Office of Fair and Safe Work Queensland

Regulatory Assessment Statement

Review of the Electrical Safety Regulation 2002

The purpose of a Regulatory Assessment Statement

A Regulatory Assessment Statement (RAS) explains the need for a regulatory response to address a specific policy issue, and to present the evaluation undertaken of the likely costs and benefits to business, the community and government that would flow from its adoption in comparison with other options explored. A RAS is required for all regulatory proposals with significant impacts put forward by government agencies and statutory bodies.

How to respond

All interested persons are invited to comment on the information presented in this RAS on the review of the Electrical Safety Regulation 2002. Written submissions should be forwarded (via mail, email or fax or) to:

Director Workplace and Electrical Policy
Office of Fair and Safe Work Queensland
Department of Justice and Attorney-General

Mail: GPO Box 69
BRISBANE QLD 4001

Email: ESO.Policy@justice.qld.gov.au

Fax: (07) 3247 4059

The closing date for providing submissions to the RAS is 5 pm, **Friday 26 April 2013**.

A RAS submission template is available at www.electricalsafety.qld.gov.au.

Public access to submissions

The *Right to Information Act 2009* provides for access to information held by government. You should consider the possible application of this legislation to any submissions made and other documents generated in the course of the Department of Justice and Attorney-General conducting this process.

Privacy statement

The Department of Justice and Attorney-General is seeking community input for the purpose of the 10-year review of the Electrical Safety Regulation 2002. The information collected as part of the review process, which may include your personal information, may also be used for statistical research purposes. Submissions will be treated confidentially. However, information contained in submissions may be anonymously included, in full or part, in departmental documents and publications. All information collected will be treated in full compliance with the *Information Privacy Act 2009*.

Further enquiries

Further enquiries can be made by contacting the Electrical Safety Office on 1300 650 662.

Review of the Electrical Safety Regulation 2002

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EXECUTIVE SUMMARY

The Electrical Safety Regulation 2002 (the 2002 Regulation) is subordinate legislation made under the *Electrical Safety Act 2002* (the Act). The 2002 Regulation provides details of compliance requirements and prescribes ways of meeting the obligations of persons created by the Act. Under existing Queensland laws, the 2002 Regulation will expire and must be reviewed.

A Regulatory Assessment Statement (RAS) assesses the impacts of proposed regulatory options on business, the community and government. This assists in determining whether a policy proposal is the most efficient and effective way of achieving the desired policy objectives.

This RAS reviews the 2002 Regulation and examines the following three options:

Option 1 *No Regulation* – this option proposes to allow the 2002 Regulation to expire without replacement

Option 2 *Remake current Regulation* – this option proposes to remake the existing 2002 Regulation (as a new regulation) without change

Option 3 *Make a new 2013 Regulation* (**preferred option**) – this option proposes to make a replacement regulation based on the 2002 Regulation with changes included to reduce red tape and regulatory burden.

This RAS provides an analysis of the costs and benefits of each option on business, the community and government. The analysis shows that Option 1 is likely to result in adverse electrical safety outcomes. The analysis also shows that while Option 2 retains current safety levels, Option 3 is preferred as it delivers the highest net benefit to the Queensland community.

Option 3 cuts red tape and regulatory burden for industry, and does not introduce any new costs or regulatory requirements. Some of the red tape reductions proposed under Option 3 include:

- the current requirements for registration of cathodic protection systems would be removed and technical requirements surrounding these systems currently mirrored in the 2002 Regulation would be deferred to the relevant cathodic protection standard (e.g. *AS/NZS 2832.1 Cathodic protection of metals—Pipes and cables*)
- rescue and resuscitation requirements would be less onerous, only required in association with high risk electrical work and any electrical work where a documented risk assessment has not been undertaken
- removal of regulatory restrictions on work able to be undertaken by electrical training persons in the first six months of their training
- replacing test and tag requirements with provisions for plug-in electrical equipment up to 20 amps used in high risk work environments to be protected by a safety switch and be visually inspected for defects prior to use.

Option 3 is expected to present savings of at least $15.5 billion net present value (NPV) over 10 years to Queensland.

Stakeholders are encouraged to examine and comment on the three options in this RAS. On the conclusion of the public comment period, the government will consider any issues raised in submissions. Further consultation may occur to address particular issues raised prior to the development of a final position for consideration by government.

PART A

1. INTRODUCTION

The Electrical Safety Regulation 2002 (the 2002 Regulation) is subordinate legislation made under *Electrical Safety Act 2002* (the Act). It provides details of compliance requirements and prescribes ways of meeting the obligations of persons created by the Act.

Under existing Queensland laws, the 2002 Regulation will expire and must be reviewed by 1 September 2013.

