Regulatory Impact Solutions

Regulatory Impact Statement

Electricity Safety (General) Regulations 2019

August 2019

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This report was prepared for Energy Safe Victoria by Regulatory Impact Solutions Pty Ltd.

VICTORIA State Government

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16 August 2019

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Director
Energy Safe Victoria
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Dear Mr Fearon

REGULATORY IMPACT STATEMENT FOR THE ELECTRICAL SAFETY (GENERAL) REGULATIONS 2019

I would like to thank your staff at Energy Safe Victoria (ESV) for working with our team on the preparation of the Regulatory Impact Statement (RIS) for the Electrical Safety (General) Regulations 2019 (the proposed Regulations), which are intended to replace the Electrical Safety (Installations) Regulations 2009 (the current Regulations) which sunset on 8 December 2019.

The *Subordinate Legislation Act 1994* (SLA) requires the Commissioner for Better Regulation to provide independent advice on the adequacy of analysis provided in all RISs in Victoria. A RIS is deemed to be adequate when it contains analysis that is logical, draws on relevant evidence, is transparent about any assumptions made, and is proportionate to the proposal's expected effects. The RIS also needs to be written clearly so that it can be a suitable basis for public consultation.

I am pleased to advise that the final version of the RIS received by us on 16 August 2019 meets the adequacy requirements set out in the SLA.

Background

The *Electrical Safety Act 1998* (the Act) is the primary legislation concerning electrical safety in Victoria. The purpose of the Act is to ensure the safety of electricity supply and use, the reliability and security of electricity supply and the efficiency of electrical equipment. In the RIS, ESV notes that while the Act establishes most of the safety obligations, some more detailed requirements are set out in regulations.

The proposed Regulations are about electrical installations and are one of a number of sets of regulations that sit under the Act. Electrical installations are any electrical appliances, wires, fittings, cables, conduits or apparatus that generate, use, convey or control electricity. For a typical house, electrical installations are all of the electrical components that are installed on the premises and any appliances that are 'hard wired' into the power supply (such as stoves and hot water systems). ESV notes in the RIS that the proposed Regulations largely continue the same requirements as the current Regulations.

ESV explains in the RIS that like the current Regulations, the proposed Regulations:

- prescribe the standards of work for electrical installations;
- prescribe the testing requirements for installations;
- establish the inspection requirements for installations;
- set the fee for Certificates of Electrical Safety (COES); and
- set out duties on parties, including duties of the public to avoid risks.

Analytical approach

In the RIS, ESV considers three broad options for regulating electrical installations:

1. the current approach of making regulations that prescribe Australia-specific, Victoria-specific and sector-specific safety standards for electrical installations, largely through adopting the national Wiring Rules;
2. self-regulation in the form of a voluntary code of conduct; and
3. adopting an alternative standard from another sector or overseas.

ESV explains in the RIS that its preferred option is the current approach as these regulations set clear and objective requirements that reduce harms associated with electrical installation work. The regulatory framework facilitates ESV's enforcement.

ESV discusses its compliance and inspection regime in the RIS. It explains that the Act requires a person responsible for electrical installation work to complete a COES and provide copies to the customer and ESV. The Regulations define what electrical installation work is 'prescribed', which means that it requires a Certificate of Inspection (inspection by a licensed electrical inspector) as part of the COES process. ESV explains the scope of prescribed work in the RIS.

Scope of prescribed work

ESV analyses three options for the scope of prescribed work in the RIS:

1. not prescribing any types of electrical installation work, which would mean that no work would require a Certificate of Inspection;
2. prescribe the same types of work as the current Regulations; and
3. prescribe more or fewer types of work than the current Regulations

ESV's preferred option is prescribing the same types of work as the current Regulations. It reached this conclusion because:

- the types of work prescribed in the current Regulations represent a higher level of risk than other types of electrical work;
- there is no clear evidence that other types of work should be prescribed because of higher risks; and
- stakeholders did not identify any types of work that should no longer be prescribed during preparation of the RIS.

The total cost of Certificates of Inspections in Victoria was estimated by ESV in the RIS to be $11.7 million per year. ESV states in the RIS that the benefits of these inspections (through reduced risks of death and injury) outweigh this cost.

Technical changes

In the RIS, ESV notes that the proposed Regulations are the same as the current Regulations, with the addition of five sets of technical changes and discusses the impacts of these changes These changes are to:

1. Clarify that any installation work carried out on a Battery Energy Storage System (BESS) must be inspected by a licensed electrical inspector if the system's nominal voltage is at least 12 volts direct current and storage capacity is at least 1 kilowatt hour. ESV estimates that this will add $50 of inspection costs to BESS installations, totalling up to $513,000 over the next decade in increased installation costs.
2. For work on energised ('live) electrical equipment, establish additional requirements based on the Australian Model Regulations for Work Health and Safety but without the need for safety observers. ESV states that the additional costs of compliance are expected to be minimal because changes primarily involve standardising good practice steps that are already taken by industry.
3. Require that high-voltage installation work be independently certified for compliance with standards. ESV estimates that this requirement will apply to about 300 installations per year. It explains that the additional costs of verification work are relatively minor for larger businesses, which do the majority of such work, and that additional costs are between $5,000 and $10,000 per installation for smaller businesses. The combined cost is estimated to total $1.134m annually over the next ten years.
4. Require low-voltage protection for all low-voltage connections to new substations to be located within the substation. Drawing on data from stakeholders, ESV explains that the cost of this change to the four Distribution Businesses (DBs) would be between $20,000 and $60,000 per substation and would apply to approximately 60 new substations per year, for a total additional cost of $1.84m per year. This cost would likely have been incurred by customers regardless. This change results in a transfer of obligations and therefore costs to DBs from customers, which are likely to be passed back on to customers.
5. Remove the requirement for private service lines to be underground in limited circumstances. (Private service lines are electrical lines connecting a building to an electrical supply located on the same property, e.g. from a powerline running through the property). Under the proposed Regulations, private service lines could be above ground provided that they are single span, constructed of aerial bundled cable and fitted with a break away device. ESV notes in the RIS that these safety measures would effectively eliminate fire ignition risks for above ground lines. ESV also notes that above ground private service lines are significantly cheaper than underground lines (about $2,500 rather than $5,600, on average).

The RIS notes that these changes in aggregate are estimated to generate an expected saving of more than $352,375 per year relative to the status quo. ESV also explains that the electrical safety benefits outweigh the costs for each of these five technical changes.

Fees for certificates of electrical safety

ESV's activities are fully funded by industry through a combination of fees for services and a levy on distribution companies. ESV uses fees for COES to cover its costs related to electrical installations.

In the RIS, ESV explains that its preferred option is full cost recovery for its electrical installation costs through fees for COES. It notes that full cost recovery would not interfere with other policy objectives such as equity.

ESV notes in the RIS that its forecast average annual costs over the next decade related to electrical installations are $11.2 million (in 2019 dollars) and that its expected revenue from COES in 2018-19 is $11.0 million. It therefore proposes to increase its fees slightly to achieve full cost recovery.

ESV's preferred option involves:

- no change to fees for electronic and paper COES for prescribed work ($32.60 and $35.50, respectively);
- no change to fees for periodic COES for non-prescribed work ($823.40); and
- a 20 per cent increase in fees for electronic and paper COESs for non-prescribed work (up to $8.10 and $8.90, respectively).

ESV notes in the RIS that fees for non-prescribed COES have been increased because they are less than one fee unit ($14.81 in 2019-20), and therefore are not automatically increased. ESV has increased these fees so that cost-recovery will be achieved on average over the next ten years.

Implementation and evaluation

ESV notes in the RIS that no substantial implementation strategy is needed for the proposed Regulations because, for the most part, the proposed Regulations continue the current arrangements and minor changes to the Regulations can be communicated through existing consultation with the electrical industry including periodic information bulletins, guidance material (printed and online), and regular engagement with stakeholders. ESV outlines in the RIS that the five technical changes discussed in the RIS would need to be communicated to industry.

ESV notes in the RIS that despite the significant impact of the regulations, it does not propose to formally review them until they are due to be remade in 2029. ESV justifies this approach as it has a number of existing mechanisms that will allow it to continuously monitor the performance of the Regulations, including regular consultation with industry. ESV proposes to use data on incidents, injuries and fatalities to continue to assess the effectiveness of the Regulations, including comparisons of Victoria's performance with that of other jurisdictions. ESV states that if required, it would propose adjustments to the regulations immediately, rather than wait for a mid-term review.

Should you wish to discuss any issues raised in this letter, please do not hesitate to contact my office on (03) 9092 5800.

Yours sincerely

Anna Cronin
Commissioner for Better Regulation
Regulation

Glossary

The Act	*Electricity Safety Act 1998*
The current Regulations	Electricity Safety (Installations) Regulations 2009
The proposed Regulations	Electricity Safety (General) Regulations 2019
AS	Australian Standard
AS/NZS	Australian Standard/New Zealand Standard
BESS	Battery Energy Storage Systems
COAG	Council of Australian Governments
COES	Certificate of Electrical Safety
DB	Distribution business
dmp	Deaths per million people
ERAC	Electrical Regulatory Authorities Council
ESV	Energy Safe Victoria
FTE	Full-time equivalent
HBRA	Hazardous bushfire risk area
HV	High voltage
LEI	Licensed Electrical Inspector
LEW	Licensed Electrical Worker
LV	Low voltage
MEC	Major electricity company
NETS	New Energy Technology Systems program
NPV	Net present value
OCBR	Office of the Commissioner for Better Regulation
OCEI	Office of the Chief Electrical Inspector
PAL	Private aerial line
PPE	Personal protective equipment
REC	Registered Electrical Contractors
RIS	Regulatory Impact Statement
UPS	Uninterruptible power supply system
VGR	Victorian Guide to Regulation
Wiring Rules	Australian/New Zealand Standard AS/NZS 3000:2018, *Electrical installations*

Executive Summary

Background

For more than a century, electricity has been an essential part of daily life in Victoria. It now powers our homes and our workplaces.

'Electrical installations' are any electrical appliances, wires, fittings, cables, conduits or apparatus that generate, use, convey or control electricity, that are fixed or to be fixed in, on, under or over any land. For a typical house or business, electrical installations are all of the electrical components that are installed on the premises, and any appliances that are 'hard wired' into the power supply.

What's being proposed?

The Electricity Safety (Installations) Regulations 2009 (the current Regulations) lapse on 8 December 2019. It is proposed that new Regulations—the proposed Electricity Safety (General) Regulations 2019—would replace the current Regulations when they lapse.

The current Regulations:

- prescribe standards for the design, construction, operation and maintenance of electrical installations
- prescribe the methods to be followed in carrying out electrical installation work
- prescribe the quality of materials, fittings and apparatus to be used in connection with electrical installations
- prescribe the testing and certification requirements for installations
- establish the inspection requirements for certain installations
- set the maximum fee for certificates of electrical safety
- prescribe certain provisions that create offences as provisions in respect of which infringement notices may be served.

The proposed Regulations largely continue the same requirements as the current Regulations, but there are a number of important changes (see below).

Why are regulations still needed?

Electricity is inherently hazardous. Electricity can cause death or serious injury through electrocution, or death, and injury or property damage through fires ignited by electricity. Electrical incidents have consequences beyond the immediate impacts on life and wellbeing. Serious injuries entail healthcare and downtime costs. Economic losses from electrical fires can be very significant.

The Victorian Government's energy policy emphasises the sustainable, secure, reliable and affordable supply of electricity and other forms of energy; and safety in the supply and use of electricity and other forms of energy. Of specific relevance to this RIS, the Government has articulated a goal of promoting, through Energy Safe Victoria, the safe use of electricity.

What options were considered?

Three broad options to achieving safety in relation to electrical installations were identified:

- Continuing the current approach of making regulations that prescribe Australia-specific, Victoria-specific and sector-specific safety standards for electrical installations, largely through adoption of the national Wiring Rules.[1]
- Self-regulation in the form of a voluntary code of conduct.
- Adopting an alternative standard from another sector or overseas.

The options were assessed against the base case (of having no regulations) using the following criteria:

- effectiveness in maintaining and improving safety
- practical and low-cost implementation
- low ongoing administrative costs for industry and government (including both one-off and ongoing costs)
- low impact on competition.

In summary, the current approach of mandating electrical safety standards was assessed as preferred. The objective of the Regulations, in relation to setting standards, is to state clear and objective requirements that aim to reduce harms associated with installation work, and assist Energy Safe Victoria (ESV) in taking appropriate enforcement action.

The primary expected benefit of the proposed Regulations is improved safety in relation to electrical installation work. Other benefits include the related protection of property from electrical fires.

Adopting the safety standards that are set out in the Wiring Rules and therefore the proposed Regulations would not be expected to change radically the behaviour of most people in the industry, as the 'base case' behaviour of those people would already be to adhere to standards broadly equivalent to those set out in the Regulations; people would do so on legal, market and psychological grounds. The current standards are seen as a reasonable minimum by industry, and therefore it is likely that only people who would otherwise do 'unsafe' work would be materially affected by mandating the standard. Although it is expected to come with some behaviour change, and therefore some compliance burdens, mandating adherence to the standards is not in itself assessed as a significant regulatory (compliance) burden, but a practical means to ensure consistency and allow ESV to respond to poor performance.

Further, ESV does not assess there to be significant consequential impacts from making the standards mandatory. The expected burden is small and inherently difficult to quantify, so this has not been attempted. To the extent that there are benefits, they would arise from greater consistency and clarity of the applicable standards, and the embedding of positive industry behaviours and conduct in line with the standards.

But in this sphere, where the risks to human life and wellbeing are so significant, even small improvements in sector-wide conduct and behaviour can have important benefits for the community as a whole. The public interest in making buildings and workplaces safe is very high. In 'breakeven' terms over the life of the Regulations, they would need to prevent just one death or serious injury to be worthwhile.

In developing the proposed Regulations, ESV also considered which types of electrical work should require an independent inspection by a licensed electrical inspector. All electrical work requires a

[1] Australian/New Zealand Standard AS/NZS 3000:2018, *Electrical installations.*

certificate of compliance and a certificate of electrical safety. Certificates of inspection are only required for certain 'prescribed' electrical work. These are typically types of installation work that represent a higher risk, and warrant additional checks before being used.

It is proposed to continue the same arrangements as the current Regulations as to which types of work require inspection, subject to the inclusion of battery energy storage system (BESS) installations (discussed below).

This will result in around 22 per cent of electrical work requiring inspection. The additional cost to the sector of these inspections, relative to a base case of no regulations, is estimated to be up to $11.7 million per year. This is a small amount, relative to the amount of electrical installation work overall. It is difficult to quantify the benefits of these particular regulations. However, using an estimated value of a statistical life of $4.6 million[2], if the additional testing and inspection requirements associated with prescribed electrical installation work prevent at least 2½ deaths per year (i.e., around 25 avoided deaths over the 10-year life of the Regulations), the benefits would outweigh the costs.

It is difficult to attribute electrical-related deaths to a specific omission in the process, nevertheless, ESV believes, based on their experience of regulating these activities, that the avoided deaths are reasonable to expect from these requirements.

It is also noted, that the benefits could also outweigh the costs if other avoided costs (injury to persons, medical and energy costs, damage to property) are also taken into account. For example, depending on the property, the prevention of a number of property fires may be enough for the benefits to outweigh the costs.

It is noted that by prescribing certain types of work that require a certificate of inspection, the Regulations reduce the amount of inspection work needed to be performed by ESV. The majority of ESV's audit activity relates to non-prescribed work as this has not been subject to independent inspection. If certificates of inspection were not required for the higher-risk work, ESV would need to employ additional inspectors to undertake more audits, and more detailed audits, of this work (or otherwise reduce the audits of current non-prescribed works).

What changes are proposed?

Specific technical options were considered, in the following five areas:

- Inspection of Battery Energy Storage Systems (BESS) installations
- Electrical work on energised electrical equipment
- Independently verifying standards compliance for high voltage electrical installation work
- Protection of low voltage electricity supplies provided from substations
- Private aerial lines.

The key details and the reasons for the changes are summarised in Table 1 below.

[2] As suggested in guidance published by the Office of the Commissioner for Better Regulations (2016), updated to 2019 values.

Table 1: Proposed technical changes to the Regulations

The proposed change	The expected cost	Why benefits are expected to outweigh costs
Ensure that electrical installation work carried out on any BESS be inspected by a licensed electrical inspector, provided that the system has: a) a nominal voltage exceeding 12 volts direct current; and b) an individual or combined rated storage capacity equal to or greater than 1 kilowatt hour including work on associated wiring systems, switchgear, control gear or accessories.	Minimal because current regulation 238(f) already requires BESS installations to be inspected; the proposed change just makes the requirement less ambiguous. The maximum annual cost impact is estimated to be $63,250, implying a total cost over the life of the Regulations of around $513,000.	Minimal or no change in compliance costs. Improved regulatory certainty and potentially improved enforcement.
Establish the new 'good practice' regulatory requirements for electrical work on energised electrical equipment, based on Model regulations but without a requirement for safety observers	The additional costs of compliance are expected to be minimal: the option would primarily involve standardising good practice steps that in large part are already taken by participants in the industry.	This type of work is especially risky, and regulatory clarity is valuable, as is consistent adoption of good practice. This change would mandate good practice elements, but not the requirement to have a safety observer for all types of work on energised electrical equipment, which is considered to be a disproportionate and unwarranted requirement.
Ensure that proposed high voltage installation work will comply with AS 2067 and AS/NZS 7000 when completed; but do not allow the designer to certify (i.e. no self-certification).	Additional inspection costs. The requirement would not apply to the repair or maintenance of a high voltage electrical installation where such a repair or such maintenance did not compromise the original design of that installation. The total additional cost is estimated to be less than $1,134,375 annually.	The current regulations do not require independent verification of compliance with standards for high voltage electrical installation work. This increases the dangers of that type of work. The proposed change would give greater independent assurance that high voltage installation work adhered to the relevant standards.
Require low voltage protection to be provided for all low voltage connections to new substations.	Additional connection costs for distribution businesses of up to $60,000 per substation. This change acknowledges stakeholder views that retrofitting low voltage protection in existing substations would be costly and difficult. The costs for the distribution businesses would likely be recovered from customers. From the perspective of society as a whole, this proposed change entails a probable net saving due to lower lifetime costs from reduced maintenance costs and better protection of equipment.	Greater safety from matching specific low voltage protection to low voltage electricity supplies and installations; better back-up protection; and safer and more practical locations of equipment.

The proposed change	The expected cost	Why benefits are expected to outweigh costs
Remove the requirement, in limited circumstances and with additional risk mitigation, that when single span private aerial lines (PALs) in high bushfire risk areas require replacement, they must be placed underground.	Reduced costs, as overhead lines plus break-away devices are less expensive than underground lines. This change entails an estimated annual saving of around $1.55 million.	This change would reduce costs and address regulatory anomalies but with a risk-targeted approach and specific risk mitigation such that safety would not be reduced.

These five changes in aggregate are estimated to generate an expected saving of more than $352,375 per year relative to the status quo. Further information on the proposed changes is set out in chapter 5 (page 27).

Fees for certificates of electrical safety

ESV is a self-funded authority. Its activities are funded through a combination of fees for services and a levy on distribution companies. In 2017-18, ESV had total operating expenses of $36.8 million; around $10.5 million of these expenses were met from revenue from the fees charged for the issue of Certificates of Electrical Safety (COES).

The fees from COES fall short of the estimated costs of ESV activities related to electrical installations. This shortfall would be around $200,000 in 2019-20, but increasing in future years. The main reason for the shortfall is that some of the fees—for COES that relate to non-prescribed electrical work—are expressed in fixed amounts and have not changed since 2014.

It is desirable to set fees that fully recover the costs of the associated activities, as this promotes efficient allocation of government resources, and achieves an equitable basis for cost recovery. In the case of ESV, this is important as all costs are recovered from industry, and costs that are fully recovered through fees will require some form of cross-subsidisation.

To achieve full cost recovery, ESV proposes the fees as shown in Table 2—these show the value of current fees as at 1 July 2019, and the proposed values once the new Regulations commence (expected in December 2019).

Table 2: Comparison of current and proposed fees

COES type	Current fee units	2019-20 fee amount	Proposed fee units	2019-20 fee amount	% change
Electronic Certificate of Electrical Safety form for prescribed electrical work	2.2	$32.60	2.2	$32.60	0%
Paper Certificate of Electrical Safety form for prescribed electrical work	2.4	$35.50	2.4	$35.50	0%
Periodic Certificate of Electrical Safety form for non-prescribed electrical work	55.6	$823.40	55.6	$823.40	0%
Non-prescribed Certificate of Electrical Safety (electronic)	-	$6.75	-	$8.10	20%
Non-prescribed Certificate of Electrical Safety (paper)	-	$7.40	-	$8.90	20%
Exemptions application fee	5.99	$88.70	5.99	$88.70	0%

The 20 per cent increase for COESs for non-prescribed electrical work reflects the increase needed to fully recover costs over the next 10 years, noting that these fees do not automatically increase each year like most other government fees. This proposed increase both makes up the current shortfall, and prevents a shortfall from reoccurring during the life of the Regulations. The new fees for these

items—which will be fixed for the life of the Regulations—is still lower than what the fees would have been now if they were automatically indexed from 2009 (see Appendix C).

In total, the proposed fees in the Regulations will generate revenue of around $11.2 million per year (in 2019 dollars), which is around $4.1 million per year higher than the default fee that would apply if there were no Regulations, and around $200,000 per year higher than the current fees in real terms.

Implementation strategy

The proposed Regulations are intended to commence in December 2019. No substantial implementation strategy is needed as, for the most part, the proposed Regulations continue the current arrangements. The minor changes to the Regulations can be incorporated within business-as-usual dealings with the electrical industry, such as periodic information bulletins, guidance material (printed and online), and regular engagement with stakeholders. The more substantial changes will be communicated to relevant industry participants through targeted communications.

Evaluating the proposed Regulations

ESV does not propose to formally review the proposed Regulations until they are due to be remade in 2029. However, ESV has a number of mechanisms that will allow it to monitor the performance of the Regulations, including regular consultation with industry participants that will enable it to identify any implementation issues or unintended outcomes and address them. ESV proposes to use data on incidents, injuries and fatalities to continue to assess the effectiveness of the Regulations, including by comparing Victoria's performance with other jurisdictions.

There may be other reviews that have indirect consequences for the Regulations in the future, such as administrative changes to ESV's regulatory approach. Specific performance indicators for the more substantial changes to the Regulations have been identified (see page 61).

Who has been consulted?

There has been extensive engagement with industry on the development of the relevant standards and how they are reflected in the Regulations. The Regulations, too, have been the subject of extensive consultation.

Engagement to date suggests that the standards and the Regulations are well targeted, and are likely to deliver a positive net benefit to the community.

The release of the proposed Regulations and this regulatory impact statement now provides a further opportunity for interested stakeholders to provide comment on any element of the proposed Regulations. All submissions will be considered before the proposed Regulations are made.

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1 Background

1.1 What are electrical installations

For more than a century, electricity has been an essential part of daily life in Victoria. Today, it powers our homes and our workplaces. Electrical products are already ubiquitous and, with the emergence of new technologies and imperatives, are becoming even more so.

'Electrical installations' are any electrical appliances, wires, fittings, cables, conduits or apparatus that generate, use, convey or control electricity, that are fixed or to be fixed in, on, under or over any land.[3] For a typical house or business, electrical installations are all of the electrical components that are installed on the premises, and any appliances that are 'hard wired' into the power supply.

1.2 Why we regulate electrical installations

Electricity is inherently dangerous. Electricity can cause death or serious injury through electrocution, or death, injury or property damage through fires ignited by electricity. Inappropriate installations can also damage appliances.

Electrical fires can be caused by faulty or incorrectly installed equipment, and by the proximity of live wires and other installations to combustible matter including flammable gasses, and materials such as timber and some forms of insulation.

Injuries caused by electricity include burns, trauma injuries, damage to tissues (from electricity entering the body), brain injuries, and organ failure, including heart attack.

The specific nature and extent of these risks is discussed in chapter 2.

These risks have been long recognised, and therefore have been subject to government legislation, in some form, for over a century.

1.3 Legislative framework

The primary legislation that currently regulates electrical safety in Victoria is the *Electricity Safety Act 1998* ('the Act').[4] The Act takes a comprehensive approach to promote end-to-end safety when dealing with electricity. The Act sets out:

- Who can be an electrical contractor or worker
- Rules for carrying out electrical work
- Standards for electrical equipment
- Requirements for electrical lines on public land and underground electrical lines
- Bushfire management requirements and electrical line clearances
- Safety management duties for major electricity companies
- Reporting of incidents
- Systems for the checking, audit, compliance and enforcement of safety requirements.