The 2002 Regulation will be reviewed in accordance with terms of reference that will:

- provide the rationale for exclusion of provisions in the 2002 Regulation which have recently been reviewed or amended, or are currently the subject of alternative review processes
- evaluate the continuing relevance, effectiveness and efficiency of the 2002 Regulation and also identify whether there is a need for continued regulatory action
- evaluate whether the 2002 Regulation is meeting its objectives while not imposing unnecessary burdens on stakeholders
- consider whether the regulatory objectives could be achieved in a more effective and efficient way
- include consultation with stakeholders.

2. SCOPE

While this Regulatory Assessment Statement (RAS) reviews the 2002 Regulation a number of parts are outside the scope of this review. They include:

- those that are purely administrative or machinery in nature
- those that have been recently reviewed (ie during the last two years)
- those that are, or have recently been, the subject of alternative public review processes including uniform national initiatives, which (if adopted in Queensland) will separately amend the electrical safety legislation.

The out-of-scope parts are as follows:

National model Work Health and Safety (WHS) legislation

- Part 2 Electrical work (specifically):
  - division 2 (sections 9-12) – basic requirements for electrical work, including the requirements for live work
  - division 5 (sections 16-18) – testing and maintenance of test instruments and safety equipment
  - division 6 (sections 19-20) – isolation and lockout procedures for electrical work;
- Part 4 Work around electrical parts (all divisions)
- Part 12 Incident notification and reporting (specifically):
  - sections 196-198 – requirements for reporting serious electrical incidents or dangerous electrical events
  - section 201 – scene not to be interfered with.

Un-commenced electrical provisions contained in the *Work Health and Safety Act 2011* will (on commencement) give effect to the national model WHS legislation. These provisions have already been the subject of a national Regulation Impact Statement (RIS). This RIS is available on the Safe Work Australia website: www.safeworkaustralia.gov.au/sites/SWA.

However, national model WHS requirements that relate to inspection, testing and tagging of all plug-in electrical equipment are proposed to be amended. As these provisions are a minor variation from the model laws, they are now within the scope of this RAS. This is discussed further in the Options and Alternatives section.

Electrical equipment

- Part 6 Electrical Equipment (entire part except division 8A).

The Electrical Equipment Safety System (EESS) is a Queensland initiative, delivered through the Electrical Regulatory Authorities Council (ERAC), which commenced in Queensland on 1 March 2013 under the *Electrical Safety and Other Legislation Amendment Act 2011*. A national RIS was developed and made available in relation to the introduction of this new safety system (which includes electrical equipment approvals). This RIS is available on the Electrical Regulatory Authorities Council website: www.erac.gov.au.

Electrical licensing

- Part 3 Licensing (entire part).

The proposed national licensing system is still in development (a national RIS was released on 15 July 2012 and closed on 12 October 2012). The final proposed arrangements will be subject to separate consideration by government.

Provisions introduced within the last two years

- Part 5, division 4A (sections 81A-81K) – Installation of ceiling insulation.
- Part 6, division 8A (sections 120A-120C) – Requirement for warning sign for sale of particular electrical equipment.

3. ISSUES STATEMENT

Electricity includes electric current, electrical energy and similar or related physical properties.

Risk profile
Contact with electricity or electrical faults can pose significant risks to people and property including[1]:

- Fatal electrocution injuries: An electric current passing through the human body interferes with the operation of the heart. The electrical conductivity of the heart muscle is disrupted and the muscle can fibrillate. This condition dramatically reduces the oxygenated blood to vital organs including the brain and, unless reversed immediately, death will follow.
- Non-fatal electrical injuries: If any part of the body receives an electric shock, the electricity will flow through the tissues with little obstruction. There are a number of factors that vary the result from a minor electric shock to an electrical fatality. They include:
  - The period of time the victim is exposed to the shock
  - The level of voltage or electric current that the body is exposed to
  - The path of the electric current as it flows through the body, for example from the hand to the feet, from the hand to the hand, etc
  - The level of impedance between the entry and exit point.

  Depending on the above factors, injuries can include permanent burns to the skin; burns in internal tissues; and electrical interference and/or damage to the heart, which could cause the heart to stop, or to beat erratically.
- Property damage: Unsafe electrical installations and electrical equipment can cause fires and explosions, which can result in extensive damage to property including homes, workplaces and other environments wherever electricity is present.

Electrical risks are compounded by the fact that electricity is such an integral aspect of almost every part of our daily lives. Hundreds of thousands of kilometres of electrical infrastructure transport electricity from generators and substations into homes and workplaces across the state. As a result, electrical risks affect all Queenslanders in their homes, workplaces and other environments, wherever electricity is present.