[3] The definition does not include a supply network that is owned or operated by a major electricity company. See section 3 of the Act.

[4] There are also other Acts that affect electrical safety, such as the *Electricity Industry Act 2000, Energy Safe Victoria Act 2005 and Occupational Health and Safety Act 2004.*

While the Act establishes most of the safety obligations, some of the finer details are set out in associated statutory rules (or 'regulations'), made under the Act. There are currently nine sets of regulations in place:

- Electricity Safety (Bushfire Mitigation Duties) Regulations 2017
- Electricity Safety (Bushfire Mitigation) Regulations 2013
- Electricity Safety (Cathodic Protection) Regulations 2009
- Electricity Safety (Electric Line Clearance) Regulations 2015
- Electricity Safety (Equipment Safety Scheme) Regulations 2019
- Electricity Safety (Installations) Regulations 2009
- Electricity Safety (Management) Regulations 2009
- Electricity Safety (Registration and Licensing) Regulations 2010.

The proposed Electricity Safety (General) Regulations 2019 (the subject of this RIS) would replace the Electricity Safety (Installations) Regulations 2009 (the current Regulations), which are due to lapse on 8 December 2019. The current Regulations:

- prescribe the standards of work for electrical installations
- prescribe the testing requirements for installations
- establish the inspection requirements for installations
- set out duties on parties, including duties of the public to minimise risks.

Some standards for electrical safety (such as the Australian 'Wiring Rules') are developed at the national level, although they only become a formal requirement in Victoria where they are formally incorporated into the Victorian legislative requirements, usually by reference in regulations.

1.4 Energy Safe Victoria

Following a review of Victoria's energy safety regulators, Energy Safe Victoria (ESV) was created in 2005 through the merger of the former Office of the Chief Electrical Inspector (OCEI) and the Office of Gas Safety.

The rationale was to establish a single, integrated, energy safety regulator and to streamline its work and improve efficiency, without compromising the high-quality safety outcomes achieved by its predecessor organisations.

ESV is an independent statutory authority responsible for electricity, gas and pipeline safety in Victoria. A technical regulator, it licenses electricians; manages the Certificate of Electrical Safety Program; conducts community safety campaigns; ensures electrical and gas products are approved and safe for use; and investigates gas and electrical incidents.

ESV's role is broad and ranges from accepting industry's safety cases and safety management schemes for the design, construction and maintenance of electricity, gas and pipeline networks across the state, to enforcing standards and administering regulations covering gas and electrical appliances and installations, pipelines and energy efficiency.

In relation to electrical installations, ESV's objectives include:

- ensuring the safety of electrical generation, transmission and distribution systems, electrical installations and electrical equipment
- controlling the safety standards of electrical work.

Of particular relevance to this RIS, ESV performs a number of regulatory functions in relation to electrical installation work. ESV employs staff who:

- handle complaints relating to electrical installation work
- carry out investigations and prosecutions arising from complaints and incidents
- respond to electrical installation incidents involving injury or death, or damage to property
- undertake electrical installation safety-related advocacy and awareness raising at industry fora.

ESV is led by the Director of Energy Safety (the Director), who is appointed under the *Energy Safe Victoria Act 2005*. This Act is administered by the Minister for Energy, Environment and Climate Change, the Hon. Lily D'Ambrosio.

ESV's activities are fully funded by industry, through a combination of fees for services and a levy on distribution companies. In 2017-18, ESV had a total income from transactions of $38.1 million. This was made up of:

- $22.8m (55 per cent) from levies on distribution companies ($8.9m from electricity companies)
- $16.9m (44 per cent) from fees for services
- $0.4m (1 per cent) for other income (such as interest).

Around 62 per cent of ESV's income from fees ($10.5m) came from the fee for Certificates of Electrical Safety, the fee for which is included in the proposed Regulations and is examined in this RIS.

1.5 Industry context

The Act and the current regulations define the key participants in the industry in connection with electrical installations:

- electricity suppliers
- licensed electrical installation workers
- Registered Electrical Contractors (REC)
- Licensed Electrical Inspectors (LEIs)
- owners and operators of high voltage and complex electrical installations
- owners and operators of railway supply networks and embedded networks
- owners and occupiers of patient treatment areas
- electricity suppliers and metering providers.

In 2017-18 there were over 30,000 Licensed Electrical Workers (LEWs) and registered contractors, who carried out work on over 735,000 electrical installations.

A national profile of the electrotechnology industry is shown below. The scope of this industry includes the design, maintenance, installation and repair of all electrical and electronic equipment. The scope traverses several sectors including mining, manufacturing, ICT and communications, construction, renewables, domestic and commercial refrigeration and air-conditioning. The electrical services industry (a subsector within electrotechnology) involves work by electricians, such as work on electrical wiring and fittings in buildings and other construction projects; and repair and maintenance of existing electrical equipment and fixtures.

Table 3: Electrotechnology industry data[5]

Metric/indicator	Level
Workforce	Almost 340,000
Revenue	$87.1 billion
Profit	$11.73 billion
Average annual wage	$72,493
Number of businesses	53,649
Forecast employment growth (%, 2018 to 2023)	5.0 per cent

Source: Australian Industry Standards, Electrotechnology Industry Reference Committee, Skills Forecast, Key Findings Discussion Paper 2018; drawing on data from the Australian Bureau of Statistics and IBISWorld.

Key sector trends over the past five years include:

- greater use of battery power
- wider use of solar power and panels, particularly in households
- power over ethernet and other IT-related electrical technologies
- other economic and technological trends that are changing how people and businesses use electricity.

The adoption of solar panel and battery arrays is enabling traditional consumers of power to now generate, store and trade their own electricity. Australia has one of the world's highest rates of rooftop solar PV systems and integration of photovoltaic systems with home battery storage.

Power over Ethernet is becoming widely used to support scalability of networks through the transmission of power through network cables. These networks include video, point-of-sale devices, security access control, building automation and lighting and industrial automation.

New products and services in process and home automation are regularly coming to market. Packaged home automation systems are now being offered that include smart plugs, door, window and motion sensors to conserve energy and finely control household devices. Industrial process automation services and devices are also becoming commonplace.

Further specific trends, including in relation to solar power and battery storage, are discussed in later sections of this RIS.

1.6 The purpose and structure of this RIS

The *Subordinate Legislation Act 1994* requires that all statutory rules in Victoria automatically lapse after ten years. This is to ensure that the need for continued regulation is regularly re-examined and regulations remain fit for purpose.

Accordingly, the Subordinate Legislation Act requires that proposals for regulations that impose a 'significant economic or social burden on a sector of the public' must be formally assessed in a Regulatory Impact Statement (RIS), whether for new regulations or replacing existing ones. The RIS assessment process aims to ensure that the costs of the regulations are outweighed by the benefits, and that the regulatory proposal is superior to alternative approaches.

The Electricity Safety (Installations) Regulations 2009 lapse on 8 December 2019. This RIS is being prepared to facilitate public consultation on the proposed Electricity Safety (General) Regulations 2019, which will replace the current Regulations.

[5] Scope is nationwide and includes Fire and Security Alarm Installation Services, Electrical Services, Elevator Installation and Maintenance, Computer and Electronic Equipment Repair, Wired Telecommunications Network Operation, Domestic Appliance Repair and Maintenance, Air Conditioning and Heating Services, Telecommunications Services.

As required by the Subordinate Legislation Act, the assessment framework of this RIS:

- examines the nature and extent of the problem to be addressed
- states the objectives of the proposed Regulations
- explains the effects on various stakeholders
- assesses the costs and benefits of the proposed Regulations, and compares their impacts to other feasible alternatives.

Reflecting the scope of the proposed Regulations, this RIS is set out in the following sections:

- **Chapter 2** outlines the problem being addressed by the proposed Regulations—that is, the reasons for setting standards for electrical installation work, options, and the preferred approach based on an assessment of costs and benefits of the feasible options (page 6)
- **Chapter 3** states the objectives of the proposed Regulations (page 13)
- **Chapter 4** outlines assesses the various approaches to regulating electrical safety work and the costs and benefits of these approaches, as well as the means to ensure compliance (page 15)
- **Chapter 5** examines proposed specific technical changes to the Regulations (page 27)
- **Chapter 6** is concerned with determining the appropriate fee for Certificates of Electrical Safety (page 53)
- **Chapter 7** outlines the intended approach to enforcement, implementation and review of the proposed Regulations (page 60).

This RIS adopts a two-step analysis for assessing the content of the proposed Regulations:

- Step 1 (chapters 2 to 4) is a decision on the general approach to how electrical safety should be regulated (or not),
- Step 2 (chapter 5) is a number of smaller decisions on whether and how to change or reform the technical elements of the current requirements.

2 The problems addressed by the Regulations

2.1 The problems sought to be addressed

Electricity is inherently hazardous. The main hazards are:

- proximity to or contact with live lines and parts (including batteries) can cause electric shock and burns
- electrical installations (with and without faults) can be the source of ignition for fires and explosions.

Electric shock accidents and electrical fires in homes, workplaces and elsewhere present a major health and safety risk to people. In the extreme, electrical accidents can cause death. (Formally, the Electrical Regulatory Authorities Council defines a 'fatal electrical incident' as any fatal event that results from an electrical shock, electrical burn or electrical arc burn except if linked to the initial event of a natural disaster, criminal activity or suicide.)

When working with electricity, safety is paramount. Exposure to electricity can result in a range of injuries, including:

- damage to the cardiovascular system (e.g. rhythm disturbances)
- skin injuries and burns
- nervous system disruption
- respiratory arrest
- head injuries, fractures and dislocations caused by being thrown due to the severe muscle contractions induced by the current.

The severity of electrical injury varies according to the strength of the current, the method of transmission (direct or indirect), the point at which electricity enters and leaves the body, the pathway the current takes through the body, and the physical conditions under which the event takes places.

Electrical incidents have consequences beyond the immediate impacts on life and wellbeing. Serious injuries entail healthcare and downtime costs. Incidents also involve damage to property. Economic losses from electrical fires can be very significant.

Construction industry: electrical safety snapshot

The construction industry includes building-related electrical installation work, which is a key area of risk for electrical workers.

According to the Safe Work Australia construction industry snapshot (June 2018)[6]: Construction and mining labourers accounted for the highest proportion of worker fatalities (22 per cent or 27 fatalities over the four-year period), followed by electricians (11 per cent or 14 fatalities), bricklayers, carpenters and joiners (8 per cent or 10 fatalities) and mobile plant operators (8 per cent or 10 fatalities).

2.1.1 Incident data

The latest Electrical Regulatory Authorities Council (ERAC) report covers the 12-month period from 1 July 2017 to 30 June 2018. It is based on details of incidents reported to electrical safety regulators in Australia and New Zealand. In summary, five electrical deaths from five incidents were recorded in Australia and New Zealand in 2017-18. This is equivalent to 0.20 deaths per million people (dmp)

[6] https://www.safeworkaustralia.gov.au/doc/construction-priority-industry-snapshots-2018.

which is 0.14 dmp lower than the prior year. All of the five deaths occurred in Australia; three of them in Victoria. The ERAC results are summarised in the following table.

Table 4: Incidents 2017-18 (Australian and New Zealand) by source

Type	Incidence	Affected persons
Distribution-network-related deaths	There were two deaths caused by electrical accidents: contact with overhead line, by a member of the public and by a non-electrical worker respectively	Of the five people in total who were electrocuted, 80% (four of the five) were either non-electrical workers, or members of the general public.
Customers' installations, appliances or equipment	There were three deaths caused by separate incidents: two of these involved misuse or interference with equipment or wiring	

About 90 per cent (111 of 123) of the number of deaths associated with the electricity supply network from 2000-01 to 2017-18 (the last 18 years) involved contact with overhead electrical conductors (power lines).

Table 5 presents data on the number of deaths and serious injuries arising from electrical accidents in Victoria since 2003-04 (in 2001-02 it became mandatory for electrical safety switches to be installed to both the power and lighting circuits of new residential dwellings, and in established dwellings where significant electrical work was undertaken). To adjust for Victoria's rising population, the table also shows death and serious injuries per million people.

Over this period, there have been 40 deaths and over 700 serious injuries in Victoria. While there is no apparent trend in the number of electrical-related fatalities since 2003-04, there has been a marked downward trend in the number of serious injuries.

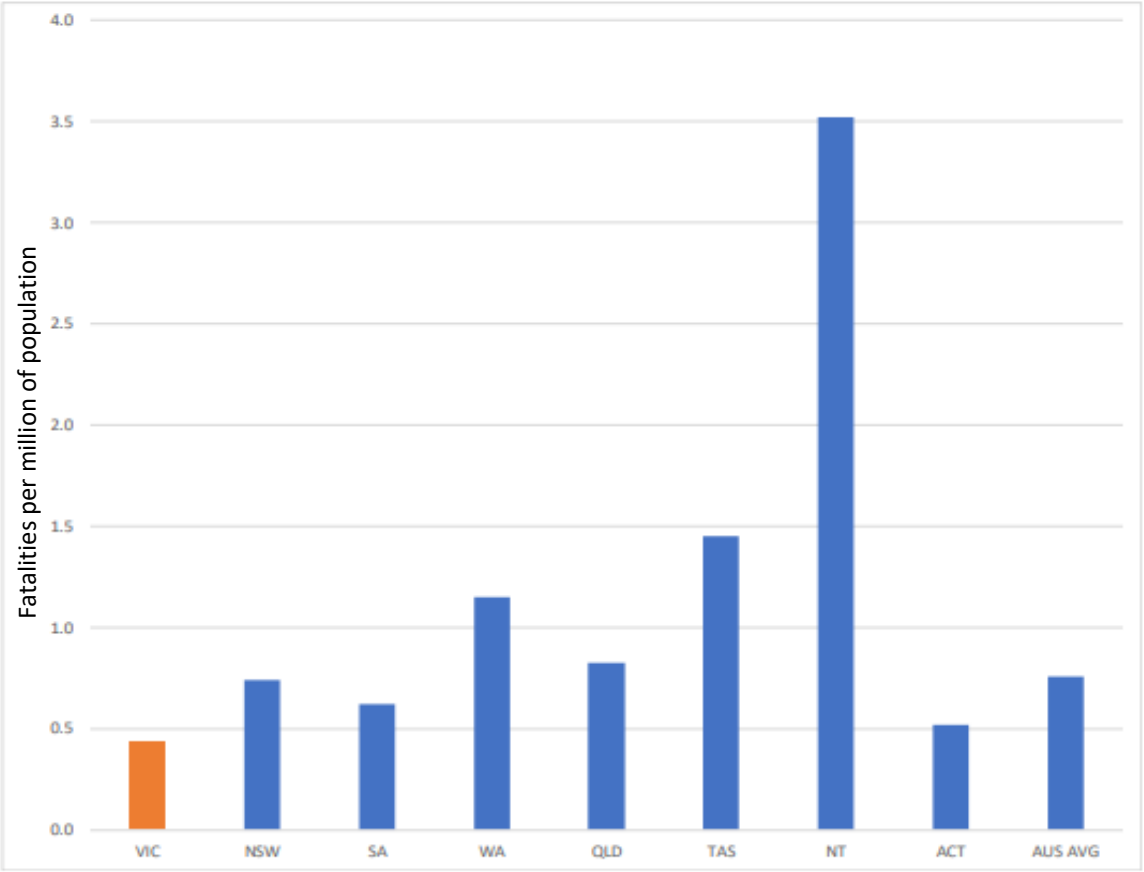
Table 5: Number of deaths and serious injuries from electrical accidents in Victoria since 2003-04

	Deaths	Serious Injuries	Deaths per million people	Serious Injuries per million people
2003-04	1	138	0.20	28.01
2004-05	1	156	0.20	31.37
2005-06	6	67	1.38	13.24
2006-07	2	44	0.78	8.54
2007-08	1	69	0.19	13.13
2008-09	1	56	0.19	10.42
2009-10	9	45	1.83	8.24
2010-11	4	37	0.72	6.68
2011-12	1	40	0.18	7.08
2012-13	1	38	0.17	6.58
2013-14	2	9	0.34	1.53
2014-15	1	9	0.17	1.49
2015-16	5	7	0.81	1.13
2016-17	2	7	0.32	1.11
2017-18	3	2	0.46	0.31
Total	**40**	**724**		

Note: Excludes wilful events. *Sources: ESV, ABS.*

The following figure compares the electrical safety performance of each jurisdiction in Australia, as measured by the average number of electrical fatalities per million of population over the period from 2001-02 to 2017-18. It reveals that Victoria has the lowest rate of electrical death in Australia over this period.

Figure 1: Interjurisdictional comparison of electrical deaths, 2001-02 to 2017-18



Sources: ESV, Electrical Regulatory Authorities Council, Australian Bureau of Statistics

2.1.2 Trend analysis

ERAC analysed electrical fatality information from the past 18 years (2000-01 to 2017-18) for trends and frequency. In summary, ERAC found:

- electrical deaths continued to show a decrease from an average (three years) of 1.79 deaths per million people (dmp) in 2000-01 to 0.39 in 2017-18. The average rate of reduction was 0.08 dmp per year.
- in Australia, the reduction was from 1.87 to 0.43 (0.08 per year) dmp, while for New Zealand the reduction was from 1.39 to 0.14 (0.07 per year).
- the highest proportion of electrical deaths associated with electricity networks were as a result of working on or near energised overhead conductors: 90% (111 of 123) of electrical deaths associated with electricity supply networks involved overhead conductors.
- consumer appliances and equipment were involved in a little over twice (250) the number of deaths than the electricity supplier assets (123). There was large variation in the number of deaths involving consumer equipment from one year to the next, compared to deaths involving electrical supplier assets. The dmp continued to decline over the 18 years for both consumer and supplier assets.

The following figures from ERAC provide a breakdown of the electrical deaths according to the states and territory; and by category of victim. The figures show that, while deaths have broadly declined over the past two decades, there are significant differences in the location and nature of the fatal incidents.[7]

Figure 2: Number of electrical deaths in Australia and New Zealand

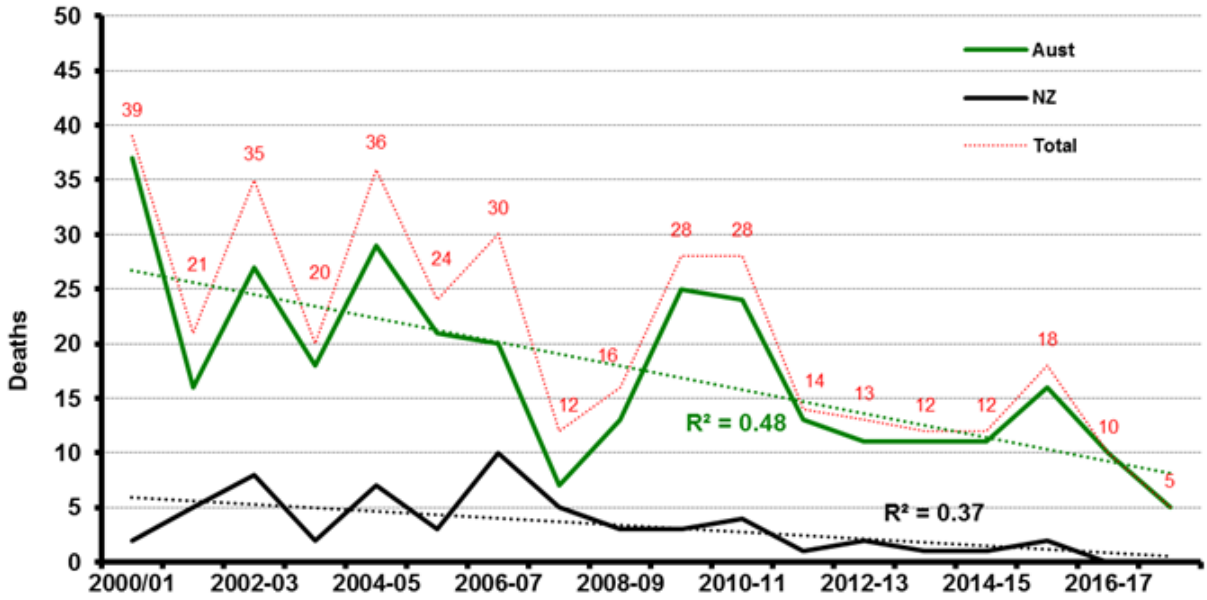
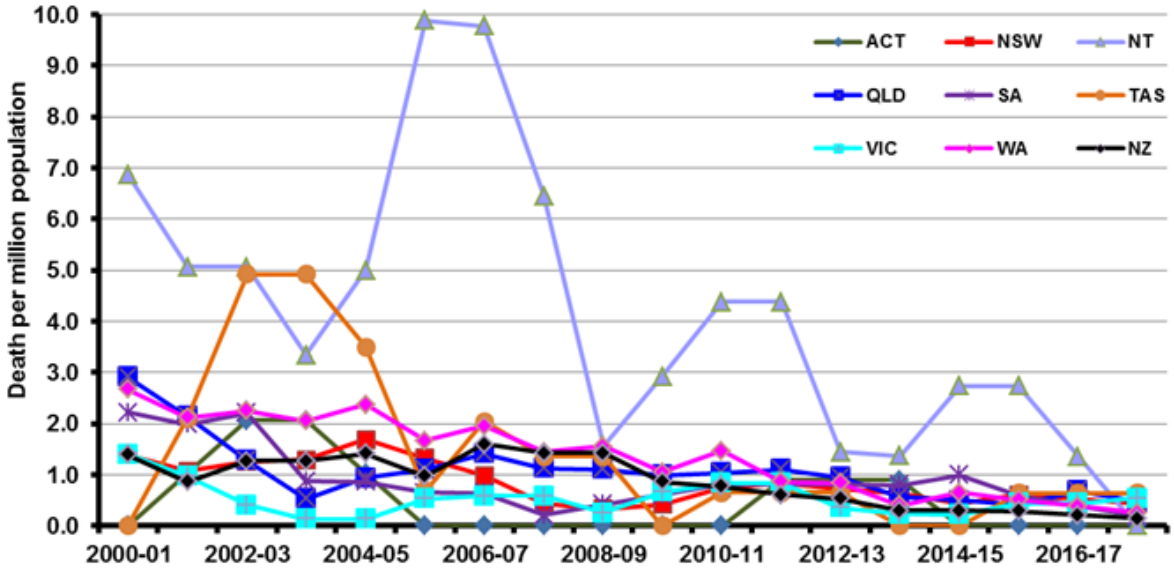
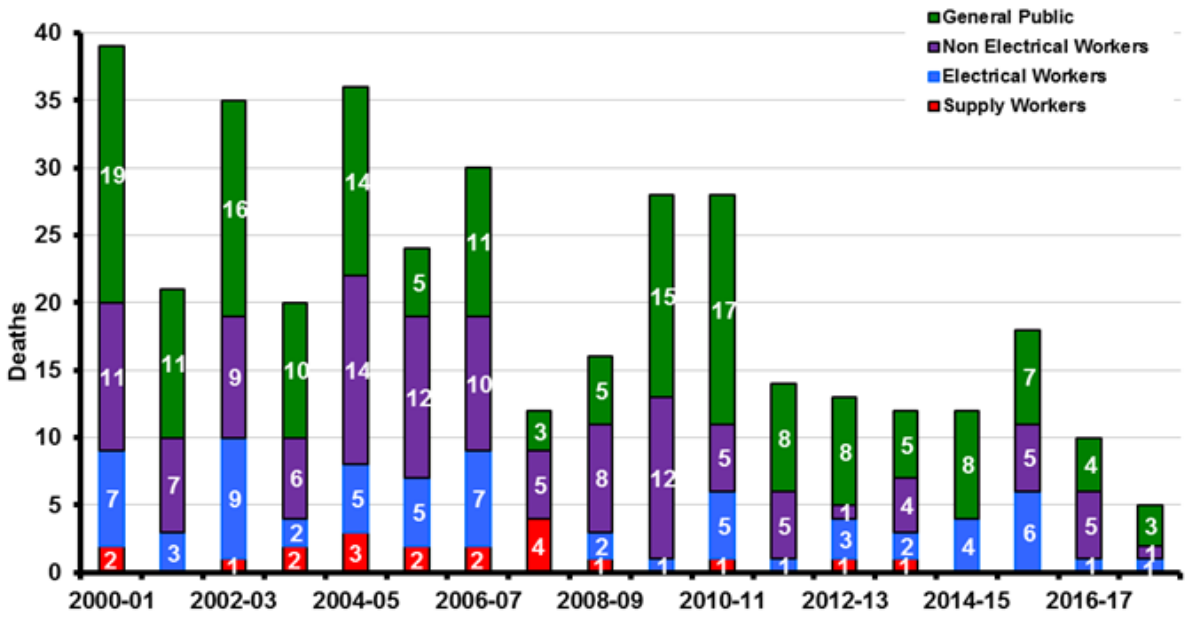


Figure 3: Trends in electrical deaths by state/territory, Australia and NZ (three-year moving average er million people)



[7] Source of figures: Electrical Regulatory Authorities Council, Electrical Fatal Incident Data, Australia & New Zealand 2017–2018, Item 2.9.