The hazards associated with electricity can be linked to how it is used and the inherently dangerous properties of electrical currents. These hazards include:

- That electrical currents are not visible, neither is there any smell or sound
- The unknown presence of overhead or underground power lines
- Poor electrical installation or faulty electrical equipment
- Unqualified persons working with electricity
- Fires and explosions, as electricity can be an ignition source[2].

[1] 'Harmonisation of WHS Regulations and Codes RIS' Safe Work Australia, p. 111.

[2] 'Harmonisation of WHS Regulations and Codes RIS' Safe Work Australia, p. 111.

The *Electrical Safety Plan for Queensland 2009-2014* (the Electrical Safety Plan) identifies three key areas of electrical risk (based on electrical fatalities data in Queensland) as follows:

- Powerlines: This relates to persons making contact with overhead or underground powerlines, whether as a result of working too close to them, coming into contact with them accidentally while undertaking other activities, or contacting fallen powerlines.
- Electrical installations: This relates to electrical incidents associated with fixed wiring and related electrical accessories in workplaces and dwellings. Relevant issues include common work practises of the general electrical industry, other industries which can affect the integrity of an electrical installation, unlicensed electrical work and improving the coverage of safety switches.
- Electrical equipment: This relates to electrical incidents associated with portable and stationary electrical appliances that are found throughout homes and workplaces. Typically much of this equipment is operated by untrained laypersons and children in a domestic setting, which can increase its risk profile.

Examples
A person received a fatal electric shock after piercing the insulation of an underground electricity supply cable while digging a garden bed in the backyard of a domestic residence.

A painter received a fatal electric shock while working on a billboard. The work was being performed in the vicinity of overhead powerlines. It is understood that the 11 000 volt conductor came into contact with, or arced across to, the long metal pole being used by the painter at the time.

A labourer received a fatal electric shock while moving a switchboard at a construction site. It is believed that while the switchboard was being moved an active part came into contact with the exposed metal parts of the switchboard, causing the outer casing of the switchboard to become energised.

It is clear the risk profile of electricity is affected by the likelihood of occurrence and the severity of the consequences that may occur. While it could be argued that there is a relatively low likelihood of an incident occurring, the severity of the consequences associated with any incident that does occur can be extreme.

Extent of the problem
In the workplace setting, across Australia each year there are approximately 190 accepted workers' compensation claims relating to contact with electricity. Approximately eight workplace fatalities occur annually due to contact with electricity, with a typical compensation payment for a fatality claim in excess of $190 000.

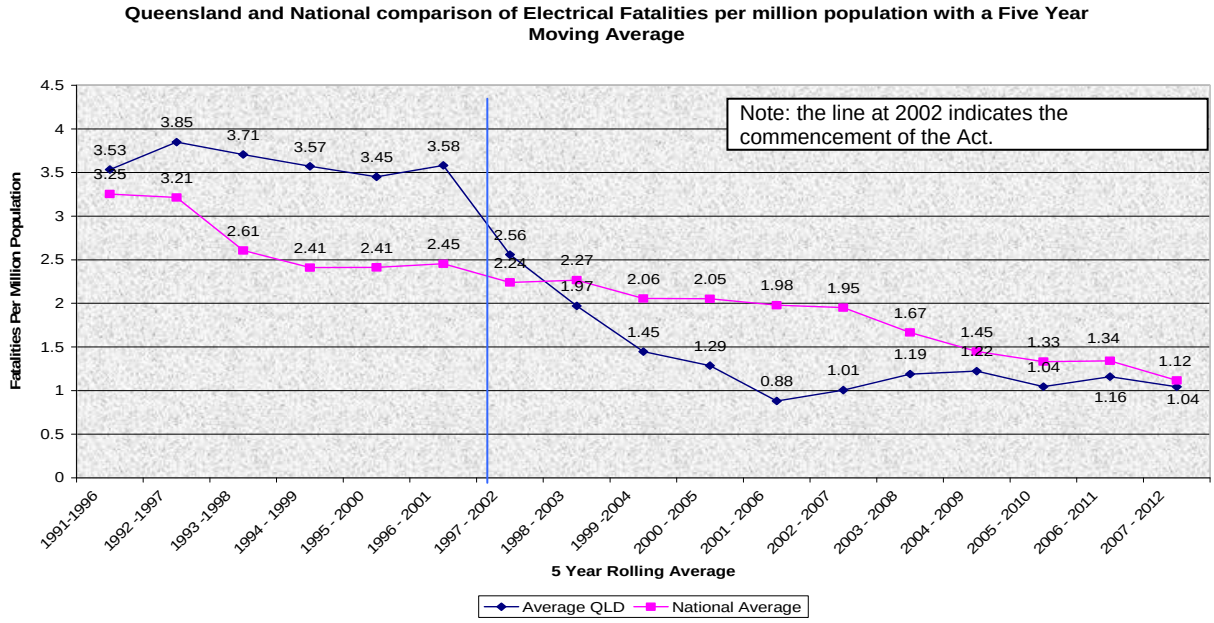
Accepted claims for contact with electricity during the period 2003-2004 to 2007-2008 resulted in an average of $7.8 million in direct workers' compensation payments and an estimated $50 million annually in total economic costs (covering areas such as lost productivity, health care costs and loss of human capital)[3].

It is difficult to accurately estimate the number electrical safety incidents per year outside of the workplace setting. This is because not all electrical safety incidents are reported to electrical safety regulators for a variety of reasons including under reporting or reporting incidents to other regulatory bodies such as police and emergency services. However, the Queensland Electrical Safety Office incident notification database has recorded approximately 400 serious electrical incidents and was notified of 44 fatalities from electrocution across Queensland over the past 10 years (2001-2002 to 2011-2012).

[3] Harmonisation of WHS Regulations and Codes RIS' Safe Work Australia, p. 111.

Graph 1 below shows electrical fatality data for Queensland and Australia. It should be acknowledged that the graph shows the observed number of incidents both before and after the introduction of Queensland's electrical safety laws in 2002. Post 2002, while relatively low compared to other Australian jurisdictions, this data shows the extent of harm that continues to occur.

Graph 1: Queensland and Australian electrocution rates ***(source: Electrical Safety Office)***



Incentives for controlling electrical risk

It is important to acknowledge that electrical workers, manufacturers, suppliers, employers and electrical transmission and distribution entities have business incentives that encourage electrical safety. These incentives include:

- ensuring their own safety, and in the case of employers, the safety of their workforce to ensure continued business operations
- the costs of accident compensation claims which all businesses would seek to minimise
- protecting against damage to their property and assets which can adversely affect continued business operations (this includes electricity transmission and distribution infrastructure)
- protecting their reputation which may negatively impact continuing business operations.

However, business incentives alone are unlikely to be sufficient to meet community expectations in ensuring electrical safety. This is acknowledged in the findings of the then Industry Commission (*an Inquiry into Occupational Health and Safety 11 September 1995*) that found employers typically bear only around 30 per cent of the true costs of workplace incidents, with the remaining costs being borne by workers (approximately 30 per cent) and by the community (approximately 40 per cent).

Consumers and the community in general also have incentives to control electrical risk. These incentives include:

- not placing themselves and others at risk of electrocution (e.g. not using a knife to clear bread from a toaster which could accidentally come into contact with the live electrical circuit)
- maintaining electrical equipment to ensure it remains in an electrically safety condition (e.g. testing of electric blankets after extended periods of no use)
- using trained and licensed electrical contractors to do electrical work i.e. to avoid electrical faults which could result in electrocution or an electrical fault based fire if not undertaken correctly.

However, consumer and community incentives alone are also unlikely to prevent fatalities and injuries to the public caused by electric shock in domestic dwellings. In addition this is compounded by the fact electrical safety risks on persons and property may not be necessarily obvious, for example, laypersons would have no way in knowing if an electrical installation has been wired safely.

As the incentives for controlling electrical risk are unlikely to prevent fatalities and injuries, the risk of taking no action is unacceptable. To overcome this governments in developed countries regulate the issue of electrical safety.

4. POLICY OBJECTIVES

The objective of government action is to improve situations for business, community and government that cannot be improved through existing business and social institutions and mechanisms.

The key objective of government action in this context is to reduce electric shock incidents and as a consequence reduce deaths, injuries, and property damage that can be caused by electricity. This is to be achieved by eliminating, or minimising, exposure to electrical risk of licensed electrical workers and contractors, other workers, consumers and the general public.

The aim of the Electrical Safety Plan is to eliminate all preventable electrical deaths. However the key measure used to evaluate Queensland's electrical safety performance is electrical fatality data. The target in the Electrical Safety Plan is for the Queensland electrical fatality rate to be below the national average. Fatalities are expressed in 'per million population', to incorporate population growth, improve accuracy, allow for easier comparison with other jurisdictions, and account for fluctuations in annual results.

5. OPTIONS AND ALTERNATIVES

Three options have been identified in terms of the expiring 2002 Regulation.

Option 1 *– No Regulation (base case)*
Under this option (not preferred), the 2002 Regulation would expire on 1 September 2013 without replacement and non-regulatory alternatives would be used to address the policy objective.