Figure 4: Electrical deaths classified by category of victim



2.1.3 ESV audit data

Based on ESV data, of approximately 60,000 electrical installation audits conducted each year, there are approximately 4,000 detected non-compliances, representing a defect rate of around an 8 per cent. The identified defects range in scale and severity.

2.2 The costs of regulating electrical installation work

ESV is a self-funded authority. Its activities are funded through a combination of fees for services and a levy on distribution companies. In 2017-18, ESV had total operating expenses of $36.8 million; around $10.5 million of these expenses were met from revenue from the fees charged for the issue of Certificates of Electrical Safety (COES).

2.2.1 The principle of cost recovery

All government activities involve a cost. Cost recovery is a method of recovering all or some of the cost of particular activities undertaken by government agencies from individuals or businesses, based on the beneficiary pays[8] or impactor pays[9] principle. The concept 'user pays' is used to capture both situations.

The task of setting fees or charges involves determining whether to recover costs directly from users or others who benefit from the service being provided, those whose actions give rise to the need for the activity, or taxpayers more generally. Whether costs should be user pays or more generally funded by taxpayers will depend on the type of activity and the existence of any public benefits.

The Victorian Government's *Cost Recovery Guidelines* apply to the question of cost recovery of the following activities:

- Government provision of a good or service e.g. issuing a birth certificate, certificate of title, or a working with children check; or providing access to land valuation data

[8] Those who benefit from the provision of a particular good or service should pay for it (Productivity Commission, 2001, p. XXI).

[9] This is where impactors (the party that gives rise to the need for regulation) meet the full costs of their actions, based on the view that those who create the need for a service should incur these costs.

- Regulatory activities e.g., registration, licensing, approvals, issuing of permits, and compliance and enforcement.

There are costs associated with ESV undertaking its regulatory activities in relation to electrical installations. The need for these activities arises because of the framework established in the Act, which permits registered contractors and licensed electricians to undertake electrical installation work, subject to the inspection and audit regime set out in the Act. It is the activities of the electrical contractors and workers that give rise to the need for ESV's inspection and enforcement activities.

If the cost of ESV's activities are not adequately recovered through fees, the cost would need to be met from taxpayers generally through the state budget, or, under the ESV funding model, from other parties[10] not directly connected to the provision of electrical installation services. This raises a number of problems:

- No cost recovery for these ESV activities from those that use the services could lead to higher demand for these activities, leading to higher than optimal costs. This is likely to be an inefficient use of government resources, as there is no price signal to reflect the cost of each activity.
- No cost recovery may be unfair, in that all taxpayers or other parties pay for the activities even though they do not directly benefit from the activities. This is a failure to achieve what is known as 'horizontal equity'.

On the other hand, cost recovery promotes the efficient allocation of resources by sending the appropriate price signals about the value of all the resources being used in the provision of government goods, services and/or regulatory activity. From a horizontal equity point of view, cost recovery ensures that those that have benefited from government-provided goods and services, or those that give rise to the need for government regulation, pay the associated cost. Those parties that do not benefit or take part in a regulated activity do not have to bear the costs.

Arguably, the need for ESV's activities is ultimately not driven by electricians themselves, but by their customers who create the demand for electrical installation services. However, the cost recovery principles assume that levying fees on a regulated party are ultimately reflected in the price charged to customers, and hence are an effective price signal, compared to raising funds from taxpayers generally whether or not they use any electrical installation services.

The proposed Regulations address the problems of inefficient resource allocation and lack of horizontal equity that are consequences of no cost recovery by setting fees for COESs.

The fees for COESs are designed to raise revenue to fund ESV's activities related to the safety of electrical installations.

These activities are required to fulfil ESV's statutory role to:

- ensure the electrical safety of electrical installations and electrical equipment
- control the electrical safety standards of electrical work carried out by electrical workers
- maintain public and industry awareness of electrical safety requirements.

The following table sets out the fees in 2018-19 and the expected revenue to be generated.

[10] For example, without charging fees for COES, ESV (as a self-funded agency) would need to increase its other fees or levies, which would most likely be major electricity companies (MECs).

Table 6: COES revenue from current fees (2018-19)

COES type	Current fee (fee units)	Fee in 2018-19	Number	Revenue ($'000)
Electronic COES for prescribed electrical work	2.2	$31.79	93,120	$2,960
Paper COES for prescribed electrical work	2.4	$34.68	88,408	$3,068
Electronic COES for non-prescribed electrical work	NA*	$6.75	310,189	$2,094
Paper COES for non-prescribed electrical work	NA*	$7.40	341,935	$2,530
Periodic Certificate of Electrical Safety form for non-prescribed electrical work[11]	55.6	$803.42	415	$334
TOTAL				**$10,986**

***** *Prescribed fees are not tied to the Monetary Units Act 2004 as the fee is less than one fee unit under the Act.*

The fees for COES prescribed in the Regulations are a maximum fee (i.e. ESV can charge any amount that does not exceed the prescribed amount).[12] ESV generally charges a fee at the prescribed maximum, however use of a maximum allows some flexibility to respond to exceptional circumstances. For example, following Black Saturday, COES were provided free to restore power to victims.

[11] Periodic certificates allow organisations that have a large number of separate electrical works carried out to provide a single certificate for all works completed within a 3-month period. Typically, this is only used by very large companies.
[12] See section 45B of the Electricity Safety Act 1998.

3 Objectives of the proposed Regulations

3.1 Policy context

The Victorian Government's energy policy emphasises the sustainable, secure, reliable and affordable supply of electricity and other forms of energy; and safety in the supply and use of electricity and other forms of energy. Of specific relevance to this RIS, the Government has articulated a goal of promoting, through Energy Safe Victoria, the safe use of electricity. That goal is expressed in ESV's mission and vision.

ESV's mission

We protect and assist the community by:

- working co-operatively and in consultation with the industry and community to facilitate safety outcomes
- developing and communicating safety and efficiency requirements and programs
- monitoring, auditing, and enforcing compliance with the requirements
- administering licensing, registration and approval systems that maintain safety standards and skills.

ESV's vision is:

- Victoria will be a state where the community, industry and regulators share a strong commitment to the safe and efficient supply and use of electricity and gas. There is a similar commitment for pipeline safety.
- To ensure their safety, the community and industry will demand that work involving electricity and gas is carried out only by workers who are skilled and appropriately trained. The industry workforce will have numbers sufficient to deliver community requirements into the future.
- ESV will be nationally respected and recognised as a leader in safety regulation that facilitates safety and efficiency outcomes through strong communication and consultation, clear regulation, and fair audit and enforcement activities. These activities will be carried out by a highly skilled, professional and adaptable regulatory team who are leaders in their field, and are able to explain their actions and decisions.
- Safety and efficiency will be delivered within a framework that is cost effective and fair for all parties. This framework will be consistently and openly communicated to the community and industry.
- This will create a safer state for the benefit of all Victorians.

The Victorian Government is encouraging the adoption of household solar and battery systems, including through the Solar Homes Initiative, which offers a 50 per cent rebate to eligible households on the installation of residential battery storage systems. Public safety considerations are emphasised in this program, which includes funding to train and accredit electricians as installers of solar and battery systems that meet safety standards. The Minister has asked ESV to give particular attention to battery system and solar system safety in the performance of its regulatory roles.[13]

[13] For further information on solar safety and quality assurance, see: https://www.solar.vic.gov.au/Quality-Assurance.

3.2 Legislative objectives

The regulatory objectives must give effect to the objectives of the *Electricity Safety Act 1998*, which are to ensure:

- the safety of electricity supply and use
- the reliability and security of electricity supply
- the efficiency of electrical equipment.

3.3 Objectives of the proposed Regulations

Taking into account the nature and extent of the 'problem' outlined in chapter 2, the objectives of the legislation, and the government's policy intentions, the objectives of the proposed Regulations are to:

- improve electrical safety for the general public, electricity customers and electrical workers
- ensure that all electrical installation work is undertaken only by qualified persons
- ensure completed electrical work is available to be audited for compliance
- educate the industry
- promote efficiency and horizontal equity in the recovery of the costs of ESV compliance and enforcement activities related to electrical installations.

4 Identification and assessment of options for regulating electrical installations

4.1 Assessment of broad options

As noted above, we have adopted a two-step analysis for this part of the RIS, where step 1 is a decision on the general approach to how electrical safety should be regulated (or not), and step 2 is deciding whether and how to change or reform the technical elements of the current requirements. This chapter relates to step 1. Step 2 is set out in the following chapter.

The following broad options were identified:

- Status quo (mandating Australia-specific, Victoria-specific and sector-specific safety standards for electrical installations)
- Self-regulation in the form of a voluntary code of conduct, possibly supported by a public information campaign
- An alternative standard from another sector or from overseas.

The three broad options were assessed against a 'base case' of having no Regulations made. The options were assessed according to criteria based on the statutory objectives. The criteria relate to safety, competition and financial costs. Specifically, the criteria are:

- effectiveness in maintaining and improving safety
- practical and low-cost implementation
- low ongoing administrative costs for industry and government (including both one-off costs and ongoing costs)
- low impact on competition.

4.1.1 The base case

In order to complete step 1, this subsection describes the base case, i.e., the situation without the Regulations. In a world without the Regulations, a variety of serious harms would exist. These stem from the inherent risks associated with electricity, and they include:

- death and serious injury from electric shock, including from energised ('live') equipment and contact with distribution and transmission lines
- risks from explosion and fires, including death and injury risks, and major damage to property.

There are important mitigations, however, regarding the impact of not replacing the Regulations.

In the absence of the Regulations (i.e. if the current Regulations were allowed to lapse with no replacement), work on electrical installations would not become completely inconsistent or unregulated. Even in the absence of the Regulations, the risks associated with electrical installations would be addressed somewhat by a number of legal, market and psychological factors, as detailed below:

- General safety requirements in the Act: The *Electricity Safety Act 1998* sets out general obligations to ensure the safety of electrical installations.
    - For example, under section 43 of the Act, a person must not install any electrical equipment if the person knows or should reasonably be expected to know that the electrical equipment is unsafe or will be unsafe if connected to an electricity supply, or the installation will make any other electrical equipment unsafe if connected to an

electricity supply, or the installation will make a building or structure unsafe if that building or structure is supplied with electricity.

- In addition, a person carrying out electrical installation work must ensure that all electrical circuits or electrical equipment handled in the course of that work are disconnected from the electricity supply, or adequate precautions are taken to prevent electric shock or other injury in the handling of electrical circuits or electrical equipment in the course of that work.

ESV enforcement officers may give rectification notices where they consider an electrical installation does not meet the requirements of the Act.

- Specific requirements in the Act: There are other elements under the Act that would continue to promote safety and/or allow ESV to take action to manage safety risks. For example, electrical workers would still be required to be licensed under the Act, which would continue to:
  - include qualification and experience requirements
  - allow ESV to attach conditions on a licence
  - allow ESV to stop a worker from working on electrical installations in various circumstances, including negligence or incompetence in carrying out electrical work.
- Other legal and commercial factors including consumer law, common law and reputational pressure: There are likely to be commercial and other legal incentives to ensure electrical work is safe (e.g. reputational impacts, tort of negligence), as well as other consumer legislation (e.g. Australian Consumer Law) that would require electrical work to meet an appropriate standard of quality. Further, there are duties on the occupiers of certain premises (to ensure the premises are safe) and on people carrying out building work.
- Training and professional development: Electrical industry workers subject to registration and licensing requirements would still undertake training and professional development, and this would include instruction in aspects of safely working on electrical installations.
- Industry practices and inertia: Electrical work has been regulated for a long time in Victoria. Industry practices have embedded safety principles that would substantively continue, at least for the short term, although they may decrease incrementally over time.
- Psychological factors: Most people working on electrical installations would have an understanding, at least in part, of the risks involved and the need to take reasonable care, in the interests of personal safety as well as the safety of other workers, consumers and residents.

To some extent, these mitigating factors are consistent and mutually reinforcing. Together, they mean that the difference between the base case and the status quo is not the difference between a wholly safe and a wholly unsafe scenario.

4.1.2 Option 1: Status quo (the Regulations based on Australian standards such as the Wiring Rules)

Despite the mitigations in the base case scenario, there are residual harms that the Regulations would seek to address. The proposed Regulations:

- prescribe the methods to be followed in carrying out electrical installation work
- prescribe the quality of materials, fittings and apparatus to be used in connection with electrical installations
- provide for inspection of prescribed electrical installation work
- provide for the testing and certification of electrical installation work

- prescribe standards for the design, construction, operation and maintenance of electrical installations
- provide for the protection of persons from risk, and property from damage, associated with the generation, transmission, distribution and use of electricity
- prescribe certain provisions of the Regulations that create offences as provisions in respect of which infringement notices may be served.

The Regulations are concerned with achieving the desired safety outcomes. The Regulations are based in large part on mandating relevant electricity safety standards, and particularly the nation-wide Australian/New Zealand Standard AS/NZS 3000:2018, *Electrical installations* (the Wiring Rules), which are the relevant Australian standard for electrical installation work. Standards Australia is the body responsible for standards development nationally. The Wiring Rules committee contains technical experts and representatives from manufacturers, installers, regulators and consumers.[14]

ESV has technical representatives on all committees involved with the writing and review of the Wiring Rules. Key Victorian stakeholders are also consulted and represented. The Rules therefore have a high degree of industry buy-in and they are effectively an industry standard. The Rules are revised approximately every five years, and they can be amended at any time as issues are identified or new technologies need to be included. The Rules were last revised in 2018.

Standards Australia requires that the rules must meet a net public benefit test prior to being approved. This is consistent with other national standards development processes, and involves considering the likely net benefits of potential revisions and additions to the rules.

Where appropriate, the Regulations permit alternative compliance pathways, including scope to seek exemptions.

In light of the mitigations in the base case scenario, the risks of harm associated with electrical installations in the absence of the proposed Regulations are likely to be moderate in their incidence. (In other words, without regulation, the number of incidents is likely to increase moderately.) Nevertheless, given the risks associated with electrical installations and related work, and the potentially high impact of any incident, any increase in the number is to be avoided, and there are likely to be benefits from adopting consistent standards. Prescribing suitably conceived standards would:

- act as an 'additional line of defence' against unsafe installations (over and above the mitigations in the base case) by establishing clear and consistent standards based on industry good practice
- provide a clear and objective basis for industry to demonstrate compliance
- reduce costs for industry by providing certainty
- make it easier for ESV to take appropriate actions to remedy unsafe installations by referencing more specific standards than the general obligations in the Act
- establish offences as a basis for investigative and enforcement actions.

Another potential difference between the base case and the status quo relates to rigidity and flexibility. Over time, there may be changes in practices if the standards were not mandated. However, there is also a degree of flexibility in the standards. In the interests of safety, the standards and regulations change over time to reflect the emergence of new technologies and new safety practices. There is also scope within the regulations to permit innovation and the adoption of different practices, including via the exemptions process.

[14] For details see: http://www.sdpp.standards.org.au/ActiveProjects.aspx?SectorName=Electrotechnology and Energy&CommitteeNumber=EL-001&CommitteeName=Wiring Rules#simple2.

4.1.3 Option 2: Self-regulation against a voluntary code

Self-regulation against a voluntary code is another broad option. Such a code would be industry-developed and not subject to government enforcement. It could be supported by a public information campaign.

This option was not assessed as desirable because, in summary:

- it would reduce clarity and consistency of standards and conduct in the industry
- it would increase risk, such as where 'rogue operators' chose not to adhere to the code, without enforcement consequences
- the small potential reduction in administration and compliance costs would be more than offset by greater risk to life and property.

4.1.4 Option 3: Adopting an alternative standard from overseas or another sector

With respect to the option of adopting an alternative standard from elsewhere, that too was not assessed as desirable as, in summary:

- it would lose the benefit of tailoring the standard to relevant risks for electrical installations and related work in the local context, i.e. tailoring to the Australian and Victorian contexts compared to a jurisdiction from overseas (which may have different risks and industry practices); and tailoring to the electrotechnology sector, which has unique risks compared to, say, general construction or manufacturing
- it would lose the benefit of the deep involvement of local industry participants in the development of the standard and how it is reflected in the regulations; this deep involvement increases industry buy-in and helps ensure the standards and the regulations are up-to-date and relevant, and that unnecessary costs are avoided
- the additional risk from a potentially misunderstood or mismatched standard would materially outweigh the potential reduction in administrative costs.

4.2 Overall assessment of options

In light of the legislative objectives, this RIS assesses relevant options against criteria relating to safety, competition and financial costs. Specifically, the options were scored 'high', 'medium' or 'low' relative to the following criteria (which reflect the legislative objectives):

- effectiveness in maintaining and improving safety
- practicality and cost of implementation for industry and government
- administrative costs for industry and government (including both one-off costs and ongoing costs)
- impact on competition.

Table 7: Assessment of regulatory options

Criterion/ Option	1. Effectiveness in maintaining and improving safety	2. Practicality and cost of implementation for industry and government	3. Administrative costs for industry and government (one-off and ongoing)	4. Impact on competition
Status quo: mandating safety standards for electrical installations	**High**: Clear and consistent standards are a 'line of defence' that helps mitigate the residual harms not otherwise addressed.	**High**: This option involves adopting relevant provisions from a national standard, rather than reinventing them. Provides a clear and objective basis for industry to demonstrate compliance. Reduces costs for industry by providing certainty.	**Low**: The cost of compliance is only incrementally higher than the base case. Standards make it easier for ESV to take actions to remedy unsafe installations. Standards establish offences as a basis for investigation and enforcement. The standards can adjust to new technology and industry practices.	**Low**: Minimal measurable difference in impact on competition between this option and the base case. Industry involvement in development of the standard leads to potential innovation.
Self-regulation in the form of a voluntary code of conduct	**Medium**: This option has the benefits of an explicit standard, but the code's non-binding nature would lead to wider diversity of conduct in the industry. It would increase risk where rogue operators chose not to follow the code.	**Medium**: Some additional costs in developing a new code, different from national standards.	**Medium**: Some additional costs from maintaining a voluntary code, different from national standards. The potential for cost savings from reduced compliance or non-compliance is very low given that a degree of safety compliance is already mandated, including by the Act.	**Low**: Minimal measurable difference in impact on competition between this option and the base case. Small potential for greater innovation under a voluntary code.
An alternative standard from another sector or from overseas	**Low**: Significant additional risk from establishing a potentially ill-fitting standard, not adapted to local industry approaches and conditions.	**Low**: Some additional costs in adopting and applying a non-local standard or one from another sector.	**Medium**: Some additional costs from adopting a non-local standard; some additional enforcement and compliance costs if an ill-fitting standard is adopted or if there is lower industry buy-in.	**Medium**: Less industry involvement in the standard could lead to less innovation, thereby reducing competition.

The objective of the Regulations, in relation to setting standards, is to state clear and objective requirements that aim to reduce harms associated with installation work, and assist ESV in taking appropriate enforcement action.

As discussed above, adopting the safety standards that are set out in the Wiring Rules and therefore the proposed Regulations would not be expected to change radically the behaviour of most people in the industry, as the 'base case' behaviour of those people would already be to adhere to standards broadly equivalent to those set out in the Regulations; people would do so on the legal, market and psychological grounds outlined above. Although it is expected to come with some

behaviour change behaviour change, and therefore some compliance burden, mandating adherence to the standards is therefore in itself not assessed as a significant regulatory (compliance) burden.

Further, ESV does not assess there to be significant consequential impacts from making the standards mandatory. To the extent that there are benefits, they would arise from greater consistency and clarity of the applicable standards, and the embedding of positive industry behaviours and conduct in line with the standards.

But in this sphere, where the risks to human life and wellbeing are so significant, even small improvements in sector-wide conduct and behaviour can have important benefits for the community as a whole. The public interest in making buildings and workplaces safe is very high, and electrical safety is an important component of building and workplace safety. In 'breakeven' terms over the life of the Regulations, they would need to prevent just one death or serious injury to be worthwhile.

There has been extensive engagement with industry on the development of the relevant standards and how they are reflected in the Regulations. The Regulations, too, have been the subject of extensive consultation. The current standards are seen as a reasonable minimum by industry, and therefore it is likely that only people who would otherwise do 'unsafe' work would be materially affected by mandating the standard. The number of people who would do unsafe work is impossible to quantify, but is expected to be small given other controls in place such as other regulations that prescribe who can do electrical work and the competence and training they must have, and commercial, reputation and legal incentives to do safe work.

In this important sense, the standards and the Regulations are well targeted, and are likely to deliver a positive net benefit to the community. For these reasons, ESV believes that there is a benefit in setting clear standards for electrical installations in detail in the Regulations.

In summary, the primary expected benefit of the proposed Regulations is improved safety in relation to electrical installation work. Other benefits include the related protection of property from electrical fires. Specific individual costs and benefits are discussed further below in relation to the most significant technical changes to the electrical installations regulations.

4.3 Achieving compliance under the proposed approach

4.3.1 The rationale for a compliance and inspection regime

The above assessment was based on the conclusion that prescribing standards for electrical installation work in the Regulations would be effective. For any standards to be effective, they must be followed. If there is a high rate of non-compliance, the benefits of having standards are not realised. It is the role of ESV to ensure that electrical installations meet the prescribed standards.

There are theoretically a number of ways to check standards are complied with. These include:

- ESV inspecting every electrical installation in the state prior to its use. This is not practical, as it would raise a number of challenges to provide enough resources to inspect every installation, and in a timely way that does not lead to unreasonable delay.
- Alternatively, ESV inspecting only a sample of installations. But ESV would also need significant additional resources to be able to identify where installations were, and collect other information about the installation in order to implement a robust risk-based approach to determining inspections.

The Act already provides the mechanism for a more practical approach to monitoring compliance: the use of Certificates of Electrical Safety (COES). A COES is completed for all electrical installation work performed in Victoria. It is a statement that the person who carried out the work has tested the installation in accordance with the Act and regulations, and provides information to ESV that enables it to undertake a proportionate and risk-based enforcement approach.

The COES system aims to:

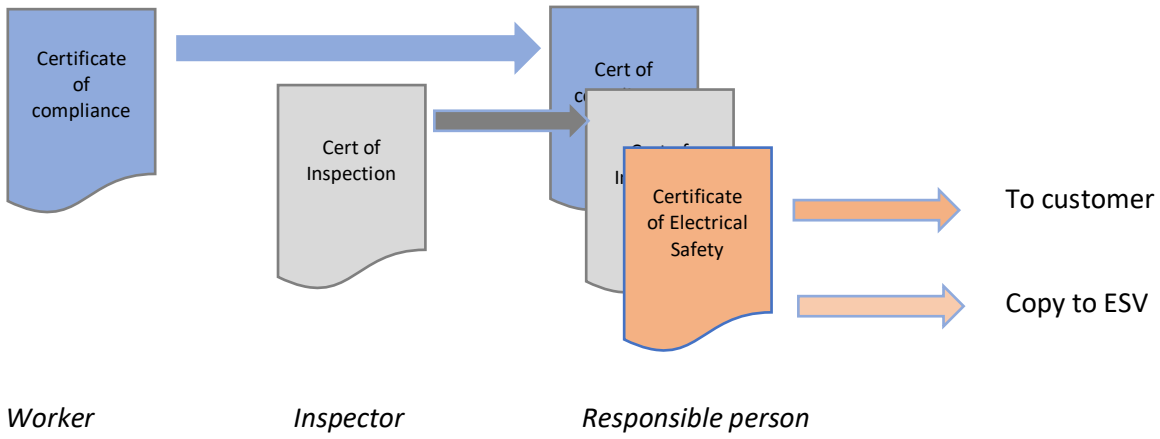
- improve electrical safety for the general public, electricity customers and electrical workers
- ensure that all electrical installation work is undertaken only by qualified persons
- ensure completed electrical work is available to be audited for compliance
- educate the Industry.

4.3.2 The legislative requirements for a COES and inspection

Section 45A of the Act requires a person responsible for electrical installation work to ensure that a COES is completed and provide it to the customer (and a copy to ESV) within the required time.