Regulation is seldom the only option available to government and the Queensland RAS System Guidelines specify that alternatives to regulation should be considered. A number of alternatives to regulation exist that could be used to address the policy objective including information or education campaigns and industry self-regulation.

Option 1 is not preferred, as it is expected to result in adverse electrical safety outcomes across Queensland where the rate of electrocutions, serious electrical injuries and property damage would be high. While a number of business and community incentives exist to encourage electrical safety, relying solely on non-regulatory means is unlikely to meet community expectations in ensuring electrical safety.

Option 2 *– Remake current Regulation*
Under this option (not preferred), the existing 2002 Regulation would be remade as a new regulation without any changes.

Retaining the current requirements of the 2002 Regulation would result in the same costs and compliance impact on industry, government or consumers experienced currently. This option is expected to yield continued reductions in electrocution and electrical injury rates.

However, under this option stakeholders would not be given the opportunity to provide comment on implications of the effective continuation of the 2002 Regulation relevant to industry or the community. This approach would also result in a failure to address the Queensland Government's focus on red tape reduction. This is not the preferred option.

Option 3 *– Make a new 2013 Regulation (with potential red-tape reductions)*
Under this option (preferred), the 2002 Regulation would be reviewed and a replacement regulation made (e.g. as the Electrical Safety Regulation 2013) with changes from the current 2002 Regulation.

This option proposes to make a new 2013 Regulation which incorporates the government's red tape reduction strategy, findings from the review of the 2002 Regulation, any other changes related to government policy, and consideration of stakeholder feedback from this RAS process. This option includes proposed red tape reduction opportunities in an effort to reduce the regulatory burden on business without reducing safety standards in Queensland. Opportunities identified include:

- Removing the specific requirement for rescue and resuscitation training of non electrical workers, as this should be determined by employers as part of their overarching duties of care and risk management principles. This requirement is already addressed for higher risk activities in other existing regulatory provisions such as 'live work' and electrical licence eligibility requirements. It is proposed that this section is remade with the changes to reflect that the requirement for resuscitation and rescue training does not apply where a documented risk assessment identifies that the particular work to be undertaken is low risk electrical work. There is a cost saving for employers not needing to have workers unnecessarily trained in rescue and resuscitation to assist with low risk electrical work. The only jurisdictions with similar resuscitation requirements for non electrical workers undertaking or assisting in electrical work are South Australia and Northern Territory.

- Removing registration requirements and regulatory specification surrounding the design, installation, operation, testing and registration of cathodic protection systems, as much of the detail in existing provisions is a reflection of the *Cathodic protection of metals – Pipes and cables* Standard (AS/NZS 2832.1). These systems are integral to the safety of structures like building reinforcement, buried metallic pipeline and cables, and operate by using the metal to be protected as a cathode in an electrochemical process created by an extra low voltage electric current that facilitates corrosion in sacrificial anode material which completes the system. Correctly operated, these systems represent a low level of electrical safety risk. These risks can be managed by requiring cathodic protection systems to be designed, installed, operated and testing in accordance with the relevant cathodic protection standard (e.g. AS/NZS 2832.1). No other jurisdiction has registration requirements for cathodic protection systems, except Victoria which relates to the registration of electric tram systems.
- Removing the current restrictions on the type of work that may be undertaken by electrical training persons during the first six months of training. The requirement to ensure the electrical safety of all workers including training persons is inherent in the employer's primary obligation under the Act, and the 2002 Regulation imposes unnecessary restrictions on productivity. These requirements are considered to be unnecessarily restrictive, as they impose an arbitrary time-based approach rather than supporting the risk management and competency approach required by the legislation. In many cases workers bring previous industry experience into a new role subject of the training being undertaken. They may be non-licensed trades assistants or other classes of worker previously authorised to work in these environments or holders of other classes of electrical licences seeking to cross skill. While other jurisdictions have the same general supervision requirements, none have the specificity or impose the limitations of these Queensland provisions.
- Queensland already has comprehensive safety switch requirements for all socket outlets up to 20 hmps. The 20 amp threshold reflects the rating of the vast majority of plug-in electrical equipment used in workplaces. The national model WHS laws will extend safety switch installation requirements to all socket outlets in high risk work environments, including those rated above 20 amps. This requirement is expected to significantly impact on Queensland businesses, particularly in the rural and manufacturing sectors. It is proposed to vary the safety switch requirement for fitting of safety switches to socket outlets not exceeding 20 amps, which is consistent with the current Queensland requirements.
- Currently, workplaces in Queensland have various testing and tagging requirements determined by the type of work carried out (i.e. the work type). The work type also determines the type of electrical equipment requiring testing (limited to 20 amps). The national model requires inspection, testing and tagging of all plug-in electrical equipment used in higher risk work environments. This requirement is expected to significantly impact on Queensland businesses, particularly the rural and manufacturing sectors. It is proposed to replace the current test and tag requirements for all socket outlets up to 20 amps with provisions for plug-in electrical equipment to be protected by a safety switch and to be visually inspected prior to use to identify defects. This visual inspection requirement is consistent with *AS/NZS 3760 In-service safety inspection and testing of electrical equipment*. This proposal acknowledges that the use of safety switches in conjunction with a regular visual inspection process provides an effective control measure against the risk of electric shock when using the type of electrical equipment addressed by this regulation. This means plug-in equipment above 20 amps can have either safety switch protection or be tested and tagged.

Option 3 is the preferred option as it will deliver the highest net benefit in relation to the policy objective.

6. IMPACT ASSESSMENT

The costs of safety compliance are acknowledged by other significant reviews as being very difficult to quantify. As a result, there are no relevant surveys or statistical data collections published in Queensland, or Australia, by government or any other authority[4]. There are several aspects of health and safety compliance in particular that make it difficult to measure. These include the extent of compliance in the community, safety outcomes produced in conjunction with other activities, legislation in other areas that have consequences for health and safety, and biases in estimation[5].

Electrocutions and serious electrical incident rates have been conservatively estimated. These estimates are conservative because they are calculated using rates before and after the introduction of the 2002 Regulation, two points in time where electrical safety regulation existed. A comparison using unregulated rates in Queensland is not available and as such the true cost of not regulating for electrical safety is unknown but believed to be greater than the estimates in the analysis.

Despite these limitations, some estimation of costs has been possible and is sufficient to perform a meaningful cost benefit analysis of the options. Table 2 provides a snapshot of the net impact on business, the community and government of the three options and further details of the costs and benefits analysis is at Schedule 2. It includes both the cost and the benefit elements of each option (other than Option 1 – base case, as this option is effectively cost neutral as it is the reference point from which the incremental costs and benefits of each alternative have been determined) along with an estimated net dollar value of the impact.

Option 1 – *No Regulation* (base case). This option proposes to allow the 2002 Regulation to expire without replacement.

Under this option, the 2002 Regulation would expire without replacement and non-regulatory alternatives would be used to address the policy objective.

Option 1 would result in adverse electrical safety outcomes across Queensland where the rate of electrocutions, electrical injuries and property damage would be high. Accurate costs are unable to be quantified. The Occupational Safety and Health Administration in the United States (US) Department of Labor have historically used the results of a university study that found indirect costs can range from 1.1 to 4.5 times the direct costs[6].

Any perceived cost savings to business via a deregulated environment would be transferred to community and government in terms of human capital costs as a result of higher rates of electrocution, electrical injuries and property damage. There would also be range of flow-on costs to business through higher workers compensation premiums, higher property insurance premiums, productivity losses, retraining staff costs, etc.

[4] This was stated in a publication by the Australian Government of 9 December 2009; Decision Regulation Impact Statement for a Model Occupational Health and Safety Act, Executive Summary, page i.

[5] Reasons for difficulties in estimation are outlined in a publication by the Industry Commission in 1995; Report number 47: Work, Health and Safety; an inquiry into occupational health and safety. Volume 2, p160.

[6] As quoted in a publication by the Occupational Safety and Health Administration, US Department of Labor 'Injury and Illness Prevention Program' White Paper. January 2012.

As noted in the *Issues Statement* section (refer page 6), a number of market incentives do exist for controlling electrical risk. However, a range of economic reasons exist which result in these market incentives being inadequate for controlling electrical risk. For example:

- private individuals or business are unlikely to fully consider the electrical risks on other persons, property and the community. For example, the Industry Commission found that employers generally incur only approximately 30 per cent of the true cost associated with workplace accidents, with approximately 30 per cent borne by workers and the remaining 40 per cent borne by the community
- adverse impacts from electrical safety risks on persons and property may not be necessarily obvious, resulting in potentially adverse outcomes in workplaces and homes. For example, unskilled laypersons would have no way in knowing if an electrical installation has been wired safely.

Further, compliance with standards set by self-regulation is subject to pressures that government regulation is not. These pressures include prioritisation, competition for resources, and the need to return a profit to shareholder. As a result when an industry self-regulates, there is an inevitable slide into complacency, where safety becomes a target for savings just like marketing and administration costs.

An advantage of this option is that, while it offers a non-regulatory approach it ensures increased industry and public awareness of the risks associated with the use of electricity. The main disadvantage of this option is that it is not in the interest of the safety of Queenslanders. Doing nothing would deny Queenslanders protection against an average of four fatal incidents per year and many injuries. While advertising and promotion may result in an increased awareness of electrical risks, experience to date would tend to indicate that this alone would not be sufficient to maintain Queensland's electrical fatality rate below the national average.