The COES must include other certificates already required to be completed under the Act: a certificate of compliance by the worker who carries out the work, and (in the case of prescribed types of installation work), a certificate of inspection by a licensed electrical inspector.

Figure 5: Scheme for certificates of compliance, inspection and electrical safety



The Act does not set out what information must be contained in a COES. The Act provides that the COES must be in the form supplied by ESV. Hence, the proposed Regulations (and any alternative options that could be considered) do not affect the need to complete a COES for electrical work. The proposed Regulations set out the basic information that needs to be included in a certificate of compliance.

4.3.3 Why are regulations needed?

Section 45 of the Act establishes the requirement for any prescribed electrical installation work to be inspected by a licensed electrical inspector, and to issue a certificate of inspection that:

- describes the work
- states that the inspector has inspected the work
- states whether or not the work complies with this Act and the regulations.

The Act requires the inspector to give to the person who is responsible for the carrying out of the work a signed certificate of inspection in respect of that work within 4 business days after the completion of that inspection.

The Act leaves some of the detail to be prescribed in regulations. The current Regulations put in place important elements of this framework:

- define what is 'prescribed' electrical installation work—without prescribing the types of electrical work for this purpose, no electrical installation work would require an inspection by an

inspector. All work would continue to require the electrician to complete a certificate of compliance and a COES for the work

- set the required times within which the inspection must occur (currently within 8 business days after the completion of that work)—without prescribing a time period, inspections could be delayed, increasing the risk that other parties may attempt to use an installation before it has been certified
- ensure that certificates of compliance and certificates of inspection include the information necessary to complete the COES—without prescribing this information, parts of the COES may not be able to be completed
- put in place a number of integrity measures to ensure the system is effective, such as prohibiting a licensed worker from inspecting their own work, ensuring that information on certificates is complete, accurate and legible on each copy, and
- put in place a number of provisions to facilitate the electronic notification of the completion of paper certificates.

4.3.4 Options for inspection requirements

In order to issue a certificate of inspection, the licensed inspector must:

- attend the address of the installation works
- check compliance with the Wiring Rules and the Regulations
- carry out testing of the installation in accordance with the Act and Regulations
- fill out the certificate of inspection.

The only element of the Regulations that creates a specific additional compliance burden is the defining of prescribed electrical installation work—the main consequence of this is that prescribed work is also required to obtain a certificate of electrical inspection. If no installation work is defined as 'prescribed' in the Regulations, no certificates of inspection would be necessary.

The definition of 'prescribed' electrical installations in the current Regulations applies to higher risk installation work, which in practice will cover around 22 per cent of all electrical installation work.[15] The specific electrical installations that are prescribed in the proposed Regulations are set out below.

Table 8: Prescribed electrical work and their associated risks

Type of Work	Risk associated with type of work
Consumer's mains, main earthing systems, consumer's terminals connection devices, any supports for overhead service lines (including any poles) and those parts of main switchboards that are related to the control of electrical installations or the protection against the spread of fire.	Interruption/damage to main systems and supply. This type of work often involves installations that are put in place for a long time with limited maintenance.
If a main switchboard or a replacement main switchboard is connected for the first time, any circuit protective devices, switchgear, controlgear, circuit breakers and wiring systems of that main switchboard in place at the time that the items set out in paragraph (a) are inspected.	Interruption/damage to main systems and supply. This type of work often involves installations that are put in place for a long time with limited maintenance.
Sub-mains, earthing systems and any distribution boards related to the control of individual occupiers' portions of a multiple occupancy.	Higher risks of electrical damage/fires. This type of work often involves installations that are put in place for a long time with limited maintenance.

[15] This includes the addition of BESS (see chapter 5), which will increase the proportion of work requiring inspection by around 3 per cent.

Type of Work	Risk associated with type of work
If a distribution board related to the control of individual occupiers' portion of a multiple occupancy, or a replacement distribution board related to the control of individual occupiers' portion of a multiple occupancy, is connected for the first time, any circuit protective devices, switchgear, controlgear, circuit breakers and wiring systems of that distribution board in place.	Higher risks of electrical damage/fires. This type of work often involves installations that are put in place for a long time with limited maintenance.
High voltage installations, except high voltage electrical equipment that is— (i)associated with an electric discharge lighting system; or (ii) associated with X-ray equipment; or (iii) associated with high frequency equipment; or (iv) within self-contained equipment supplied at low voltage.	Higher risks of electric shock due to step and touch voltages. Fires due to inadequate insulation / clearance.
Wiring systems, switchgear, controlgear and accessories installed to provide control or protection to generation systems (excluding stand-alone power systems with a power rating that is less than 500 volt-amperes).	Incorrect connections to an installation that has both mains supply and generator supply can have catastrophic consequences to the installation and occupants.
Electric fences used for security purposes but not including electric fences intended primarily for the containment of animals.	Higher risks to safety of persons due to step and touch voltages. Risk of entrapment and electrocution if not correctly installed.
Electrical equipment installed in a hazardous area and electrical equipment associated with the protection of a hazardous area but not installed within the hazardous area.	Petrochem, Spray booths, dust emitting environments. Higher risks of the spread of fire and explosions. Foreseeable adverse effects of dust, flammable liquids or gases.
Circuit protective devices, switchgear, controlgear, wiring systems and accessories (other than fire detection and alarm systems) installed to provide control or protection to, fire pumps (excluding pumps for fire hose reels where those hose reels are not the sole means of fire protection) or air handling systems intended to exhaust or control the spread of smoke or fire or the electricity supply for emergency lifts.	Higher risk due to high rise structures or installations requiring Fire pumps, evacuation equipment, emergency lifts etc, and the need for persons exiting a building safely during a fire by the use of emergency lifts.
A part 1 solution installed in an electrical installation. (A part 1 solution is where the prescribed requirements of the regulations cannot be met, and for which the regulations allow an alternative method that is intended to satisfy the fundamental safety principles of the Wiring Rules.)	Higher risk due to departure from applicable standard and the need to confirm the solution ensures that all hazards and risks are identified and eliminated to ensure a safe outcome for the preservation of life and installation.
Work on all or part of any fixed electrical equipment operated at any voltage installed in a patient area (other than communication equipment operated at extra low voltage).	Higher risk due to proximity to patients, and Includes increased protective requirements for operating theatres to ensure elimination of electric shock by medical equipment to the patient during an operation.
Work on all or part of any battery or other electricity storage system with a nominal operating voltage exceeding 12 volts direct current and an individual or combined rated storage capacity equal to or greater than 1 kilowatt hour including work on associated wiring systems, switchgear, controlgear and accessories. **(New inclusion.)**	Higher risk due to higher voltage and risk of incorrect battery use (e.g. battery gas). Flash burn or fire risk from arcing faults. Battery fires from incorrect charge / discharge management.

Further detail on the prescribed electrical work is set out at Appendix A, together with the rationale for why each has been prescribed. As well as electrical work that is not specifically listed in the Regulations, there are also specific types of work that are explicitly excluded from the definition. These are:

- the repair or maintenance of a single component part of an electrical installation; or
- the replacement of a single component part of an electrical installation by an equivalent component part at the same location; or
- the installation or connection of a consumer billing meter.

Given the primary obligations are contained in the Act itself, the only area to consider options that will change the overall compliance burden is which types of electrical installation work should be prescribed for the purposes of requiring certificates of inspection.

The feasible options are:

- Not prescribe any types of electrical installation work (i.e., this is base case, where no work would require an inspection by a licensed electrical inspector)
- Prescribed the same types of work as the current Regulations
- Prescribe more or fewer types of work than the current Regulations

As discussed in chapter 2, all electrical installation work involves a relatively high level of risk. The overarching rationale as to why inspections are required for prescribed electrical installation is to provide a third party check of electrical work that presents a higher level of risk, as these types of work are more likely to significantly increase the risk of death or damage if not done correctly.

The types of work that are currently 'prescribed' and require third party inspection date back to the time of the SECV and include work that has in the past been found to present a higher risk of adverse outcomes if done incorrectly. For example, work on hazardous area wiring, high voltage and solar installations. The Victorian classifications mirror those used by New Zealand for their certification system.

The types of work that are prescribed in the current Regulations represent a higher level of risk to persons and property than other types of electrical work.

ESV has reviewed the types of work that are defined as prescribed electrical work, including through seeking views of stakeholders. ESV also considered the types of electrical work that require independent inspections in other states: New South Wales has no corresponding requirements for inspections; other Australian jurisdictions require inspections for electrical work that represent a broadly similar, or slightly increased scope of inspections than currently in Victoria.

ESV has considered whether additional types of electrical work, beyond BESS, should also be prescribed. However, there is no clear evidence of other types of work presenting increased risk (since the regulations were last made), or any views among stakeholders, that warrant additional work types to be included. To include additional types would increase the cost of the Regulations without any clear additional benefits.

ESV also considered whether there was any evidence to support removing any types of work from the prescribed list. Engagement with stakeholders during the preparation of this RIS did not identify any types of work that should be removed. ESV believes that the types of electrical work prescribed in Victoria remains appropriate, as the associated risks remain high.

It is noted that the proposed definition of prescribed electrical installations work will result in around 22 per cent of all electrical installation work. This is considered a reasonable proportion to subject to the certificate of inspection requirements.

4.3.5 The compliance cost of the inspection requirements

There are expected to be around 180,000 certificates of inspection completed each year. These are issued by just over 300 licensed inspectors, giving each inspector an average of around 600 certificates of inspection each year. Under the current and proposed Regulations, the licensed inspector cannot be the inspector for any electrical work for which they are the person that carried out the electrical work, the person responsible for the electrical work, the person who designed the electrical work, or an employee of the person or entity responsible for the work.

ESV understands from consultation with industry stakeholders that each inspection costs on average $65, being the cost of the time for inspection and other business costs of inspectors (e.g., travel, equipment) attributable to inspections. Obviously, every inspection is different, and some may cost considerably more than this, while others may be less. This average cost gives a total cost of $11.7 million per annum. It is difficult to know how much of this should be attributed to the Regulations, as even if no types of work were defined as 'prescribed electrical installation work', it is expected that some work (particularly larger works or higher risk works) may voluntarily engage another person to check compliance in the absence of regulatory requirements. However, for the purposes of this RIS, we have taken the cost to industry of defining certain types of work as prescribed, to be $11.7 million per year.

This is a small amount, relative to the amount of electrical installation work overall, and also compared to the likely benefits of these additional checks. It is difficult to quantify the benefits of these particular regulations. However, using an estimated value of a statistical life of $4.6 million,[16] if the additional testing and inspection requirements associated with prescribed electrical installation work prevent at least 2½ deaths per year (i.e., around 25 avoided deaths over the 10-year life of the Regulations), the benefits would outweigh the costs.

It is difficult to attribute electrical-related deaths to a specific omission in the process, nevertheless, ESV believes, based on their experience of regulating these activities, that the avoided deaths are reasonable to expect from these requirements.

It is also noted, that the benefits could also outweigh the costs if other avoided costs (injury to persons, medical and emergency costs, damage to property) are also taken into account. For example, depending on the property, the prevention of a number of property fires may be enough for the benefits to outweigh the costs.

It is noted that by prescribing certain types of work that require a certificate of inspection, the Regulations reduce the amount of inspection work needed to be performed by ESV. The majority of ESV's audit activity relates to non-prescribed work as this has not been subject to independent inspection. If certificates of inspection were not required for the higher-risk work, ESV would need to employ additional inspectors to undertake more audits, and more detailed audits, of this work (or otherwise reduce the audits of current non-prescribed works).

4.4 Competition and small business impacts

4.4.1 Impact on competition

Any regulatory proposal needs to be scrutinised carefully to assess whether it is having an adverse impact on the ability of firms or individuals to enter and participate in the market. As a matter of good public policy, it is a fundamental principle in Victoria that any new legislation (both primary and subordinate) will not restrict competition unless it can be demonstrated that:

- the benefits of the restriction, as a whole, outweigh the costs; and

[16] As suggested in guidance published by the Office of the Commissioner for Better Regulations (2016), updated to 2019 values.

- the objectives of the legislation can only be achieved by restricting competition.

A measure is likely to have an impact on competition if any of the questions in Table 9 below can be answered in the affirmative.

Table 9: Competition questions

Test question	Assessment for this RIS
Is the proposed measure likely to affect the market structure of the affected sector(s) – i.e. will it reduce the number of participants in the market, or increase the size of incumbent firms?	No
Will it be more difficult for new firms or individuals to enter the industry after the imposition of the proposed measure?	No
Will the costs/benefits associated with the proposed measure affect some firms or individuals substantially more than others (e.g. small firms, part-time participants in occupations etc)?	No
Will the proposed measure restrict the ability of businesses to choose the price, quality, range or location of their products?	Yes
Will the proposed measure lead to higher ongoing costs for new entrants that existing firms do not have to meet?	No
Is the ability or incentive to innovate or develop new products or services likely to be affected by the proposed measure?	Yes

The proposed Regulations restrict competition, as they regulate the standard of work that can be provided by electrical workers. Prescribing minimum standards limits the ability for businesses to choose the quality of services they offer customers (services must be at or above the minimum standards), and may also limit the ability to offer new innovations where such innovative approaches are not contemplated in the prescribed standards.[17] This directly affects the choices of services and prices available to consumers (i.e., consumers are not free to choose a 'lower quality/lower price' option for their electrical work).

However, the adoption of safety standards through mandatory regulations ensures overall community safety, including the safety of staff, owners and customers of small businesses. This RIS considers that the benefits of regulation outweigh the costs, and the restriction on competition is justified as it ultimately provides a better outcome for consumers.

4.4.2 Small business impact

The proposed Regulations have a concentrated impact on small businesses, as the majority of electrical workers are likely to be small businesses (i.e., less than 20 employees), with many as sole traders. However, the proposed Regulations do not impose a disproportioned burden on small businesses relative to larger businesses, as the Regulations apply equally.

[17] ESV continues to monitor developments in changing products and services, and to ensure the regulatory framework remains fit for purpose for emerging developments, however, there can sometimes be delays in updating minimum standards to reflect new innovations in (or potentially in) the market.

5 Proposed technical changes to the Regulations

5.1 Assessment of specific technical options

In this chapter, five sets of technical options are assessed against the baseline of the status quo (the current Regulations). The options are in the following areas:

- Inspection of Battery Energy Storage System (BESS) installations
- Electrical work on energised electrical equipment
- Independently verifying standards compliance for high voltage electrical installation work
- Protection of low voltage electricity supplies provided from substations
- Private aerial lines.

Each of the five sets of options is considered in detail below. The options were assessed in relation to the combined criteria (based on the statutory objectives) of:

(1) impact on the safety of people (including electrical workers and members of the public) and the protection of property

(2) impact on regulatory burden including compliance costs and other costs; having regard specifically to the impacts on small business and on competition.

5.2 Inspection of Battery Energy Storage System (BESS) installations

5.2.1 Background

The installation of small-scale battery systems in Victoria is predicted to grow as new battery technologies become more readily available and their purchase costs fall. Battery systems are able to complement residential solar generation systems by providing a way for consumers to store electricity generated during the day for use when needed.

The growth in the use of battery and solar systems will be assisted by the Victorian Government's Solar Homes Initiative, which will offer a 50 per cent rebate to 10,000 eligible households on the installation of residential battery storage systems. When announcing this program, the Government stated that 'safety is paramount'; the program will include $9 million to support accreditation of 4,500 electricians to install solar panels and batteries. These systems will only be installed by accredited solar installers using approved products, to ensure the highest safety standards are adhered to.[18]

5.2.2 Problem

The general problem with electricity safety was described above. This subsection focuses on the particular dangers associated from battery energy storage systems (BESS) for homes or small commercial buildings. These systems are a serious safety risk if incorrectly installed, potentially leading to:

- electric shock
- fire
- flash burns

[18] Andrews, D. (Premier of Victoria) 2018, *Cheaper Electricity With Solar Batteries For 10,000 Homes*, Media Release, 11 September, Victorian Government, Melbourne, viewed 8 May 2019 < https://www.premier.vic.gov.au/cheaper-electricity-with-solar-batteries-for-10000-homes/>

- explosion
- exposure to hazardous chemicals.[19]

The draft Australian Installation Standard (AS/NZS 5139; currently under development) outlines the following hazards associated with energy storage systems:

- Electrical hazard
- Energy hazard
- Fire hazard
- Explosive gas hazard
- Chemical hazard
- Mechanical hazard
- Toxic fume hazard.

In order to mitigate these risks, it is important that electricians installing BESS comply with the applicable installation standards. AS/NZS 5139, 'Electrical installations – Safety of battery systems for use with power conversion equipment', is currently being developed by Standards Australia and is expected to be published in August 2019.

This standard will be called up in AS/NZS 3000 (the Wiring Rules) as a mandatory standard that must be followed by electricians when installing a BESS. To ensure a high level of adherence to this standard, all BESS installations are to be inspected and certified by a licensed electrical inspector.

5.2.3 Current requirements

Section 238(1)(f) of the current regulations provides that: 'For the purposes of section 45 of the Act, prescribed electrical installation work means work on all or part of any of the following electrical installations if they are ordinarily operated at low voltage or a voltage exceeding low voltage— …wiring systems, switchgear, controlgear and accessories installed to provide control and protection of generation systems (excluding stand-alone power systems with a power rating that is less than 500 volt-amperes).'

Pursuant to this regulation, BESS installations (whether including a solar component or not) are currently inspected by licensed electrical inspectors on the basis that they are connected to 'wiring systems, switchgear, controlgear and accessories installed to provide control and protection of generation systems (excluding stand-alone power systems with a power rating that is less than 500 volt-amperes)'.

Appling this basis for the inspections is problematic for several reasons. For example, it could be argued a battery system that is not connected to a generation system is not part of a generation system at all, but merely a storage system that is therefore not specifically required to be inspected. Also, it could be argued that a battery and solar system is not 'installed to provide control and protection of generation systems'. There are other ambiguities also, and practical problems with how BESSs are defined and treated in relation to the inspection requirement.

[19] WorkCover Queensland (2018), *Installing battery energy storage systems (BESS)* viewed 8 May 2019 < https://www.worksafe.qld.gov.au/injury-prevention-safety/electricity/installing-battery-energy-storage-systems-bess>

5.2.4 Options

Table 10: Options considered: Inspection of Battery Energy Storage System (BESS) installations

Option	Description
Option 1.1: No change	Continue to rely on the current regulation 238(f).
Option 1.2: Ensure that electrical installation work carried out on any BESS is to be inspected by a licensed electrical inspector	To avoid uncertainty and ambiguity, this option would require that all BESSs are inspected regardless of whether they are connected to a generation system or not. This would ensure that all installed BESSs are inspected by a licensed electrical inspector.
Option 1.3: Ensure that electrical installation work carried out on any BESS be inspected by a licensed electrical inspector, provided that the system has: (a) a nominal voltage exceeding 12 volts direct current; and (b) an individual or combined rated storage capacity equal to or greater than 1 kilowatt hour including work on associated wiring systems, switchgear, control gear or accessories.	Same as option 1.2 but with a scope that is risk-based and therefore more targeted. Excludes battery systems that have a nominal voltage of 12 volts or less; and that have a storage capacity of less than 1 kilowatt hour.

5.2.5 Impact analysis

The three battery-related technical options were assessed against the criteria. The summary of the assessment is shown in the table below.

Table 11: Assessment of options Battery Energy Storage System (BESS) installations

Option	Summary of assessment against criteria
Option 1.1	ESV currently relies on 238(f) (generation system) as a basis for inspecting BESSs. There is a risk of non-compliance and uncertainty now, as it could be argued a battery system not connected to a generation system is not part of a generation system, but merely a storage system that is not required to be inspected.
Option 1.2	Wide scope: covers all BESS installations including low voltage, low storage capacity ones.
Option 1.3 (Preferred)	Option 1.3 is the preferred option as it specifically targets BESSs that can store higher amounts of energy and, therefore, have a greater potential to cause significant harm compared to smaller systems such as small uninterruptible power supply systems (UPS).

Option 1.1 is not preferred because it does not address the ambiguity in the current Regulations. Option 1.2 is not preferred because it is too wide in scope, and would not represent a risk-based approach. Based on the analysis, Option 1.3 is the preferred option. It is more targeted and represents a better balance of safety benefits and regulatory costs.

Last year, 1263 solar generation systems with a BESS were installed in Victoria.[20] The inspection of the installation of a BESS is estimated to add $50 to the cost of the inspection of a solar generation system.[21] As such, the option would have had a maximum annual cost impact of $63,250, or a total cost over the life of the Regulations of around $513,000 (net present value, using a real discount rate of 4 per cent).

Table 12: Average inspection costs[22]

Inspection type	Cost
Solar PV System	$150
Solar PV System + BESS	$200
Difference between BESS and non-BESS inspection	$50
BESS retrofit to existing Solar PV System	$150

This amount represents an upper bound of additional costs relative to the current regulations; the actual additional cost is estimated to be significantly lower than this because, under the current regulations, there is already a requirement (though its scope is ambiguous) that BESS installations be inspected by licensed electrical inspectors, pursuant to regulation 238(f), on the basis that the relevant systems are connected to wiring systems, switchgear, controlgear and accessories installed to provide control and protection of generation systems. It is also noted that the number of battery and solar systems in Victoria is expected to rise in the foreseeable future. (Recent data on installations by state are shown below.)

Table 13: Solar PV installations with concurrent battery storage capacity, by year and state/territory[23]

Year	ACT	NSW	NT	QLD	SA	TAS	VIC	WA	Total
2014*	8	208	3	129	34	5	137	169	**693**
2015	3	133	1	186	21	6	163	24	**537**
2016	105	668	6	331	130	18	240	70	**1568**
2017	205	1942	18	856	479	93	845	212	**4650**
2018	305	1862	8	1110	613	163	1324	236	**5621**
2019**	127	570	3	1189	370	37	374	85	**2755**
Total	**753**	**5383**	**39**	**3801**	**1647**	**322**	**3083**	**796**	**15,824**

Source: http://www.cleanenergyregulator.gov.au/RET/Forms-and-resources/Postcode-data-for-small-scale-installations#Smallscale-installations-by-installation-year.

By clarifying the regulatory requirements for BESSs, Option 1.3 is expected to generate the following benefits:

- Ensure a higher and more consistent level of adherence to installation safety standards, in order ultimately to help keep the community safe
- Ensure that the equipment being installed complies with relevant Australian Standards, thereby achieving good practice

[20] Clean Energy Regulator, Australian Government, (17 April 2017), *Postcode data for small-scale installations, Table: Solar PV systems with concurrent battery storage capacity by year and state/territory*, Retrieved from < http://www.cleanenergyregulator.gov.au/RET/Forms-and-resources/Postcode-data-for-small-scale-installations#Smallscale-installations-by-installation-year>.

[21] Source: ESV.

[22] Source: ESV.

[23] The table is based on voluntarily disclosed data for batteries that were installed at the same time as the solar PV system. *Collection of grid-connected installations with disclosed battery data commenced in September 2014. ** Current as at 30 June 2019.

- Ensure that identified defects are rectified before battery storage systems enter service
- Help ensure the Victorian Government solar-battery rebates program (mentioned above) is delivered safely
- Identify defect trends that may inform of knowledge gaps in the industry that require targeted education. (This would include providing feedback to the Victorian Government funded New Energy Technology Systems program.[24])
- Ensure data are properly collected via the Certificates of Electrical Safety (COES) system, which would assist with national initiatives such as the Council of Australian Governments (COAG) supported national register for distributed energy resources.[25]

5.2.6 Preferred option: Inspection of Battery Energy Storage System (BESS) installations

In summary, Option 1.3 is assessed as having a positive net benefit because the modest incremental cost is likely to be offset by the safety improvement from reducing uncertainty and ambiguity about the application of the current Regulations. The proposed regulation 247(3) (below) would require that all installed BESSs are inspected regardless of whether they are connected to a generation system or not. This would ensure that all installed BESSs are inspected by a licensed electrical inspector. (Note also that the preferred option contains a threshold, as described above.)

The preferred option would seek to improve clarity and the basis of regulation, by putting beyond doubt that battery systems are required to be inspected. It is noted that this option does not relate to items such as portable or self-contained systems like solar garden lights and battery backups for alarm systems.

Proposed regulation:

247 Electrical installation work that must be inspected

(3) For the purposes of section 45 of the Act, ***prescribed electrical installation work*** means work on all or part of any battery or other electricity storage system with a nominal operating voltage exceeding 12 volts direct current and an individual or combined rated storage capacity equal to or greater than 1 kilowatt hour including work on associated wiring systems, switchgear, controlgear and accessories.