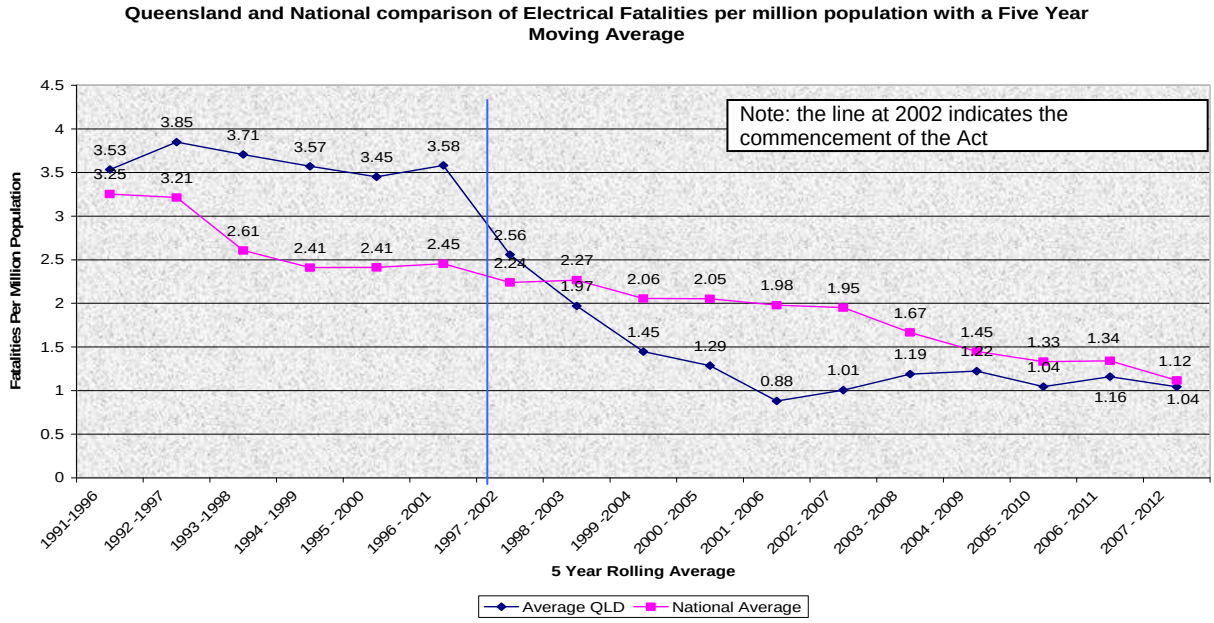
The Electrical Safety Office already relies on a range of information, education and awareness campaigns to raise awareness and communicate key electrical safety messages to stakeholders. This includes comprehensive advertising which include television commercials, radio advertisements and digital advertising. These major advertisement campaigns are supplemented by media releases, 'e-alerts' and feeds from the Electrical Safety Office twitter account. For example, '*Don't do your own electrical work'* or the Christmas lights campaign; or '*Are you prepared summer storms*?'.

All available evidence indicates that relying exclusively on non-regulatory means such as community engagement to control electrical risk, without any supporting regulation, would be problematic because of the public and worker safety risks that electricity poses. This includes the potential for death, serious injury and property damage. There is a high risk that the education and awareness campaigns and industry self regulation in and of themselves would not achieve the Queensland target of an electrical fatality rate below the national average. In addition they will not result in the public confidence in electrical safety in Queensland. For example, members of the public would be unable to engage workers to do electrical work where they do not have the skills and knowledge to perform this work safely.

The key measure used to evaluate Queensland's electrical safety performance is electrical fatality data. Fatalities are expressed in 'per million population', to incorporate population growth, improve accuracy, allow for easier comparison with other jurisdictions, and to account for fluctuations in annual results. This measure is presented as the 'five year moving average'.