5.3 Electrical work on energised electrical equipment

5.3.1 Background

Section 43(4) of the *Electricity Safety Act 1998* requires that a person carrying out electrical installation work must ensure that:

- all electrical circuits or electrical equipment handled in the course of that work are disconnected from the electricity supply; or
- adequate precautions are taken to prevent electric shock or other injury in the handling of electrical circuits or electrical equipment in the course of that work.

There are currently no further relevant requirements in the Electricity Safety Regulations.

[24] https://futureenergyskills.com.au/nets-project/.

[25] ESV has been tasked to work with DELWP to support investigation of regulatory and other options to support the information provision requirements of the register – See the Statement of Expectations for Energy Safe Victoria 2018-20 issued by the Hon. Lily D'Ambrosio MP, Minister for Energy, Environment and Climate Change on 3 September 2018 < https://www.esv.vic.gov.au/pdfs/statement-of-expectations-for-esv-letter-from-the-minister/>

5.3.2 Problem

Working on energised equipment (i.e. equipment that is connected to the electricity supply and is therefore 'live') entails significant safety risks. For harms to be reduced, the safety rules must be complied with. During industry consultation workshops, stakeholders (particularly representatives of the Electrical Trades Union) raised concerns that there was no supplemental obligation on employers of electrical workers to ensure that section 43(4) would be complied with. Furthermore, stakeholders noted there was no explanation in the legislation of what 'adequate precautions' would be in practice. ESV compliance officers concurred with these comments, agreeing that section 43(4) was arguably out of step with other Australian jurisdictions that have regulations that deal with this issue. The examples include:

- Safe Work Australia: Division 4 of Part 4.7 of the Model Regulations for Work Health and Safety
- Queensland: Division 1 of Part 3 of the Electrical Safety Regulation 2013 (Qld)
- South Australia: Chapter 4, Part 7, Division 4 of the Work Health and Safety Regulations 2012 (SA).

Example 1: Model regulation, Safe Work Australia

The Model regulation from Safe Work Australia contains the following requirements:

- Work on energised electrical equipment not to be carried out unless necessary and there is no alternative means of carrying out the work;
- A risk assessment must be carried out and recorded before work on energised electrical equipment is carried out;
- The area is to be clear of obstructions to allow easy access and exit;
- The disconnection point is to be clearly marked and able to be operated quickly;
- Work must be authorised by person with management or control of the workplace;
- Work must be carried out by a competent person who has suitable tools, testing equipment and personal protective equipment (PPE) for the work;
- Work must be carried out in accordance with a safe work method statement;
- Work must be carried out with a **safety observer** present. (*Emphasis added*.)

Example 2: Queensland Electrical Safety Regulation 2013

22 How work is to be carried out:

(1) A person conducting a business or undertaking must ensure that electrical work on energised electrical equipment is carried out—
(a) by a competent person who has tools, testing equipment and personal protective equipment that—
(i) are suitable for the work; and
(ii) have been properly tested; and
(iii) are maintained in good working order; and
(b) in accordance with a safe work method statement prepared for the work; and
(c) subject to subsection (4), with a safety observer.

……cont'd

(2) The person conducting a business or undertaking must ensure, so far as is reasonably practicable, that the person who carries out the electrical work uses the tools, testing equipment and personal protective equipment properly.

(3) For subsection (1)(b), the safe work method statement must—
(a) identify the electrical work; and
(b) specify hazards associated with the electrical work and risks associated with those hazards; and
(c) describe the measures to be implemented to control the risks; and
(d) describe how the measures mentioned in paragraph (c) are to be implemented, monitored and reviewed.

(4) A safety observer is not required if—
(a) the work consists only of testing; and
(b) the person conducting the business or undertaking has conducted a risk assessment under section 19(1)(a) that shows that there is no serious risk associated with the proposed work.

SECTION 6: SAFETY OBSERVERS

6.1 GENERAL

Where the risk assessment procedures or legislative requirements determine that a safety observer is necessary for any work on or near exposed energized conductors or live conductive parts, then work shall not be undertaken without the presence of a safety observer.

6.2 GENERAL PRINCIPLES

The safety observer's role is to be clearly communicated and understood. Their role is to be risk aware and to continually observe that safety procedures are carried out by the electrical workers performing the work and warn the workers of danger, including inadvertent contact with energised electrical circuits and equipment.

If a safety observer is used as part of a safe system of work, the following shall apply:
(a) The safety observer shall be able to warn and, if necessary, stop the work before the risks become too high.
(b) The safety observer shall not carry out any other work or function that compromises their role as a safety observer, i.e. the safety observer shall not observe more than one task at a time.
(c) The safety observer shall be able to communicate quickly and effectively with the electrical workers performing the work.
(d) The safety observer shall be capable of providing assistance in the case of emergency as well as being competent to perform electrical rescue and cardiopulmonary resuscitation, as required. On an energised electrical installation, the safety observer shall be competent to perform their task and shall also be competent in electrical rescue and cardiopulmonary resuscitation (CPR).
(e) The safety observer shall be suitably attired in personal protective equipment appropriate to the situation.
(f) The safety observer shall not have any known temporary or permanent disabilities that would adversely affect their role and performance.
(g) The presence of a safety observer is one of the risk control measures to ensure electrical safety when electrical work on energized circuits and electrical equipment is being carried out.

5.3.3 Options

Table 14: Options—Electrical work on energised electrical equipment

Option	Description
Option 2.1: No change	The regulations would not be aligned with the Model regulations (or Queensland), and no steps would be taken otherwise to clarify and strengthen the safety arrangements for working on energised equipment.
Option 2.2: Establish additional regulation requirements, based on the Model regulations, with a requirement for safety observers	This option would involve adding a new regulation that replicates the relevant parts of the Model regulations, in particular a requirement to have a safety observer present whenever work is being carried out on energised electrical equipment. Indicatively, a safety observer would cost around $75 per hour. A typical project would require several hours and possibly would extend over 2-3 days.
Option 2.3: Establish the new regulatory requirements based on the Model regulations but without safety observers	This option would add a set of requirements that replicated the good practice elements of the Model regulations covering this matter (working on energised electrical equipment), but excluding the mandatory requirement to have a safety observer present when work is being carried out on such equipment.

5.3.4 Impact analysis

The three technical options relating to energised equipment were assessed against the criteria. The summary of the assessment is shown in the table below.

Table 15: Assessment of options— Electrical work on energised electrical equipment

Option	Summary of assessment
Option 2.1	This option is not preferred as it does not address a gap in the electrical safety regime that has been identified by industry and by ESV compliance officers.
Option 2.2	The requirement to have safety observers present for all types of work on energised electrical equipment would represent a significant new regulatory obligation and costs, with potential (though uncertain) safety benefits. ESV is not of the view that a requirement for a safety observer should be mandatory in all cases of working with energised equipment. • It is ESV's current view that a requirement to have a safety observer for all work on energised equipment is a disproportionate response to the identified risks, especially if the requirements of the proposed regulation are followed. • ESV does not consider that it is best placed to identify which types of work require a safety observer and which types do not. • Also, ESV considers that there are better safety measures available than relying on a safety observer to ensure that contact is not made with live parts. For example, preparation and planning, along with appropriate tools and personal protective equipment, would ensure that contact with live electrical equipment did not occur while work was being carried out. If this standard cannot be achieved, then the work on energised electrical equipment should not proceed.

Option	Summary of assessment
Option 2.3 (Preferred)	Under this option, the regulations would adopt relevant parts of the Model regulations (excluding the mandatory requirement to use safety observers). The main benefit would be to increase adoption of best practice approaches; and to help ensure the obligations of electrical workers and their employers were aligned in making safety with energised equipment a shared responsibility. The incremental cost of this option is assessed as low, because electrical workers are already required to take adequate precautions before carrying out work on energised equipment. The option would primarily involve standardising good practice steps that are already adopted in the industry.

Under option 2.3, the regulations would adopt relevant parts of the Model regulations (excluding the mandatory requirement to use safety observers) and would help ensure the obligations of electrical workers and their employers were aligned in making safety with energised equipment a shared responsibility. The regulation would establish a specific requirement to adopt best practice elements such as a risk assessment; a safe work method statement (setting out what specific safety steps will be adopted); explicit authorisation; clear marking of the disconnection point; and working in areas clear of obstructions.

Electrical workers are already required to take adequate precautions before carrying out work on energised electrical equipment. Under Option 2.3, therefore, the additional costs of compliance are expected to be minimal: the option would primarily involve standardising good practice steps that in large part are already taken by participants in the industry. (Further points are discussed below.)

5.3.5 Preferred option

Option 2.3 is preferred.

The incremental cost of this requirement is expected to be low, and the benefits mainly arise from making practices clearer and more consistent when working with energised electrical equipment. On balance, both the costs and the benefits are small but a modest net benefit is expected.

Safety observers, if mandated, would be there to respond to an accident or emergency (i.e. shut power of, render first aid, call for help/ambulance). However, the need for these observers should be considered case by case. The need for a safety observer is best identified by the workers following the process set out in the proposed regulation. ESV will continue monitoring this issue and will consider requiring mandatory safety observers for certain types of work in the future if this appears to be justified on net-benefit grounds.

As noted above, it is ESV's current view that a requirement to have a safety observer for all work on energised equipment is a disproportionate response to the identified risks, especially if the requirements of the proposed regulation are followed. ESV, moreover, does not consider that it is best placed to identify which types of work require a safety observer and which types do not.

An area that is expected to be a focus of safety regulators in the short term is work on equipment that contain dangerous arc fault hazards. ESV or Worksafe may issue guidelines in the future to assist workers carrying out an assessment of these risks as part of their risk assessment required by the proposed Regulation. The guidelines may recommend safety observers in some circumstances.

Proposed regulations:

Division 4 – Duties related to electrical installation work carried out on energised electrical equipment

508 Who is a person conducting a business or undertaking under this Division?

In this Division, a reference to a person conducting a business or undertaking that is carrying out electrical installation work on energized equipment is a reference to—

(a) in the case of electrical installation work carried out by an electrical contractor, the electrical contractor conducting the business or undertaking that is carrying out the electrical installation work; or

(b) in the case of electrical installation work carried out by an electrical worker employed by a person (other than an electrical contractor), the employer of the person who is carrying out the electrical installation work; or

(c) if paragraphs (a) and (b) do not apply, the electrical worker who is carrying out the electrical installation work.

509 Electrical installation work on energised electrical equipment may only be permitted in particular circumstances

(1) A person conducting a business or undertaking must ensure that electrical installation work on energised electrical equipment is not carried out unless—

(a) it is necessary in the interests of health and safety that the electrical installation work is carried out on the energized electrical equipment; or

(b) it is necessary that the electrical equipment to be worked on is energised in order for the electrical installation work to be carried out properly; or

(c) it is necessary that the electrical installation work is carried out on energised electrical equipment for the purposes of testing the electrical installation work in accordance with Division 10 of Part 2; or

(d) there is no reasonable alternative means of carrying out the work.

(2) For the purposes of subregulation (1)(a), (b) or (d), electrical installation work may include testing of the energised electrical equipment.

510 Preliminary steps before carrying out electrical installation work on energised electrical equipment

(1) A person conducting a business or undertaking that is carrying out electrical installation work on energised electrical equipment must ensure that before the electrical installation work is carried out, the following steps are followed—

(a) a competent person conducts a risk assessment in relation to the proposed electrical installation work and records the results of the risk assessment;

(b) the area where the electrical work is to be carried out is clear of obstructions so as to allow for easy access and exit by the person who is carrying out the electrical installation work;

(c) the point at which the electrical equipment can be disconnected or isolated from its electricity supply is—

(i) clearly marked or labelled; and

(ii) clear of obstructions so as to allow for easy access and exit by the person who is carrying out the electrical installation work; and

(iii) capable of being operated quickly;

(d) the person conducting the business or undertaking authorises the commencement of the electrical installation work after consulting with the person with management or control of the premises where the work is to be carried out..

(2) Subregulation (1)(c) does not apply if—

(a) the electrical installation work is to be carried out on energised electrical equipment on the electricity supply side of the main switch of a main switchboard; and

(b) the point at which the energised electrical equipment can be disconnected from its electricity supply is not reasonably accessible from the location at which the electrical installation work is to be carried out.

511 How electrical installation work is to be carried out on energised electrical equipment

(1) A person conducting a business or undertaking that is carrying out electrical installation work on energised electrical equipment must ensure that the electrical installation work is carried out—

(a) by a competent person who has tools, testing equipment and personal protective equipment that—

(i) are suitable for the work; and

(ii) have been properly tested; and

(iii) are maintained in good working order; and

(b) in accordance with a safe work method statement prepared for the work.

(2) A person conducting a business or undertaking that is carrying out electrical installation work on energised electrical equipment must ensure, so far as is reasonably practicable, that the person who carries out the electrical installation work uses the tools, testing equipment and personal protective equipment properly.

(3) For the purposes of subregulation (1)(b), the safe work method statement must—

(a) identify the electrical installation work; and

(b) specify hazards associated with the electrical work and risks associated with those hazards; and

(c) describe the measures to be implemented to control the risks; and

(d) describe how the measures mentioned in paragraph (c) are to be implemented.

5.4 High voltage electrical installation work: Independently verifying standards compliance

5.4.1 Background

Australian Standard AS 2067 provides minimum requirements for the design and erection of high voltage installations in systems with nominal voltages above 1 kV AC and nominal frequency up to and including 60 Hz, so as to provide safety and proper functioning for the use intended. (The Victorian electricity supply network (transmission and distribution) does not operate above 60Hz and rarely trips above 50.3Hz. This means high voltage installations need to be constructed to operate at frequencies up to 60 Hz.)

A high voltage installation may include, but is not limited to, the following equipment:

- High voltage electrical installations on masts, poles and towers
- Switchgear and/or transformers and/or electrical equipment located outside a closed electrical operating area
- Rotating electrical machines
- Switchgear, controlgear and assemblies

- Transformers and reactors
- Converters
- Cables
- Lines
- Wiring systems
- Batteries, battery chargers and associated direct current supply systems
- Capacitors
- Earthing systems
- Buildings and fences that are part of a closed electrical operating area
- Associated protection, control, auxiliary and ancillary systems
- Structures, foundations, earthworks and drainage.

5.4.2 Problem

LEWs currently rely on engineering designs to ensure completed work will comply with AS 2067. WorkSafe and the distribution businesses agree there is a risk that, in high voltage electrical installation work, the design of that installation work may not comply with AS 2067 (and AS/NZS 7000, the standard for overhead line design), and would therefore be unsafe.

The concern here is that a disconnect can arise between the designer and the LEW, who may not have the relevant knowledge or resources to determine if the work compiles with the standard. Many of the AS 2067 requirements relate to clearance distances (and 'arc faults') for energised parts, and therefore affect future risks; that is, they are designed to mitigate risks (via clearances, protection and earthing requirements) that may endanger workers and the general public at a time long after the work is performed.

(For example, the AS 2067 protections against the dangers from arc faults include appropriate barriers. A fatality recently occurred at Yallourn Power station because a high voltage barrier was not properly secure. The relevant installation was built before AS 2067 was published, but the incident demonstrates how a failure to have proper barriers (a subject covered by AS 2067) can lead to serious injury or death.)

5.4.3 Options

Table 16: Options—Independently verifying standards compliance for high voltage electrical installation work

Option	Description
Option 3.1: No change	Maintain the status quo, without independent verification of compliance with standards for high voltage electrical installation work.
Option 3.2: Ensure that proposed high voltage installation work will comply with AS 2067 and AS/NZS 7000 when completed: adopt the WA approach in which the designer may certify the work ('self certify')	Certification of design of proposed work as complying with technical requirements must be completed by an engineer prior to commencement of work. This is broadly speaking the WA approach. In WA, there is a formal process for a professionally qualified electrical engineer (e.g. a senior engineer) to certify that the proposed high voltage installation conforms to the relevant requirements. The engineer can be the person who designed the installation, i.e. the designer may 'self certify'.
Option 3.3 (preferred): Ensure that proposed high voltage installation work will comply with AS 2067 and AS/NZS 7000 when completed; but do not allow the designer to certify (i.e. no self-certification)	Same as Option 3.2, except that the verifier must be an independent competent person who was not involved in the design of the installation work. ('Electrical installation' and 'electrical installation work' are defined in the Electricity Safety Act 1998. 'High voltage' is defined in regulation 105 and 'competent person' is defined in regulation 106.)

5.4.4 Impact analysis

The three options were assessed against the safety and regulatory burden criteria outlined in section 5.1. The assessment is summarised in

Table 17 below. Option 3.1 is not preferred as it entails material risks in relation to the design and quality of high voltage electrical installation work. Option 3.2 would reduce this risk, but it would not achieve a high degree of independence between certification of the design, and production of the design itself. Option 3.3. is preferred as it helps address the safety risk while achieving a high degree of independence of the certifier of the work, thereby avoiding conflicting interests.

Table 17: Assessment of options—Independently verifying standards compliance for high voltage electrical installation work

Option	Summary of assessment
Option 3.1	No additional costs relative to the base case of no regulations, but potential risks relating to the design and quality of high voltage electrical installation work.
Option 3.2	Gives greater assurance that high voltage installation work adheres to the relevant standards. This is important given the safety risks associated with this work, and the danger that no directly involved individual person or organisation would otherwise be accountable for verifying standards compliance.
Option 3.3 (preferred)	This option, unlike the 'self certify' option (3.2), would require someone independent of the designer to certify the design. The requirement would not apply to the repair or maintenance of a high voltage electrical installation where such a repair or such maintenance did not compromise the original design of that installation. Proposed regulation 255 will also prohibit a licensed electrical inspector involved with the independent verification of proposed high voltage installation work from inspecting that work when completed. (Relevant figures are provided below.)

With Option 3.3, the associated increase in compliance costs is likely to be proportionally modest when considered in the context of the overall costs of high voltage electrical installation work (running to hundreds of millions of dollars each year).

In the first half of 2019, 256 certificates for prescribed high voltage work (Type 4) were lodged with ESV. We estimate that 50 per cent of those would need to comply with this requirement (the other 50 per cent were for repairs and maintenance work). The unit cost is highly dependent on the size of the firm designing the installation.

ESV cost estimates

If a large firm is used to design the high voltage installation, the additional verification cost would be minimal as they would have one or more employed engineers design the installation, and then use other employed engineers to verify; i.e. in large firms the relevant verification work would already be undertaken by a senior staff member. In this case, the additional cost is that the firm would need to complete the required verification form. The estimated cost here (of $62.50 per installation) is based on 15 minutes to fill out the form; and a gross wage/salary cost of $250/hr.

If a small firm is used to design the high voltage installation: the verification cost would be much higher, as the designer would be unlikely to have the same internal review processes of a large firm. Therefore, the small firm would be paying for a separately engaged firm to verify adherence with the standards. The cost is estimated to be between $5,000 to $10,000 depending on the size of the high voltage installation.

The estimated total number of Type 4 certificates for 2019 is 512. This is similar to the ten-year average of 600 per year. (Recall that half of these would relate to repairs and maintenance work and therefore would not need to comply with the verification requirement.) If 50 per cent of the 300 relevant high voltage installations were designed by small firms (this is a conservatively high estimate, as there are few small firms in this field), the total additional cost would be less than $1,134,375 annually.

This is based on: an average cost of $62.50 for every relevant high voltage installation for large firms, and $7,500 per installation for small firms, an amount that compares with a typical cost for small high voltage installations in the vicinity of $250,000 and for large installations (e.g. for rail depots) that ranges well into multiple millions of dollars. Given the safety risks involved with high voltage

installations, we assess that the expected benefits of improved safety significantly exceed the estimated costs, noting that the estimated cost figures here are conservatively high.

5.4.5 Preferred option

Option 3.3 is preferred. That option would address a potential gap in the safety regulations, at a proportionally low incremental cost and with a high degree of independence. The main expected benefit of Option 3.3 is greater certainty about compliance with AS 2067 (and AS/NZS 7000), leading to higher safety and greater accountability for the design of high voltage installations.

Proposed regulations:

205 High voltage electrical installation work

(1) Before commencing any electrical installation work related to the installation or alteration of a high voltage electrical installation, the person who is to carry out the work must ensure that the design of that installation work has been verified in writing as complying with AS 2067 and AS/NZS 7000 (if applicable) by an independent competent person who was not involved in the design of the installation work.

(2) Sub-regulation (1) does not apply to the repair or maintenance of a high voltage electrical installation provided that the repair or maintenance does not alter the original design of that installation.

(3) A person carrying out high voltage electrical installation work must comply with the requirements of the Blue Book when carrying out that work.

5.5 Protection of low voltage electricity supplies provided from substations

5.5.1 Background

Regulations 234(b) and 235(3) of the Electricity Safety (Installations) Regulations 2009 (the current regulations) require electricity suppliers to ensure that any of their low voltage electricity supplies that are supplied directly from a substation are protected by protective equipment 'installed within the substation' that can isolate each of the active conductors supplying an electrical installation. ('Active conductors' carry the voltage and current to the installation.)

Current regulations

234 Service lines and electricity supplies

An electricity supplier must ensure that the supplier's service lines and low voltage electricity supplies provided from the supplier's substations—

(b) are protected by protective equipment, installed in accordance with regulation 235, that can isolate each of the active conductors of an electrical installation.

235 Installation of protective equipment

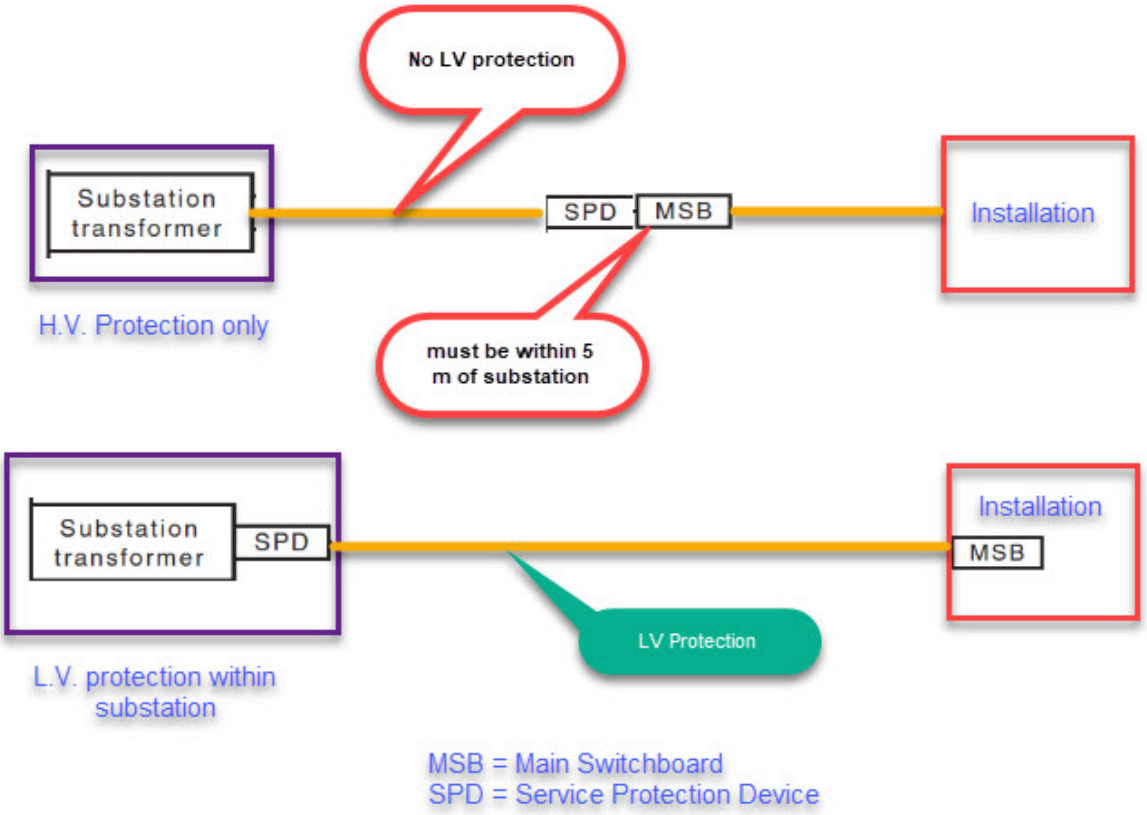
(3) In the case of electricity supplies to an electrical installation provided directly from a substation, protective equipment must be installed within the substation.

5.5.2 Problem

Low voltage protection (such as through a 'service protection device') is expected to operate more rapidly than high voltage protection, and this is expected to help limit damage to customers' equipment, and in some circumstances to prevent fires. As the current regulations relate to low voltage electricity supplies, it was understood by ESV officers that the type of protection provided would be low voltage protection.

However, the current regulations do not state this explicitly. While the regulations state that protective equipment must be installed within the substation, they do not state that the protection must be low voltage protection. Accordingly, some distribution businesses have complied with the current regulations by using high voltage protection systems to protect low voltage electricity supplies that are supplied directly from a substation. However, this approach has a limitation in that it can usually only effectively protect a low voltage electricity supply for a distance of approximately five metres. (See graphical representation below.)

Figure 6: Figurative representation of low voltage protection alternatives



As such, customers who are supplied in this way must establish their required protection equipment (usually at their main switchboard) within five metres of the substation. Such an approach can, in some cases, result in a supply arrangement that is suboptimal from the perspective of safety. For example, more distant and convenient locations may be safer.

Figure 7: Example of equipment that is poorly maintained and in an unsuitable location

Example of deteriorated electrical equipment. If low voltage protection is provided, equipment such as this would not be required.

Equipment such as that shown in the image is owned by the electricity customer and it is their responsibility to maintain it. However, this equipment is often neglected by property owners, who are in many cases unaware that they are responsible for the care and maintenance of the equipment. Customers may not be aware that they own the equipment, and they may assume incorrectly that it is part of the distribution network.

As these assets deteriorate, they can become hazardous, or the protection equipment inside may lose its ability to operate as intended. There is no systematic reporting or data collection on the state of this equipment, but numerous compliance officers, switchboard manufacturers and repairers have reported these issues arising. ESV has also seen instances in public car parks of equipment installed in unsuitable locations. (In public car parks, the electrical equipment is at risk of unintended impact from vehicles.) Based on this evidence, ESV believes the issue to be significant.

If it were not for the five metre limitation, the equipment would have been placed in a safer location, such as within the building it is supplying. By requiring low voltage equipment to be provided from within the substation, the equipment would thereafter be monitored and maintained by the electricity distributor, and less susceptible to damage and deterioration. The result would be lower lifetime costs and greater safety.

An additional concern is that, in some cases, high voltage protection equipment may not always be effective for protecting low voltage installations. For example, high voltage protection equipment may not protect a customer's electrical installation in circumstances where there is a fault in the customer's equipment which creates a risk of fire and catastrophic failure of the customer's electrical installation.

A consultation draft of the proposed regulations was provided to key stakeholders, including representatives of Victoria's distribution businesses. The consultation draft proposed a modification to Regulations 234(b) and 235(3) to clarify that low voltage protection is required for low voltage electricity supplied directly from a substation.

The distribution businesses raised the following issues with respect to the initial low voltage option:

- Clause 2.5.1.2 of the Wiring Rules (AS/NZS 3000, 2018) covers the protection of low voltage electricity supply to an electrical installation, directly from a substation. The suggested amendment of 235(3) conflicted with the AS/NZS 3000 approach.
- It is sometimes not physically possible to retrofit low voltage protection in old substations.
- The option could introduce significant additional cost to customers without a material improvement in safety (the cost was estimated at around $40,000 per installation).

ESV subsequently wrote to the distribution businesses requesting further information about the protection arrangements they utilise for directly connected low voltage (L.V.) supplies. The key responses received were as follows:

- Distribution Business 1 (DB1): currently only provides L.V. protection to directly connected L.V. supplies to new distribution substations.
- DB2: currently provides high voltage (H.V.) protection only to large customers (loads exceeding 800 amps) connected directly to distribution substations.
- DB3: currently provides H.V. protection only to large customers (loads exceeding 800 amps) connected directly to distribution substations.
- DB4: Provides H.V. protection only to large customers (loads exceeding 900 amps) connected directly to distribution substations.

(The four DBs have 100% of the market share for relevant substations.)

5.5.3 Options

Table 18: Options: Protection of low voltage electricity supplies provided from substations

Option	Description
Option 4.1: No change.	This option would remake the regulations without specifying the type of protection to be provided to low voltage electricity supplies directly connected to distribution substations. This would allow either high voltage or low voltage protection to be provided.
Option 4.2: Require low voltage protection to be provided for all connections.	This option (which was proposed in the industry consultation) would require all low voltage electricity supplies directly connected to distribution substations to be provided with low voltage protection at the supply's point of origin (i.e. within the substation).
Option 4.3: Require low voltage protection to be provided for all low voltage connections to new substations.	This new approach would require all low voltage electricity supplies directly connected to new distribution substations to be provided with low voltage protection at the supply's point of origin (i.e. within the substation).

5.5.4 Impact assessment

The three options were considered against the criteria of safety and regulatory burden. The assessment results are summarised below. In summary, Option 4.1 would not address the ambiguity in the current regulations; and Option 4.2 would be impractical and potentially very costly. Option 4.3 is preferred.

Table 19: Assessment of options

Option	Summary of assessment
Option 4.1	Fails to address the underlying ambiguity in the current regulations, and the specific risk that mitigations for low voltage risks may not be appropriate.
Option 4.2	Based on the feedback received (and outlined above), ESV accepted the view of stakeholders that this option is not practical, given the difficulty and expense of retro-fitting low voltage protection for existing supplies or existing substations where space is an issue.
Option 4.3 (Preferred)	This option acknowledges stakeholders' views that retrofitting low voltage protection in existing substations (option 4.2) is a difficult task, with costs more than likely to outweigh the expected benefits. This option seeks to balance the realities of the existing distribution network and ESV's expectation that best practice protection arrangements be implemented into the future. If unique circumstances arise, distribution businesses could apply to ESV for an exemption from the requirement, and such applications would be considered on a case-by-case basis against the objectives of the legislation. The expected costs and benefits of this option are discussed below.

The distribution business stakeholders indicated that Option 4.3 entails the following expected costs:

Table 20: Feedback on costs from distribution businesses

Stakeholder	Expected costs	Comments
DB1	Nil. No additional costs for the DB.	Option 4.3 aligns with current practices at this distribution business.
DB2	Additional $20,600 to the cost of a new substation. This cost would apply to approximately 33 new substations per annum. This implies a total additional expected cost for the DB of $680,000 per annum.	The additional cost ($20,600 per connection) would likely be added to large customer's connection costs. This addition represents a modest increment to the total cost of a new substation.
DB3	This DB estimates that approximately six new substations per annum will be affected by this change. It estimates that the additional cost will be $60,000 which amounts to $360,000 in total per year.	The additional cost ($60,000 per connection) would likely be added to large customer's connection costs.
DB4	This DB estimates that approx. 20 new substations per annum will be affected by this change. It estimates that the additional costs will $40,000 per substation and $800,000 in total per year.	The additional cost ($40,000 per connection) would likely be added to large customer's connection costs.

The estimated aggregate cost is therefore approximately $1.84 million per annum, noting that this cost would in large part be incurred anyway (by customers instead of the DB), and on a whole-of-life basis would be partially offset by the lower lifetime maintenance costs. Option 4.3 is assessed as having the following benefits:

- Greater safety from matching specific low voltage protection to low voltage installations
- Low voltage protection to provide a better back-up should a customer's protection equipment fail (as noted above, low voltage protection is expected to operate more rapidly than high

voltage protection, and this is expected to help limit damage to customers' equipment, and in some circumstances to prevent fires)

- Safer locations for customers' main switchboard and protection equipment (not in places such as car parks where there is a risk of impact and vandalism)
- Customer's equipment in some cases would be better protected from deterioration due to exposure outdoors. Overall (and in addition to the safety impacts), the financial cost for society as a whole would be lower due to efficiency gains from improved maintenance and placing the protection inside substations
- Greater practicality and flexibility for customers with respect to the location of their main switchboard and protection equipment.

5.5.5 Preferred option: Protection of low voltage electricity supplies from substations

Option 4.3 is preferred. That option is expected to achieve a modest safety improvement, as well as practical benefits, for a modest incremental annual cost. The option is assessed as having a modest positive expected net benefit.

Proposed regulations:

304 Service lines and directly connected installations

(1) An electricity supplier must ensure that the supplier's service lines and low voltage electricity supplies to directly connected installations —

(a) contain a neutral conductor that is—

(i) continuous from any point of supply to the neutral terminal of the substation it is connected to; and

(ii) easily identified; and

(iii) verified as being a neutral conductor; and

(b) are protected by protective equipment, installed in accordance with regulation 305, that can isolate each of the active conductors of an electrical installation.

(2) In this Regulation and regulation 305—

directly connected installation means an electrical installation that is supplied low voltage electricity directly from an electricity supplier's substation.

305 Installation of protective equipment

(3) In the case of low voltage electricity supplies to a directly connected electrical installation—

(a) if the electricity supply is connected or will be connected to a substation constructed or reconstructed after the commencement of these Regulations, low voltage protective equipment must be installed within the substation; or

(b) if the electricity supply is connected or will be connected to a substation constructed or reconstructed before the commencement of these Regulations, low voltage or high voltage protective equipment must be installed within the substation; or

(c) if the electricity supply is connected or will be connected to a pole mounted substation, low voltage protective equipment must be installed on the substation pole.

(4) For 12 months on and from the day these Regulations commence, a substation constructed or reconstructed is taken to comply with subregulation (3) provided that the substation complies with, and continues to comply with, regulation 235(3) of the Electricity Safety (Installations) Regulations 2009 as in force immediately before those Regulations were revoked.

5.5.6 Proposed transitional period

Given the lead-time required for the installation of new substations, ESV proposes that, for the first 12 months after the regulations commence, new and reconstructed substations may comply with either the protection requirements of the current regulations or the requirements of the new regulations.

It is intended that this transitional period would allow the completion of projects that are already in progress. It is not expected that there would be a rush of installations during the transitional period as they are demand-driven and planned well in advance (i.e. a substation must be ordered in advance, and it takes a few months to build and deliver).

5.6 Private aerial lines

5.6.1 Background

When above-ground private aerial lines (PALs) in high bushfire risk areas require replacement ('substantial reconstruction'), they must be placed underground. There are potential grounds for changing this requirement in the case of above-ground 'private service lines'. Specifically, the regulations could be changed to allow these lines to be replaced with above-ground lines, provided various safety features were present, including the fitting of a 'break-away device'.

Regulation 220(1) of the current Regulations requires that a private electric line that is to be constructed, or a PAL that is to be substantially reconstructed, in a hazardous bushfire risk area (HBRA) must be placed underground. This is a bushfire mitigation measure that was introduced after the Ash Wednesday bushfires. It is intended to ensure PALs located in HBRAs are progressively placed underground as they reach the end of their service life.

Private electric lines

(1) A private electric line that is to be constructed or a private aerial line that is to be substantially reconstructed in a hazardous bushfire risk area must be placed underground.

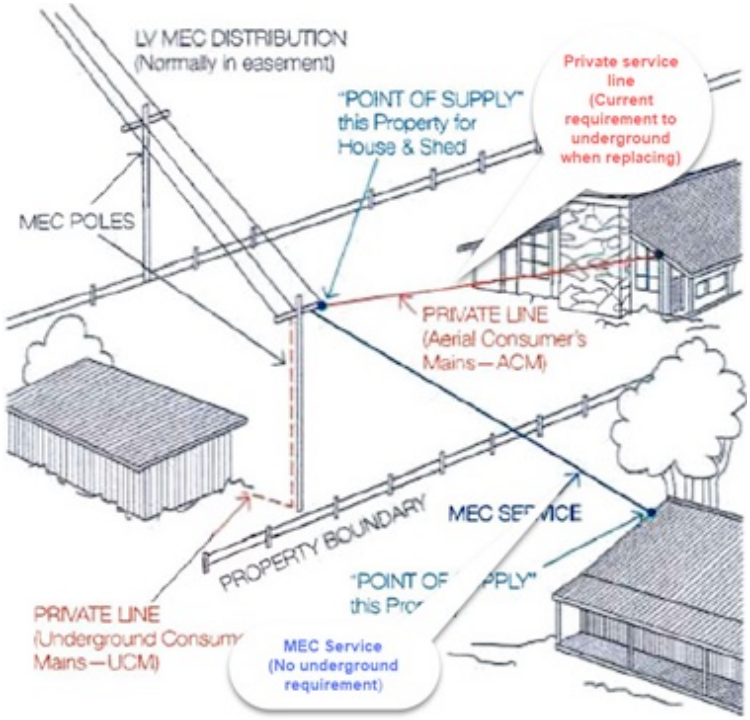
A private electric line is defined in the Act as being any low voltage electric line used to take electricity from the point of supply, whether or not that line is owned by an electricity supplier. The definition of point of supply is also set out in the Act.

For the purpose of this discussion, there are two relevant types of lines:

- Private service lines that are one span in length, connect an electricity supply to a property and are located entirely within the property's boundaries (referred to as 'private service lines' and indicated by the solid red line in the diagram below). As such, the owner is responsible for maintenance[26]
- Lines that connect an electricity supply located on an adjoining property (referred to as 'service lines' and indicated by the blue line in the diagram below).

[26] See section 84A(1).

Figure 8: Figurative example of above-ground and underground PALs, and service line



5.6.2 Problem

Two main issues have arisen in relation to private service lines.

1. Emergency restoration/enforcement issue:

When private service lines fail, they may be temporarily replaced with a private aerial line pursuant to current regulation 221. This is intended to allow people to maintain electricity supply while they arrange for the line to be replaced with an underground service. However, the cost of undergrounding electric lines is high and is arguably unwarranted with respect to private service lines, as the newly replaced private service line is safe and poses a very low bushfire ignition risk as it is short in length and only connected to distribution company assets (i.e. it is only one span long and is not attached to any private poles).

From an enforcement perspective, ESV could prosecute private service line owners for failing to underground these lines. However, with a maximum penalty of 20 penalty units, the fine imposed (if any) would be unlikely to exceed the costs of undergrounding. Moreover, at the completion of the prosecution, the line would remain above ground. As such, it is difficult for ESV to enforce the requirement to place these lines underground, with the owners of such lines understandably of the view that the requirement is an unreasonable response to the risk that lines of this type present.

ESV is unable to direct that the line be placed under ground as, being a newly replaced private service line, it is not immediately unsafe. The distribution business may have the power to disconnect the private service line from supply due to the failure to comply with the undergrounding requirement. Even if this is the case, distribution businesses appear reluctant to do so given that the line is now ostensibly safe to remain on supply. Overall, this is a difficult issue of regulatory design and enforcement.

2. Equity and consistency issue:

PALs were, in most cases, constructed by the SECV to provide electricity to rural properties. In response to the 1983 Ash Wednesday bushfires, the *State Electricity Commission (Clearance of Lines) Act 1983* was enacted. It placed responsibility for the maintenance of PALs on to the owners of the properties they serviced.

The relevant provisions of that Act now reside, largely unchanged, in the *Electricity Safety Act 1998*. They include provisions that determine the allocation of maintenance responsibilities between distribution businesses and PAL owners. When these provisions are applied to service lines, the result is that the solid red line in the diagram above is a PAL/private service line, and is therefore the responsibility of the landowner, and the blue line in the diagram is a service line, which is the responsibility of the distribution business.

The only difference between these two lines is that the private service line (the solid red line) is connected to distribution network assets located on the property it services, and the service line (the blue line) is not. A further consequence is that the private service line (the solid red line), under the current regulations, must be placed underground when it needs to be replaced, whereas the service line (the blue line) which is owned by a distribution business does not have to be placed underground when replaced.[27]

As such, owners of the private service line may see this requirement as unfair, given that the same line servicing their neighbour is the responsibility of a distribution business and is not subject to the requirement that it be placed underground at the time of replacing.

Risk assessment

ESV commissioned HRL Technology to conduct a risk review to assist with determining whether private service lines could safely remain above ground when replaced, without increasing the bushfire ignition risk associated with the line.

The report[28] advised that the use of insulated conductors to be used for the reconstruction of the private service line from pole to premises, particularly aerial bundled cable if that was required, virtually eliminated the fire ignition risk arising from clashing conductors, conductor contact with trees and branches, or contact with foliage. (These are the principal relevant fire risks.)

The report also found that the main failure mode that presented a residual bushfire ignition risk (after aerial bundled cable is used) related to the fracture of the overhead private service line near the premises, e.g. as a result of a falling branch or impact from a vehicle.

Given the above, the report recommended that a break-away device or safety service disconnection device fitted on the line at the point of connection with the distribution network (at the supply pole) would effectively eliminate the residual ignition risk. A break-away or cut-away device is a device that causes the line to break-away from the source of electricity supply in cases where it is impacted by, for example, a falling tree branch or vehicle. This will result in a dead line falling to the ground that is not capable of igniting fires. Without a break-away device, the line could break at the consumer end of the line, which could potentially leave a live line on the ground that is capable of starting fire.

[27] The safe design, construction, operation and maintenance of distribution supply assets are managed under an Electricity Safety Management Scheme (ESMS) accepted by ESV.
[28] HRL Technology, *"Bushfire Ignition Risk Associated with Private Overhead Electric Lines in High Bushfire Risk Areas"* (Prepared for ESV June 2016).

5.6.3 Options

Table 21: Options—private aerial lines

Option	Description
Option 5.1: No change.	Leave the current regulation unchanged; continue to require all PALs to be undergrounded when replaced. This option could include increased enforcement activity such as prosecution. However, for the reasons discussed above, this would not necessarily lead to an increased number of lines being placed underground. There is an equity issue as the same type of line, from the same pole, supplying a property next door, is considered a service line owned by the MEC and does not have to be placed underground at all. This is because of the definitions in the Act of 'point of supply' and 'private electric line'.
Option 5.2: Remove requirement and do not introduce additional risk mitigation.	Permit private service line type PALs to remain above ground after reconstruction without requiring it be constructed of aerial bundled cable and fitted with a break-away device.
Option 5.3: Remove requirement in limited circumstances and with additional risk mitigation.	Permit private service line type PALs to remain above ground after reconstruction provided they are constructed of aerial bundled cable and fitted with a break-away device.

5.6.4 Impact assessment

The three options were considered against the regulatory burden and safety criteria, and particularly with regard to:

- likely impacts on behaviour (non-compliance with the underground requirement due to higher costs, vs higher compliance with the lower cost above-ground requirement)
- likely impacts on safety (whether there would be a loss of safety or an equivalent level of safety in the move to above-ground replacement of private aerial lines).

The assessment results are summarised below.

Table 22: Summary of assessment—private aerial lines

Option	Summary of assessment
Option 5.1	This option is not preferred because it does not address the two sets of problems discussed above.
Option 5.2	This option would address the current regulatory anomalies but would re-introduce risks relating to bushfire safety and private aerial lines.
Option 5.3 (Preferred)	This option would address the current regulatory anomalies but with a risk-targeted approach and specific risk mitigation.

Private service line PALs are understood to be mostly short and constructed of aerial bundled cable when they are replaced. As such, this aspect of option 5.3 would not impose any additional costs.

The required break-away device is estimated to cost approximately $140. The total cost of replacing a private service line with a break-away device fitted is estimated to be approximately $2,500[29] (this

[29] Includes GST but does not include cost of required distribution business truck appointments (required to disconnect and reconnect the line from electricity supply).

includes replacing the overhead line with conductor, fused mains box, cutaway device, Certificate of Electrical Safety and Inspection).

This amount is significantly lower than the cost of installing the line underground (the current requirement), which is estimated to be approximately $5,600[30]: this includes the costs of the replacement underground line with conductor, cutaway device, Certificate of Electrical Safety and Inspection. (It is noted, as discussed above, that there is currently a level of non-compliance with this undergrounding requirement.)

Based on data provided by the distribution businesses, and assuming all defective single span PALs require replacement, ESV estimates that approximately 500 private service line PALs would require replacement each year. This implies a total annual cost of around $1.25 million (overhead lines) compared to around $2.8 million for the current requirement (underground).

5.6.5 Preferred option

Option 5.3 is preferred. ESV has accepted the recommendations of the HRL Technology report and proposes that private service lines may be reconstructed in high bushfire risk areas provided that the reconstructed line is constructed using aerial bundled cable and fitted with a break-away device at the point of connection with the supply network. The current requirement that the line be protected at its origin with an over-current protective device (other than a fuse link) that operates in all active conductors and can be operated from the ground, would also apply.

ESV sees this as a safety improvement compared to the current situation where private service lines are being reconstructed without a break-away device being fitted instead of being placed underground. The proposed exception to the underground requirement would only apply to the reconstruction of single span private service lines and would only apply to private service lines not located in an electric line construction area.[31]

ESV has consulted the distribution businesses[32] in relation to this issue. They suggested that the required break-away device should be a device approved by ESV. This is reflected in the option. ESV will work with the distribution businesses to determine suitable devices for approval, and these will be published on the ESV website.

Proposed regulation

233 Private electric lines in hazardous bushfire risk areas

(1) A private electric line that is to be constructed or substantially reconstructed in a hazardous bushfire risk area must be placed underground.

(2) Subregulation (1) does not apply to the substantial reconstruction of an existing private service located in a hazardous bushfire risk area that is not an electric line construction area provided that the private service line to be substantially reconstructed will—

(a) be comprised of aerial bundled cable; and

(b) have a single break-away device that has been approved by Energy Safe Victoria fitted at the point where the private service line is attached to the distribution company supply pole; and

(c) be protected at its origin with an over-current protective device (other than a fuse link) that operates in all active conductors and can be operated from the ground.

[30] As above.

[31] Electric line construction area is defined in section 120K of the Act and are a reference to the areas determined by the Government to be at risk of high consequence bushfires.

[32] Section 113F of the Act requires distribution businesses to inspect PALs in their areas at the frequency required under the Electricity Safety (Bushfire Mitigation) Regulations 2013 (currently at least once every 37 months for PALs in HBRA).

6 Fee for Certificates of Electrical Safety

6.1 Applying the cost recovery principles to determine the appropriate fees

6.1.1 Ability to charge fees for activities

The fees in the proposed Regulations fall within the scope of the *Cost Recovery Guidelines* (Guidelines). The activities to which fees should be considered are already articulated in the Act.

Section 45A(4) of the Act provides that a document is not a COES unless the certificate form used is a form that has been supplied by ESV (or a person authorised by ESV). Section 45B(1) allows ESV to sell COES forms to registered electrical contractors and licensed electrical installation workers and other prescribed persons, at a price not greater than the authorised amount (s. 45B(5)). Section 157 allows for regulations to set fees for or with respect to any function or service carried out by ESV.

Under the Act, COESs may only be sold to registered electrical contractors and licensed electrical installation workers and other prescribed persons.

6.1.2 Defining the activity

Clearly defining the relevant activity or activities that gives rise to the need for cost recovery is important to identify the relevant cost base.

ESV's regulatory activities related to electrical installations include:

- inspection of electrical installation work for compliance and breaches of regulation
- investigation of electrical incidents and fires
- audit of COESs
- costs associated with setting standards for electrical installations
- information/education provided about electrical installation standards and COES requirements
- assistance to the public in relation to COESs
- printing and distribution of paper COESs
- considering exemptions
- data analysis to support these functions
- investigation of complaints about electrical installations or workers.

Other ESV activities related to electrical safety more generally—such as the costs of registering and licensing electricians, and safety management of major electricity companies—are not included within the activities to be considered for cost recovery in this RIS.

6.1.3 Calculating the costs of activities

The cost base—the total cost of the above activities—has been determined based on fully distributed costs. For the most part, all ESV staff and activities can be easily allocated to specific functions, as most staff have clearly defined roles that can be mapped to regulatory functions. For example, a work group within ESV performs tasks exclusively related to COESs. Hence, staff costs that relate to the activities related to electrical installation work can be estimated based on the total cost of the relevant regulatory functions, with other corporate costs allocated based on the number of staff involved in these activities. Additional costs directly related to the particular personnel have also been included, such as superannuation and transport. Other costs (such as accommodation), can also be attributed to these activities based on the proportion of staff that undertake activities.

ESV has identified the following costs attributable to the regulation of electrical installations.

Table 23: Forecast cost of ESV activities related to regulating electrical installations

(costs are estimated average annual amount over the next ten years, expressed in 2019 dollars)[33]

Expense	$'000
Electrical Installation Safety function	
Employees (salaries, superannuation, etc)[34]	2,320
Marketing	10
Motor vehicles	200
Training & workshops	23
Travel	16
Memberships & subscriptions	1
Cost of electrical appliance check testing	24
Consultants and contractors	35
Audit of COESs	
Employee (salaries, superannuation, etc)[35]	579
Motor vehicle	42
Information services	24
Training & workshops	2
Travel	12
Memberships & subscriptions	2
Compliance audits (i.e., contracted services to conduct audits)	3,200
Admin fees – Certificates (fee paid to agents for the sale of paper COES certificates)	150
COES printing cost	90
Electrical Equipment Safety and Efficiency[36]	
Employee (salaries, superannuation, etc)[37]	775
Training and workshops	2
Travel	28
General administration	92
Other overheads	
Bank fee (proportion allocated based on percentage of value of transactions processed)	120
Insurance (based on proportion of headcount)	80
Professional fees (internal audit, external audit, legal fees) (based on proportion of FTE)	145
Occupancy (based on proportion of actual occupancy usage)	290
Computer, software and network (based on IT service type)	250
System & infrastructure (depreciation, amortisation, system investment) (by FTE)	660
RRPP (Strategy & planning team) (by FTE)	190
Director's office and ESV Corporate Services (pro rata based on proportion of FTE)	1,840
TOTAL	**$11,183**

[33] The cost of some activities can vary from year to year (e.g., specific audit blitzes). The costs smooth expected level of activities over the period of the Regulations. The costs were estimated using 2019 values only; actual costs each year would be expected to increase in line with general price and wage increases.

[34] This function comprises 18 FTE staff, with an average base salary of $133,700.

[35] This function comprises 3.5 FTE staff, with an average base salary of $133,700.

[36] The table includes 60% of the costs for this ESV function, being the estimated proportion of the work of this team attributable to activities related to electrical installations (investigating incidents involving the failure electrical equipment, conducting supplier audits, check testing of product classes for compliance with standards, initiating recalls and prohibitions of sale).

[37] This function comprises 12 FTE staff, with an average base salary of $130,00.

This total compares to an expected $10.986 million in revenue collected from the sale of COESs in 2018-19, which suggests that the total revenue for fees for COESs should increase by about 2 per cent (over and above any annual indexation to take account of inflation).

6.1.4 Assessing efficiency of costs

It is difficult to assess whether the cost of these activities is efficient in an objective way. This is because there is a degree of discretion about how many resources are devoted to some activities—such as how much audit work is undertaken. As assessment of efficiency therefore also needs to consider whether the level of audit activity is appropriate. There is a trade-off between the level of resources directed to administering COESs, and the effectiveness of the compliance system.

ESV aims for 5-10 per cent of non-prescribed COES to be audited. The results of these audits are reviewed to identify any required changes to the Wiring Rules, Education requirements, trends, overall compliance and a deterrent to the trade (to ensure that an audit is a real and not a mere remote possibility).

To assist in providing stakeholders an understanding of the appropriateness of the overall cost base, it is noted:

- The costs in Table 23 above (and associate footnotes) show the number of staff and average salary amounts (which indicates the staff grade used for the activities). ESV believes this is appropriate given the number of COESs completed each year.
- The ACT (the only other Australian jurisdiction that has implemented cost recovery through certificate fees) charges a fee of $242 for a compliance certificate (although this does not apply for all cases). The regulatory arrangements are not directly comparable, therefore it is difficult to use this fee as a benchmark.

The efficiency of ESV costs can be seen by noting that a large share of fee revenue comes from fees that are not automatically indexed each year.[38]

The fees for certificates for non-prescribed work are set as fixed dollar amounts, as they are less than one full fee unit under the Monetary Units Act.[39] To partly address this, these fees were increased via amendments to the Regulations in 2011 and 2014. However, the current fees are well below what they would have been if they were linked to the annual indexation of fees.

- Non-prescribed Certificate of Electrical Safety (electronic)—Fee has increased by 3.8 per cent since the Regulations began in 2009. Over the same period, the value of fee units under the Monetary Units Act has increased by 26.7 per cent (including increase since 1 July 2019).
- Non-prescribed Certificate of Electrical Safety (paper)—Fee has increased by 4.2 per cent since the Regulations began in 2009. Over the same period, the value of fee units under the Monetary Units Act has increased by 26.7 per cent (including increase since 1 July 2019).

If these two fees were automatically increased in line with fee unit values since 2009, total revenue in 2019 from COES fees would be around $1 million higher, or around 9 per cent. This total fee revenue (of $12 million) would be significantly more than the estimated costs to ESV of $11.2 million.

See Appendix C for further detail on the level of the current fees compared to indexed fees.

[38] The current fees set different amounts for COESs depending on whether the work is prescribed or non-prescribed electrical work, and whether the certificate is submitted online or on paper.
[39] The Monetary Units Act does not allow fee units to be used where they would amount to less than 1 fee unit (currently $14.81).

6.2 The base case

The base case is the scenario against which all other options are assessed. Usually the base case for a fees RIS is zero cost recovery, as no fees could be charged if there were no regulations in place. This is not the case for COES. The Act sets a default maximum price for COESs (see s. 45B(12)), which the regulations can vary.

In the absence of remaking the Regulations, fees would likely be set at the default maximums under the Act. The table below shows the revenue that would be raised from these prices.

Table 24: COES revenue under the base case (for 2018-19)

COES type	No.	Price	Revenue ($'000)
Prescribed - Paper	88408	$20	$1,768
Non-prescribed - Paper	341935	$5	$1,710
Other - Paper	415	$500	$208
Prescribed - Electronic	93120	$20	$1,862
Non-prescribed - Electronic	310189	$5	$1,551
COES revenue			**$7,099**

Hence, under the base case, COES fees would raise revenue of around $4.1 million less than the full cost of ESV's electrical installation regulatory activities.

Under the base case, this revenue gap could be addressed in one of three ways:

- The cost of the activities not met by COES revenue could be met by the government—i.e., taxpayers generally would fund some of the activities
- The cost of the activities not met by COES revenue could be met by increasing levies on major electricity companies (MECs)—the Act provides that a distribution company must pay to ESV such annual amount as the Minister determines to be payable by that distribution company in respect of the reasonable costs and expenses of ESV (see section 8). While an increase in the levy would be paid by distribution companies, the cost would ultimately be passed through to all electricity customers
- The regulatory activities of ESV could be scaled back so that costs were reduced to the available COES revenue. This would involve a reduction in the number of audits and inspections.

Whichever option would eventuate in practice, the relevant points are that:

- Where others (taxpayers or distribution companies) contribute to the costs, the full cost of the regulatory activities is not reflected in the price of COESs, and hence the problem of inefficient allocation of resources remains. Recovering costs through setting levies on MECs higher than they would otherwise be would involve ongoing cross-subsidisation, which is in general not desired.
- Alternatively, reducing the level of ESV's regulatory activities would increase the risk of harms arising from electrical installations.

6.3 Options for setting fees

General government policy is that regulatory fees and user charges should be set on a full cost recovery basis because it ensures that both efficiency and equity objectives are met. However, there may be other factors—such as equity considerations or risks to policy effectiveness—that may warrant consideration of less than full cost recovery.

The Guidelines outline a number of situations where partial cost recovery may be appropriate, including when:

- practical implementation issues make cost recovery infeasible—e.g., the costs of collecting fees may be high relative to the revenue collected
- there are benefits to third parties (i.e., positive externalities) e.g. preventative health care
- social policy or vertical equity outcomes may be more important than efficiency objectives
- full-cost recovery may adversely affect other government policy objectives—e.g., innovation, concessions, income redistribution, etc
- merit goods exist such as situations where the community as a whole desires a higher level of output—e.g., education, exercise and the arts.

In practice, costs are usually recovered from private parties, including individuals or businesses that directly benefit from a government good or service or whose activities are regulated by government.

6.3.1 Level of cost recovery

ESV has determined that full cost recovery is appropriate, consistent with the government's policy on cost recovery.

As stated in the Cost Recovery Guidelines, general government policy is that regulatory fees and user charges should be set on a full cost recovery basis, because it ensures that both efficiency and equity objectives are met, unless there are circumstances in which a departure from the full cost recovery principle may be justified (which may require making a trade-off between efficiency, equity and other policy considerations). There does not appear to be any factors that warrant consideration of partial or zero cost recovery: the level of the fees to achieve cost recovery is not so significant as to lead to increased non-compliance or interfere with other policy objectives, and is relatively small compared to the total amount of electrical work undertaken.

ESV therefore considers that it is appropriate that fees be increased to make up the shortfall. Increasing COES revenue in the new Regulations achieves the objectives of the cost recovery principles as it aligns the fee charged to electricians with the actual cost of providing the regulatory activities, and should therefore achieve the objectives of efficiency allocation of regulatory activities resources, and horizontal equity.

With respect to 'vertical equity' (the relative ability of different people to pay the fee), this is not considered a significant consideration in determining the fees. As professional businesses, the cost of COESs is built into the costs of business. The cost is ultimately passed through to the end consumer, although the contribution of the COESs cost to the overall cost of services is considered to be small.

Noting that some fees are already automatically increased each year in line with increases to fees under the Monetary Units Act, while other fees have not been automatically increased, it is proposed to increase the total revenue by making adjustments to the fixed fees that were last adjusted in 2014.

To achieve full cost recovery for 2019-20, the fees would need to be adjusted as follows:

- The fees for COES for prescribed electrical work (electronic or paper certificates) would not be changed (but continue to increase each year in line with automatic indexation for inflation).
- The fees for periodic COES (which only apply for a small number of non-prescribed electrical work) would not be changed (but continue to increase each year in line with automatic indexation for inflation)

- The fee for Non-prescribed Certificate of Electrical Safety (electronic)—would need to increase from $6.75 to $7.23 (an increase of 7.1 per cent)
- The fee for Non-prescribed Certificate of Electrical Safety (paper)—would need to increase from $7.40 to $7.93 (an increase of 7.2 per cent).

These fees will ensure that COESs revenue fully recover the ESV costs related to regulating electrical installations in 2019-20.

Table 25: Revenue from COESs fees

Scenario	Annual revenue (in 2018-19 dollars)
No regulations (base case, using default fees)	$7.1 million
Continue current fees	$11.0 million
Increase COES fees	$11.2 million

Therefore, in terms of incremental impacts, the proposed Regulations will raise $4.1 million per annum more than if there were no regulations (and the default fees in the Act were used), and around $200,000 more than if the current fees were continued.

6.3.2 Fee design

ESV considers that the structure of fees—which distinguish between COES for prescribed and non-prescribed work, and whether the certificate is provided in paper or electronically, remains appropriate. The difference in fees between electronic and paper certificates reflects that there is less resources required for ESV to process electronic certificates. ESV notes that there may be a shift to a higher proportion of certificates being lodged electronically in future years, in which case the costs to ESV and the revenue raised from fees in total would both be reduced in similar proportion.

However, ESV recognises that the proposed increases to these two fees would continue to be the amount fixed in the Regulations and would not automatically increase each year in line with increases to other government fees and charges to reflect cost inflation. Increasing these fees by the amounts indicated in the previous section (to $7.23 and $7.93 respectively) would be consistent with achieving full cost recovery for 2019-20, but each year beyond that, the revenue collected would continue to fall behind the increase in costs in nominal terms.

It is not possible to convert these fees into fee units. There are therefore two options in managing these fees over the life of the regulations:

- Increase the maximum fee for these items by 35 per cent, and allow ESV to increase the actual fee charged incrementally each year—a once-off increase of around 7 per cent and then further increases of the fee in line with the Treasurer's annual rate until 2029.
- Increase these two fees by 20 per cent in 2019, and then keeping it at the same rate for the duration of the new Regulations. The increase by 20 per cent is based on the total revenue over the life of the regulations matching the total costs over the life of the Regulations, but would mean slight over-recovery in the early years and under-recovery in the later years.

ESV has had regard to the need to ensure fees for COES are kept simple, and to provide certainty to industry. Therefore, ESV proposed to increase the fees for the two fixed fee classes of COESs by 20 per cent now. By removing discretion of ESV to increase fees, it also ensures that there is an incentive for ESV to keep regulatory costs efficient.

See Appendix C for further detail on the proposed increases to these fees.

6.3.3 Fees for exemption

The Regulations include a power for ESV, upon application, to grant exemptions from parts of the Regulations in certain circumstances.

There is currently a fee (of 5.99 fee units, or $88.70) for making this application. The fee is notionally for the purpose of meeting the costs to ESV of receiving the application, reviewing the reasons for the exemption, reviewing relevant technical information, determining whether to grant the exemption and imposing of any conditions, and formalising the exemption in a written agreement.

However, in practice, each application is unique and the costs to ESV of considering an exemption could range from a small cost to a more significant cost if there are complex issues to consider. Overall, the number of exemptions is relatively small, so the costs of even a 'typical' exemption is not able to be meaningfully determined.

As this activity does not represent an overall significant cost to ESV in total, is it intended to continue the current fee at the same level, primarily for the purpose of ensuring there is a price signal to discourage unnecessary applications.

It is noted that the Regulations also allow ESV to waive or rebate the fee if ESV considers the exemption being sought is minor, or if there is no appreciable burden on ESV.

6.4 Conclusion on COES fees

Based on the above considerations, ESV proposes the fees as shown in the following table—these show the value of current fees as from 1 July 2019, and the proposed values once the new Regulations commence (expected in December 2019).

Table 26: Comparison of current and proposed fees

COES type	Current fee units	2019-20 fee amount	Proposed fee units	2019-20 fee amount	% change
Electronic Certificate of Electrical Safety form for prescribed electrical work	2.2	$32.60	2.2	$32.60	0%
Paper Certificate of Electrical Safety form for prescribed electrical work	2.4	$35.50	2.4	$35.50	0%
Periodic Certificate of Electrical Safety form for non-prescribed electrical work	55.6	$823.40	55.6	$823.40	0%
Non-prescribed Certificate of Electrical Safety (electronic)	-	$6.75	-	$8.10	20%
Non-prescribed Certificate of Electrical Safety (paper)	-	$7.40	-	$8.90	20%
Exemptions application fee	5.99	$88.70	5.99	$88.70	0%

7 Enforcement, implementation and evaluation

7.1 Enforcement

The primary compliance activities of ESV are discussed earlier in this RIS in relation to inspections and audits of electrical work. The proposed Regulations include penalties for non-compliance with these requirements (as well as the potential for disciplinary action under the Act).

The proposed Regulations also impose 'duties' on the public. These are by way of prohibitions that ensure certain electrical infrastructure is not interfered with. These are by and large common sense for most people, and do not create a burden to do anything different than they would otherwise do, however by including these in the proposed Regulations, ESV can take action and apply penalties.

ESV has consulted with the Department of Justice and Community Safety on the penalty amounts.

7.2 Implementing the proposed Regulations

No substantial implementation strategy is needed for the proposed Regulations. This is because, for the most part, the proposed Regulations continue the current arrangements. Some minor changes to the Regulations can be incorporated within business-as-usual dealings with the electrical industry, such as periodic information bulletins, guidance material (printed and online), and regular engagement with stakeholders. The more substantial changes will be communicated to relevant industry participants as follows:

Table 27: Implementation actions

Key proposed changes	Key communication messages
Inspection of Battery Energy Storage Systems (BESS) installations	Convey the requirement that electrical installation work carried out on any BESS must be inspected by a licensed electrical inspector, provided that the system has: a) a nominal voltage exceeding 12 volts direct current; and b) an individual or combined rated storage capacity equal to or greater than 1 kilowatt hour including work on associated wiring systems, switchgear, control gear or accessories. The communications will focus on defining the scope of the requirement, and the conduct of the inspections.
Electrical work on energised electrical equipment	Communicate good practice elements including preparation and planning; use of appropriate tools and personal protective equipment; risk assessment; a safe work method statement; explicit authorisation; clear marking of the disconnection point; and working in areas clear of obstructions.
Independently verifying standards compliance for high voltage electrical installation work	Communicate the new requirement to have an independent competent person verify that proposed high voltage installation work will comply with AS 2067 and AS/NZS 7000 when completed. The communications will focus on the scope of the requirement, and the nature of an independent competent person; as well as relevant expected benefits, and principles of independence and accountability.
Protection of low voltage electricity supplies provided from substations	Communicate the new requirement, with a focus on its scope, and in particular the limitation to low voltage connections to new substations.
Single span private aerial lines	Communicate the removal of the requirement, in specific circumstances, that single span private aerial lines requiring replacement in high bushfire risk areas must be placed underground. Focus communications on the circumstances in which the undergrounding requirement would be removed, and the expected impacts on safety and costs.

Standards are available for purchase from SAI Global.

7.3 Evaluating the proposed Regulations

ESV does not propose to formally review the proposed Regulations until they are due to be remade in 2029. However, ESV has a number of mechanisms that will allow it to monitor the performance of the Regulations, including regular consultation with industry participants that will enable it to identify any implementation issues or unintended outcomes and address them. ESV proposes to use data on incidents, injuries and fatalities to continue to assess the effectiveness of the Regulations, including by comparing Victoria's performance with other jurisdictions.

The two elements of the proposed Regulations that have a significant quantified cost (prescribing the work for which certificates of inspection are required, and the fees for COESs) will be closely monitored on an ongoing basis, and ESV will:

- On an annual basis, review whether the fee for COESs remains consistent with recovering the cost of services over the life of the Regulations, or whether cost reductions or efficiencies could allow the fee to be set below the prescribed maximum
- Through existing consultation processes with industry, consider feedback on whether there is scope to remove, or rationale to add, any types of work to the prescribed types of work that require a certificate of inspection.

The substantial elements of the prescribed work standards in the proposed Regulations are through the incorporation of the national Wiring Rules. These Rules are developed by Standards Australia, and are reviewed periodically in consultation with industry stakeholders and state governments. The Wiring Rules were last updated in 2018.

There may be other reviews that have indirect consequences for the Regulations in the future, such as administrative changes to ESV's regulatory approach.

Specific performance indicators for the more substantial changes to the Regulations are summarised in the following table.

Table 28: Evaluation of proposed Regulations

Key proposed changes	Key performance indicators
Inspection of Battery Energy Storage Systems (BESS) installations	• Number of BESS installed. • Number of inspections (a subset based on voltage and storage capacity). • Defects and other issues identified (from inspections and incidents). • BESS related incidents. • Stakeholder understanding and acceptance of new requirements (via surveys).
Electrical work on energised electrical equipment	• Extent of work on energised electrical equipment. • Compliance with good practice elements including preparation of risk assessments; safe work method statements; and provision of explicit authorisation. • Incidents involving work on energised equipment. • Stakeholder understanding and acceptance of new requirements (via surveys).
Independently verifying standards compliance for high voltage electrical installation work	• Number of relevant high voltage installations. • Instances of independent verification of compliance with AS 2067 and AS/NZS 7000. • Availability of independent competent persons. • Incidents involving design of high voltage installations. • Stakeholder understanding and acceptance of new requirements (via surveys).
Protection of low voltage electricity supplies provided from substations	• Number of new substations and relevant connections. • Incidents involving low voltage supplies from substations. • Stakeholder understanding and acceptance of new requirements (via surveys).

Appendix A: Prescribed electrical installations

The following table sets out what is considered 'prescribed electrical installations' in the proposed Regulations.

Topic	Type of Work	Rationale for requiring inspection

Main electricity Supply and main protection systems	(a) consumer's mains, main earthing systems, consumer's terminals connection devices, any supports for overhead service lines (including any poles) and those parts of main switchboards that are related to the control of electrical installations or the protection against the spread of fire	• Single installation e.g., House, shop or factory
		  • Encompasses cabling that supplies electricity to the installation and equipment that distributes electricity throughout the installation
		  • Ensure Switchboard installed correctly – installed in an appropriate location – protected from moisture - protected from mechanical damage – correct connections
		  • Once installed can remain in place for long periods of time without maintenance
		  • Earthing systems and switchboard protective equipment critical in providing safety to the installation and occupants
		  • Includes the mandatory installation of safety switches and correct operation
		  • Includes protection against the spread of fire
		• Note: Some non-compliances can make the switchboard cabinet, all metal pipes and metal cased appliances within an installation live at 230V

New or replacement main switchboards	(b) if a main switchboard or a replacement main switchboard is connected for the first time, any circuit protective devices, switchgear, controlgear, circuit breakers and wiring systems of that main switchboard in place at the time that the items set out in paragraph (a) are inspected	• Single installation e.g., House, shop or factory
		  • Ensure Switchboard installed correctly – installed in an appropriate location – protected from moisture - protected from mechanical damage – correct connections
		  • Includes the mandatory installation of safety switches
		  • Includes protection against the spread of fire
		  • Once installed can remain in place for long periods of time without maintenance
		• Note: Some non-compliances can make the switchboard cabinet, all metal pipes and metal cased appliances within an installation live at 230V

Electricity supply and main switchboards to individual occupiers' portions of multiple occupancies	(c) sub-mains, earthing systems and any distribution boards related to the control of individual occupiers' portions of a multiple occupancy	• Single tenancy of a multiple installation e.g., residential unit
		  • Encompasses cabling that supplies electricity to the tenancy installation and equipment that distributes electricity throughout the installation
		  • Ensure Switchboard installed correctly – installed in an appropriate location – protected from moisture - protected from mechanical damage – correct connections
		  • Once installed can remain in place for long periods of time without maintenance
		  • Earthing systems and switchboard protective equipment critical in providing safety to the installation and occupants
		  • Includes the mandatory installation of safety switches and correct operation
		  • Includes protection against the spread of fire

Topic	Type of Work	Rationale for requiring inspection
		Note: Some non-compliances can make the switchboard cabinet, all metal pipes and metal cased appliances within an installation live at 230V

New or replacement switchboards for individual occupiers' portions of multiple occupancies	(d) if a distribution board related to the control of individual occupiers' portion of a multiple occupancy, or a replacement distribution board related to the control of individual occupiers' portion of a multiple occupancy, is connected for the first time, any circuit protective devices, switchgear, controlgear, circuit breakers and wiring systems of that distribution board in place at the time the items set out in paragraph (c) are inspected	• Single installation e.g., House, shop or factory
		  • Ensure Switchboard installed correctly – installed in an appropriate location – protected from moisture - protected from mechanical damage – correct connections
		  • Includes the mandatory installation of safety switches
		  • Includes protection against the spread of fire
		  • Once installed can remain in place for long periods of time without maintenance
		• Note: Some non-compliances can make the switchboard cabinet, all metal pipes and metal cased appliances within an installation live at 230V

High voltage installations	(e) high voltage installations, except high voltage electrical equipment that is—
	(i) associated with an electric discharge lighting system; or
	(ii) associated with X-ray equipment; or
	(iii) associated with high frequency equipment; or
	(iv) within self contained equipment supplied at low voltage
		• Substations or other High Voltage generation, distribution or equipment
		  • Encompasses cabling that supplies from 6.6kV to 132kV electricity to the installation and cabling and equipment that distributes electricity throughout the installation
		  • Ensure HV Substations and HV switchgear installed correctly – installed in an appropriate location – protected from moisture - protected from mechanical damage – correct connections
		  • Once installed can remain in place for long periods of time without maintenance
		  • HV Earthing systems and protection equipment critical in providing safety to the installation and occupants
		  • Includes protection against the spread of fire
		  • Includes the protection against step and touch voltages
		  • Includes confirmation that the owner/operator of the installation has the proper processes and procedures are in place for the safe operation, isolation, earthing and permit systems for safe work practices

Generation systems	(f) wiring systems, switchgear, controlgear and accessories installed to provide control or protection to generation systems (excluding stand-alone power systems with a power rating that is less than 500 volt-amperes)	• Motor driven Generator, Grid connect Solar, Water or wind generation
		  • Encompasses cabling that supplies electricity to the installation and equipment that distributes electricity throughout the installation from the Generator
		  • Ensure Switchboard installed correctly – installed in an appropriate location – protected from moisture - protected from mechanical damage – correct connections
		  • Once installed can remain in place for long periods of time without maintenance

Topic	Type of Work	Rationale for requiring inspection
		• Earthing systems and switchboard protective equipment critical in providing safety to the installation and occupants • Ensure inverter systems installed correctly to eliminate electric shock or fire from incorrect connections or installation • Includes protection against the spread of fire Note: Incorrect connections to an installation that has both mains supply and generator supply can have catastrophic consequences to the installation and occupants.
Electric Security Fences	(g) electric fences used for security purposes but not including electric fences intended primarily for the containment of animals	• Prisons or other secure locations • Encompasses cabling that supplies electricity to the fence • Ensure circuit protection installed correctly - in an appropriate location – protected from moisture - protected from mechanical damage – correct connections • Once installed can remain in place for long periods of time without maintenance • Earthing systems critical in providing safety to the installation and occupants • Includes protection against the spread of fire • Includes the protection of external persons or animals coming into direct contact
Electrical equipment in hazardous areas	(h) electrical equipment installed in a hazardous area and electrical equipment associated with the protection of a hazardous area but not installed within the hazardous area	• Petrochem, Spray booths, dust emitting environments • Encompasses cabling that supplies electricity to the equipment in the hazardous area and the equipment that is installed in the hazardous area • Includes protection against the spread of fire and explosions • Ensure equipment selected is correct for type of hazardous installation – incorrect equipment can cause fire and explosions • Ensure equipment installed is installed to the requirements of the hazardous installation – incorrectly installed equipment can cause fire and explosions • Where installed - ensure Switchboard installed correctly – installed in an appropriate location – protected from moisture - protected from mechanical damage – correct connections • Once installed can remain in place for long periods of time without maintenance • Earthing systems and switchboard protective equipment critical in providing safety to the installation and occupants • Must take into account mitigating the foreseeable adverse effects of dust, flammable liquids or gases.
Building Safety Services	(i) circuit protective devices, switchgear, controlgear, wiring systems and accessories (other	• High Rise structures or installations requiring Fire pumps, evacuation equipment, emergency lifts etc

Topic	Type of Work	Rationale for requiring inspection
	than fire detection and alarm systems) installed to provide control or protection to, fire pumps (excluding pumps for fire hose reels where those hose reels are not the sole means of fire protection) or air handling systems intended to exhaust or control the spread of smoke or fire or the electricity supply for emergency lifts	• Encompasses cabling that supplies electricity to the Safety Services and the protective equipment installed to electrically protect the safety services • Ensure Switchboard installed correctly – installed in an appropriate location – protected from moisture - protected from mechanical damage – correct connections – segregation of safety services from general electrical protection equipment • Once installed can remain in place for long periods of time without maintenance • Earthing systems and switchboard protective equipment critical in providing safety to the installation and occupants • Includes protection against the spread of fire • Ensure persons can utilise safety services to exit the building under emergency conditions i.e., persons exiting a building safely during a fire by the use of emergency lifts
Part 1 solutions under the Wiring Rules	(j) a part 1 solution installed in an electrical installation	An engineered solution that provides a safety outcome equal to or better than the requirements of the legislation or applicable Australian Standards • Used where the installation requirements cannot be met by current methods or available equipment in the marketplace • The solution must ensure that all hazards and risks are identified and eliminated to ensure a safe outcome for the preservation of life and installation.
Medical patient areas	(2) Work on all or part of any fixed electrical equipment operated at any voltage installed in a patient area (other than communication equipment operated at extra low voltage).	Installations including but not limited to: Doctors surgeries, dentists, Hospitals wards and operating theatres • Encompasses cabling that supplies electricity to the installation and equipment that distributes electricity throughout the installation • Ensure Switchboard installed correctly – installed in an appropriate location – protected from moisture - protected from mechanical damage – correct connections • Earthing systems and switchboard protective equipment critical in providing safety to the installation and occupants • Includes the mandatory installation of safety switches and correct operation • Includes protection against the spread of fire • Includes increased protective requirements for operating theatres to ensure elimination of electric shock by medical equipment to the patient during an operation
Battery systems	Work on all or part of any battery or other electricity storage system with a nominal operating voltage exceeding 12	• Includes battery storage systems for Grid connection • Encompasses cabling that supplies electricity from battery storage system to the installation

Topic	Type of Work	Rationale for requiring inspection
	volts direct current and an individual or combined rated storage capacity equal to or greater than 1 kilowatt hour including work on associated wiring systems, switchgear, controlgear and accessories.	and equipment that distributes electricity throughout the installation • Ensure battery protection equipment installed correctly – installed in an appropriate location – protected from moisture - protected from mechanical damage – correct connections to prevent battery explosion or fire • Batteries installed in a well ventilated area to eliminate suffocation by battery gases • Once installed can remain in place for long periods of time without maintenance • Earthing systems and switchboard protective equipment critical in providing safety to the installation and occupants • Includes protection against the spread of fire • Ensure inverter systems installed correctly to eliminate electric shock or fire from incorrect connections or non-compliant installation
Exclusions	(3) For the purposes of section 45 of the Act, ***prescribed electrical installation work*** does not include— (a) the repair or maintenance of a single component part of an electrical installation; or (b) the replacement of a single component part of an electrical installation by an equivalent component part at the same location; or (c) the installation or connection of a consumer billing meter. (4) A single component referred to in subregulation (3) includes any terminating device required to connect that single part of an electrical installation to the electricity supply.	The rational for NOT requiring an inspection is it has been proven that the replacement of a single component (part) is most unlikely to make the electrical installation unsafe and is often done in an emergency to restore power making the delay in arranging an inspection unacceptable.

Appendix B: Comparison with approaches of other jurisdictions

Table 29: Legislation, regulations, principal standards and distribution company requirements

Jurisdiction	Act	Regulations	Principal standards adopted	Distribution company requirements
Vic	Electricity Safety Act 1998 (Vic)	Electrical Safety (Installations) Regulations 2009 (Vic)	AS/NZS 3000*; AS/NZS 7000 (Proposed)	Service and Installation Rules 2014
NSW	Gas and Electricity (Consumer Safety) Act 2017 (NSW)	Gas and Electricity (Consumer Safety) Regulations 2018 (NSW); Electricity Supply (Safety and Network Management) Regulation 2014 #	AS/NZS 3000*	Service and Installation Rules of New South Wales 2018
Qld	Electrical Safety Act 2002 (Qld)	Electrical Safety Regulations 2013 (Qld)	AS/NZS 3000*	Queensland Electricity Connection Manual – Service and Installation Rules 2018
WA	Electricity Act 1945 (WA)	Electricity (Licensing) Regulations 1991 (Part 5); Electricity Regulations 1947 (WA); Occupational Safety and Health Regulations 1996 (WA) (Div 6, Part 3)	AS/NZS 3000*; AS/NZS 7000	Western Australian Distribution Connections Manual 2015
SA	Electricity Act 1996 (SA)	Electricity (General) Regulations 2012 (SA)	AS/NZS 3000*	Service and Installation Rules – Manual 32 2017
Tas	Electricity Supply Industry Act 1995 (Tas)	Occupational Licensing (Electrical Work) Regulations 2018; Work Health and Safety Regulation 2012 (Tas)	AS/NZS 3000*; AS/NZS 7000	Service and Installation Rules 2018
ACT	Electricity Safety Act 1971 (ACT)	Electricity Safety Regulation 2004; Utilities Networks (Public Safety) Regulation 2001#	AS/NZS 3000*	Electricity Service and Installation Rules Code 2013

Jurisdiction	Act	Regulations	Principal standards adopted	Distribution company requirements
NT	Electricity Reform Act 2016 (NT)	Electricity Reform (Safety and Technical) Regulations 2016 (NT); Work Health and Safety (National Uniform Legislation) Regulations 2017 (NT) (Part 4.7)	AS/NZS 3000*	Network Policy NP 003 – Installation Rules; NP 007 – Service Rules
NZ	Electricity Act 1992 (NZ)	Electricity (Safety) Regulations 2010 (NZ)	AS/NZS 3000*; AS/NZS 7000	Twenty nine distribution businesses with own technical requirements – Example: Orion Electricity Network Code.

***** Note: By adopting AS/NZS 3000 (The Wiring Rules) jurisdictions also adopt other key standards which are deemed by the Wiring Rules to be mandatory. This includes the following:

- AS/NZS 3010 - Electrical installations - Generating sets
- AS/NZS 4509 (Series) – Stand-alone power systems
- AS/NZS 3011 (Series) – Secondary batteries installed in buildings
- AS/NZS 5033 - Installation and safety requirements for photovoltaic (PV) arrays
- AS/NZS 4777 (Series) - Grid connection of energy systems via inverters - Installation requirements
- AS 2067 - Substations and high voltage installations exceeding kV a.c.
- AS/NZS 60079.14 - Explosive atmospheres - Design selection, erection and initial inspection
- AS/NZS 3012 - Electrical installations - Construction and demolition sites
- AS/NZS 3003 - Electrical installations - Patient areas
- AS/NZS 3004.1 - Electrical installations - Marinas and boats - Marinas
- AS/NZS 3002 - Electrical installations - Shows and carnivals.

Works protection requirements only.

Table 30: Additional rules, codes or requirements

Jurisdiction	Rules, codes or requirements
Vic	Blue Book Orange Book (Proposed) ESV Apprentice Supervision Requirements (Proposed) ESV Vegetation Management Rules (Proposed)
NSW	NSW Code of practice-Managing Electrical Risks in the Workplace 2016
Qld	Electrical safety code of practice 2010– Electrical equipment rural industry Electrical safety code of practice 2013– Managing electrical risk Electrical safety code of practice 2010–Working near overhead and underground electric lines Electrical safety code of practice 2010–Works.
WA	WA Electrical Requirements 2015 Code of Practice for person working on or near energised electrical installations (2017) Safe working guidelines for electrical workers (2018) Safe working guidelines and assessment for electrical apprentices (2018) Code of Practice for Personnel Electrical Safety for Vegetation Control Work Near Live Power Lines (2012)
SA	Code of practice-Managing Electrical Risks in the Workplace 2015 (Safe Work Australia)
Tas	Occupational Licensing Standards of Electrical Work Code of Practice 2017 Occupational Licensing (Classification of Electrical Work) Determination 2016 Occupational Licensing (Private High Voltage Electrical Work – Certification and Energisation) Determination 2016 Occupational Licensing (Supervision of Prescribed Work) Code of Practice 2010 Managing Electrical Risks in the Workplace 2018 (Safe Work Australia)
ACT	Managing Electrical Risks in the Workplace 2015 (Safe Work Australia)
NT	None.
NZ	ECP 34 - New Zealand Electrical Code of Practice for Electrical Safe Distances (NZECP 34:2001) ECP 35 - New Zealand Electrical Code of Practice for Power Systems Earthing (NZECP 35:1993) ECP 50 - New Zealand Electrical Code of Practice for Repair and Maintenance of Domestic Electrical Appliances by the Owner of the Appliance (NZECP 50:2004) ECP 51 - New Zealand Electrical Code of Practice for Homeowner/Occupier's Electrical Wiring Work in Domestic Installations (NZECP 51:2004) ECP 54 - New Zealand Electrical Code of Practice for the Installation of Recessed Luminaires and Auxiliary Equipment (NZECP 54:2001) ECP 55 - New Zealand Electrical Code of Practice for Managing Electrical Risks Associated with Electrically Conductive Thermal Insulation (NZECP 55:2016)
Norfolk Island (Cth)	None.

Table 31: Key Features of the Electrical Installation Legislation:

	Vic	NSW	Qld	WA	SA	Tas	ACT	NT	NZ	NI
Wiring Rules **Overhead Line Design (AS/NZS 7000)**	✓ P	✓ ×	✓ ×	✓ ✓	✓ ×	✓ ✓	✓ ×	✓ ×	✓ ✓	✓ ×
Certification of H.V design work	P	×	×	✓	×	✓	×	×	✓	×
Testing requirements	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Certification Requirements (Compliance Certificate or other notice)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Certificate Fees	✓	×	×	×	×	×	×	×	×	×
Inspection requirements	✓	×	✓	✓	✓	✓	✓	✓	✓	✓
Incident reporting	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Table 32: Inspection and Certification Requirements of Electrical Installation Work:

	Inspection Requirements	Testing and Self-Certification of Electrical Work
Vic	Prescribed electrical installation work must be inspected by a licensed. A licensed inspector is not to inspect an electrical installation unless they have a certificate of compliance for the installation, signed by the person who carried out the electrical installation work.	A licensed electrical installation worker who carries out electrical installation work is required to complete and sign a certificate of compliance within 4 business days after the completed of electrical installation work.
NSW	None	Safety and compliance test to be carried out on electrical installation verifying compliance with the Wiring Rules in relation to continuity of the earthing system, insulation resistance, polarity and circuit connections. A safety and compliance test must include an inspection of switchboards and other electrical equipment required by the Wiring Rules. A certificate of compliance for electrical work must be submitted by the electrician who conducted the installation work within seven days of completing any safety and compliance test on the electrical installation.

	Inspection Requirements	Testing and Self-Certification of Electrical Work
Qld	Electrical installation not to be connected to a source of electricity unless the installation has been inspected by a distribution entity. High voltage or hazardous area electrical installations not to be connected to a source of electricity after the installation/electric line work has been conducted without the installation having first been inspected for safety and for compliance with the Wiring Rules by an accredited auditor.	An eligible person who disconnects an electrical installation from an electricity supply to perform work must test and inspect the installation before reconnecting the installation to an electricity supply Electrical contractors are required to provide their customers with a certificate of testing and compliance for work conducted on an electrical installation.
WA	Network operators required to establish a system of inspection for all electrical installations, whether new or by way of alteration/addition, or individual inspections of consumers' electrical installations where no system of inspection is in place, for the purpose of ensuring the safety of the electrical installations. From time to time electrical inspectors from Energy*Safety* may conduct an inspection of electrical installations for safety and compliance with legislative requirements and standards.	Electrical contractors/electricians are required to provide an electrical safety certificate to the person for whom any electrical installing work is done within 28 days of completion of the work.
SA	Electrical installation not to be connected to an electricity supply from a transmission or distribution network unless the connection testing and inspection procedures of the operator of the network have been complied with. The person who carried out the work of connecting an electrical installation to an electricity supply is responsible for conducting the connection testing and inspection procedures of the network operator.	All new electrical installations and any modifications or repairs to existing installations must be tested by a licensed electrician to verify compliance with the Wiring Rules. Tests and examinations must be done on the installation before a certificate of compliance can be issued.
Tas	Some electrical work is required to be notified to TechSafe: a) No electrical work is required to be notified 'before it is commenced' b) Electrical work that is required to be notified, when it is 'capable of being energised' or 'after it has been energised' is: (i) an electrical installation that is energised or is capable of being energised, for the first time; (ii) a generation system that is energised, or is capable of being energised, for the first time (iii)an electrical storage system that is energised, or is capable of being energised, for the first time (iv)a new or replaced consumer main or sub main;	Electrical contractors have 3 days for notification via a certificate of electrical compliance of electrical work having been conducted. Certificate of electrical compliance must be received and accepted by an electrical inspector before high voltage and hazardous area electrical work is energised.

	Inspection Requirements	Testing and Self-Certification of Electrical Work
	(v)a new or replaced switchboard, including switchboard enclosures; (vi)the addition of a new electrical circuit, to an existing electrical installation; (vii)the addition of a new electrical appliance that is connected by fixed wiring and new to that electrical installation, excluding like for like replacements; (viii)an addition to or the replacement of, an existing generation system or component, which increases capacity, compared to its original specifications; (ix)the relocation of an existing generation system; (x)an addition to an existing electrical storage system which increases capacity, compared to its original specifications; (xi)a change of battery chemical type or technology, in an existing electricity storage system; (xii)all hazardous area electrical work, excluding like for like replacements; (xiii)high voltage electrical work excluding like for like replacements; (xiv)all electrical work performed to rectify a defective or unsafe situation, that is listed on a: 1.Defective Electrical Work Notice; or 2.Unsafe Electrical Infrastructure or Installation Notice and an Authorised Officer requires notification. c)Electrical work that is not required to be notified, when it is 'capable of being energised' or 'after it has been energised', is electrical work not included in 7(b) above. TechSafe inspects new electrical work and existing electrical installations for compliance and electrical safety.	
ACT	New installations are required to pass an electrical audit conducted by Access Canberra before they are able to be energised. Access Canberra has a program of random audits of completed electrical work, and audits all new electrical installations.	Electrical wiring work is required to be tested and certified by the licensed electrician or electrical contractor who carried out the work. When electrical work is ready to be inspected, an electrician is required to lodge a certificate of electrical safety with Access Canberra. Certificates of electrical safety must be lodged online within 14 days after completion of the work.

	Inspection Requirements	Testing and Self-Certification of Electrical Work
NT	An electricity officer for an electricity entity may enter and remain in a place to which electricity is/is to be/has been supplied for the purpose of inspecting electrical installations in that place to ensure that it is safe to connect or reconnect electricity supply.	Electrical contractors are required to provide their customers with a certificate of compliance for electrical work performed and test electrical installations to ensure that they are safe to use.
NZ	Before connection, electrical installations considered to be a high risk are subject to third-party inspection. High risk installations include those carried out in accordance with part 1 of the Wiring Rules, installations that operate at high voltages, mains work and work on hazardous areas. Certain installations require periodic inspections to ensure that they remain safe. Inspection of work conducted in a hazardous area is required to be carried out by an authorised inspector. Certificates of compliance for high voltage electrical installations can only be completed by an authorised inspector after an inspection of the installation has been conducted.	Persons doing electrical work such as additions and alterations that they connect themselves are required to provide the person for whom they have done the electrical work on the electrical installation with a combined certificate of compliance-electrical safety certificate. Persons doing electrical work that they are not connecting themselves are required to complete a certificate of compliance, with the person who reconnects the electrical installation to the electricity supply being required to complete an electrical safety certificate.
NI	Solar generation facilities on consumers' premises must be installed by an accredited installer and inspected by an authorised officer to ensure that the facility complies with the Wiring Rules. The onus is on the consumer to ensure compliance with these requirements. A person who wishes to have supply or temporary supply of electricity connected, or to make alteration or extension to service mains, point of entry, consumer's mains or a consumer's installation shall apply to the Chief Executive Officer to do so. Grant of the application shall be subject to the lodgement of a certificate of completion signed by the electrical contractor who did the work and payment of the prescribed fee for inspection and connection of the new installation/addition to an existing installation. As soon as possible after the lodgement of the certificate of completion, an authorised officer shall inspect the plant associated with the supply of electricity the subject of the application.	A consumer must make an application to the Chief Executive Officer for a solar electricity generator to be connected to a supply mains and must include a certificate of compliance for the installation received from the accredited installer with the application.

Comparative analysis: Wiring requirements

For the most part, electrical installation regulations across the jurisdictions of Australia, Norfolk Island and New Zealand are comparable, with equivalent legislative requirements found in each. This is largely in part due to the broad adoption of AS/NZS 3000 which has provided a basis against which the electrical installation legislation has been created. It is noted that similar additional requirements are also present across the jurisdictions; however, the locations of various requirements differ. For example, requirements in the Victorian legislation, may reside in a code of practice or other instrument in another jurisdiction.

As such, the inspection and certification requirements of focus for this comparative paper were found to have little differing features, with each jurisdiction adopting the same requirements in essence.

One of the key differences between the Victorian legislation in comparison to that of the others is the charging of fees for certificates of electrical safety. While certificates of compliance or notification requirements are present in the other jurisdictions, there are generally no fees associated with their lodgement or completion as many of these systems. However, the ACT does charge fees which appear to cover the costs of inspection.

Another key difference between the Victorian legislation in comparison to that of the other jurisdictions is that the Victorian legislation contains several industry specific electrical safety duties.

With regard to requiring independent inspection of electrical work, Victoria's regime is most comparable to that of Tasmania's with both jurisdictions requiring inspections from private inspectors.

It should be noted that many of the Victorian regulation's additional requirements are intended to align with the Victorian Service and Installation Rules. This is to ensure that the completed work will comply with Victorian Distribution Companies 'Reasonable Technical Requirements' which will ensure that the electrical installation will be accepted for connection to the distribution network.

The Victorian regulations also set out industry specific duties that relate to the safe operation and maintenance of certain high risk infrastructure such as private high voltage electrical installations. Many aspects of these duties are covered in some jurisdiction by the adoption of the Model Work Health and Safety Regulations (Part 4.7) and Model Code of Practice for managing electrical risks in the workplace which have not been adopted in Victoria.

Finally, it appears that most jurisdictions have a regulation or mechanism of some form or another that deals with keeping people, structures, vehicles and objects a safe distance away from electrical infrastructure.

Appendix C: Analysis of fee increases

Non-indexed fees

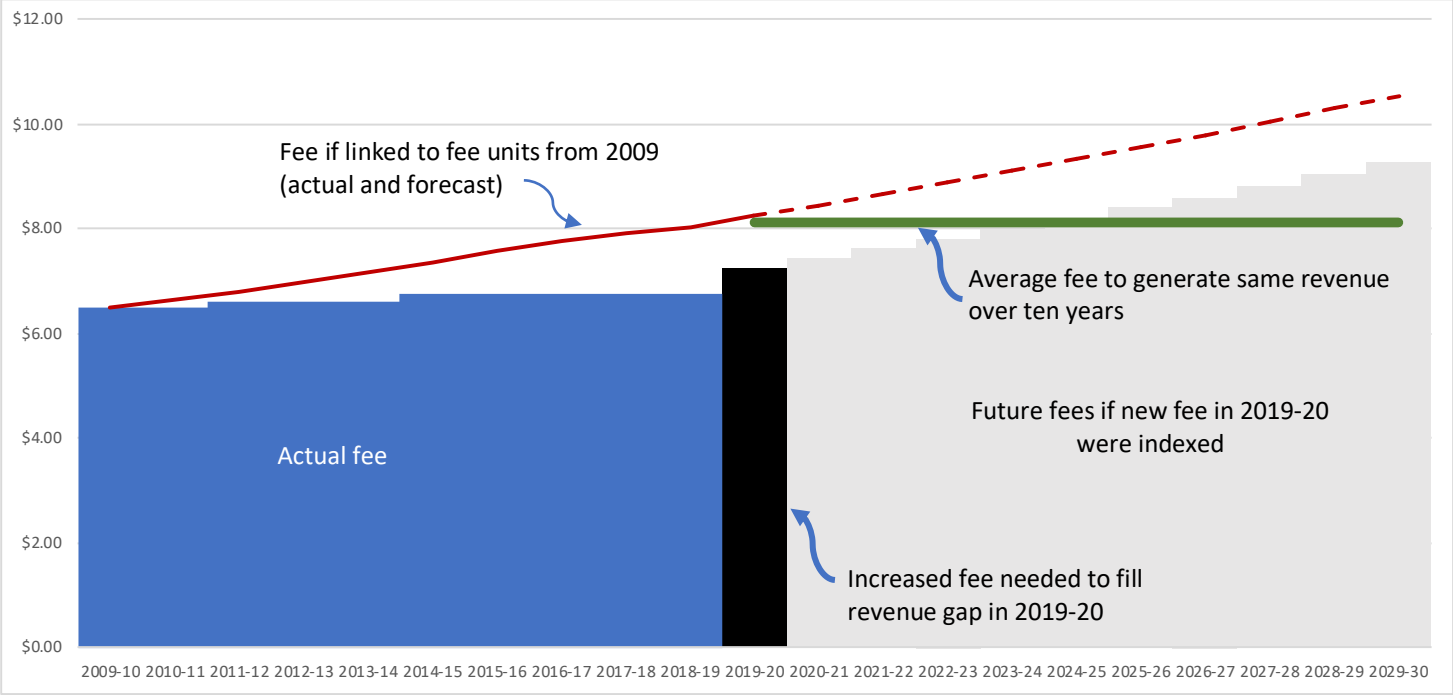
The fees for certificates for non-prescribed work are set as fixed dollar amounts, as they are less than one full fee unit under the Monetary Units Act. To partly address this, these fees were increased via amendments to the Regulations in 2011 and 2014.

Non-prescribed Certificate of Electrical Safety (electronic)

Fee has increased by 3.8 per cent since the Regulations began in 2009. Over the same period, the value of fee units under the Monetary Units Act has increased by 26.7 per cent (including increase since 1 July 2019).

Full cost recovery can be achieved if this fee is increased to $7.23 in 2019-20, an increase of 7.1 per cent. This is less than what the fee would have been at if it had been linked to fee units from 2009 ($8.23). Even if automatic indexation is started in 2014-15 (when this fee was last adjusted), the fee today would be $7.55, so the proposed fee level is still less than catch-up for indexation.

However, that increase only achieves full cost recovery in 2019-20. To avoid the need for ongoing amendments to change the fee to make up for ongoing lack of indexation, it is proposed to increase the fee to **$8.10** (and increase of 20 per cent), where it will remain for the life of the Regulations. This rate (locked in for the next ten years) is still below what the fee would have been if it had been indexed since 2009.



Non-prescribed Certificate of Electrical Safety (paper)

Fee has increased by 4.2 per cent since the Regulations began in 2009. Over the same period, the value of fee units under the Monetary Units Act has increased by 26.7 per cent (including increase since 1 July 2019).

Full cost recovery can be achieved if this fee is increased to $7.93 in 2019-20, an increase of 7.2 per cent. This is less than what the fee would have been at if it had been linked to fee units from 2009

($8.99). Even if automatic indexation is started in 2014-15 (when this fee was last adjusted), the fee today would be $8.28, so the proposed fee level is still less than catch-up for indexation.

However, that increase only achieves full cost recovery in 2019-20. To avoid the need for ongoing amendments to change the fee, it is proposed to increase the fee to **$8.90** (and increase of 20.3 per cent), where it will remain for the life of the Regulations. This rate (locked in for the next ten years) is still below what the fee would have been if it had been indexed since 2009.