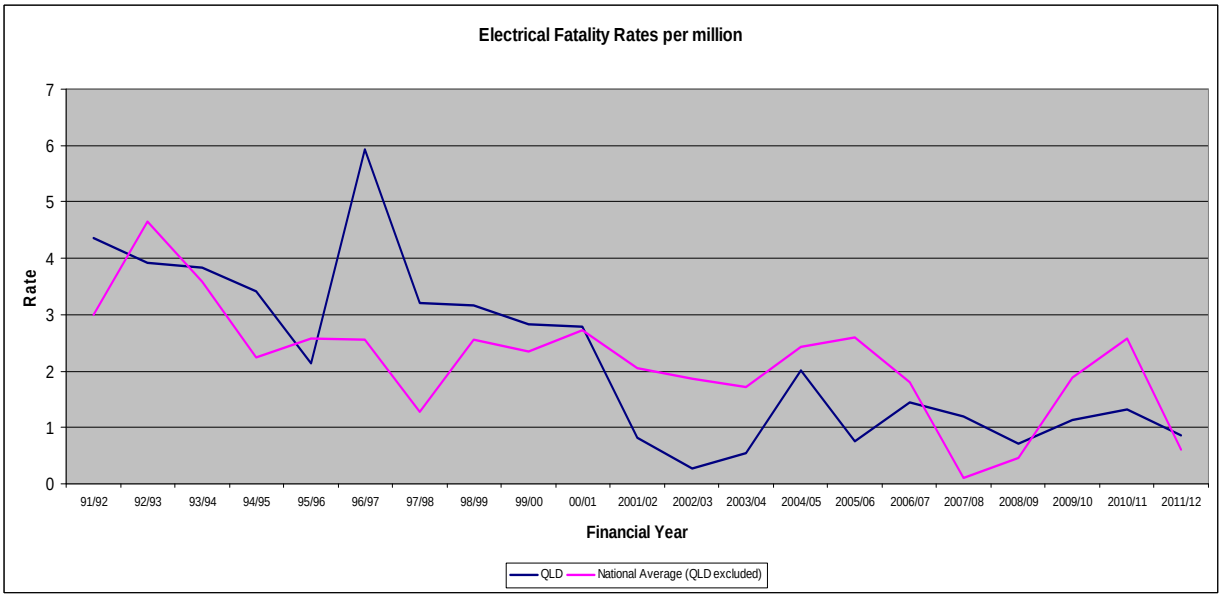
Graph 1 below indicates that electrocution rates for Queensland have declined significantly since the commencement of the electrical safety laws in 2002. For example the five year moving average for 1996-2001 was 3.58 electrocutions per million population (nearly 50% greater than the national average of 2.45) compared to 1.01 for 2002-2007 (almost 50% lower than the national average of 1.95).

Graph 1: Queensland and Australian electrocution rates (source: Electrical Safety Office)



Graph 2 provides annual electrocution data for Queensland and Australia. This data also shows a distinctive change in the number of electrocutions in the period before and after commencement of the electrical safety laws.

Graph 2: Queensland and Australian annual electrocution rates (source: Electrical Safety Office)



Electrical safety in Queensland was administered by two legislative regimes prior to the introduction of the Act and 2002 Regulation:

- the *Electricity Act 1994* which regulates electricity generators, transmitters and distributors and promoted electrical safety through regulating electrical work and electrical safety standards
- the *Workplace Health and Safety Act 1995* that sought to prevent or minimise exposure to the risks associated with hazards in the workplace, including electrical hazards.

In response to a sustained high rate of electrical fatalities in Queensland, particularly during the late 1990s, the Queensland Ombudsman recommended a comprehensive review of the former Electrical Safety Office as it existed at the time. Additionally, the Electrical Safety Taskforce (the Taskforce) was established in June 2000 to "investigate and make recommendations on improving the manner in which electrical incidents can be prevented, investigated and dealt with"[7]. The Taskforce confirmed that Queensland's electrical safety performance at that time compared poorly both nationally and internationally. It identified a number of structural impediments to improving electrical safety across Queensland. It ultimately concluded that stand alone electrical safety legislation should be developed.

It is possible that there were other matters that also contributed to the decline in fatalities, not only the regulation. It should be acknowledged that prior to the commencement of the standalone electrical safety laws, electrical safety became a major political issue. As a result there was a great deal of media scrutiny and parliamentary debate on the issue, which resulted in a number of reviews into electrical safety in Queensland. The Ombudsman's first of ten electrocution investigation reports was delivered to the Queensland Parliament in February 2001, the final report of the Taskforce was finalised in April 2001, and two Ministerial inquiries were finalised in July and August 2001. This heightened public awareness of the dangers of electricity via the regular media coverage of the issue, and may explain the marked drop in electrocution rates at the time just prior to the introduction of the legislation in 2002. At that time there was also extensive stakeholder engagement and consultation on this matter.

Prior to the commencement of the 2002 Regulation in October 2002, Queensland recorded 107 electrical fatalities during the 10 years to 30 June 2002. There was a marked reduction in the number of electrical fatalities coinciding with the commencement of the 2002 Regulation, with Queensland recording just 44 fatalities attributed to electrocution during the 10 years to 30 June 2012. This is a significant reduction in electrical fatalities of almost 59 percent over the preceding decade. The 59 percent is based on the reduction in the five year moving averages of 2.56 for 1997-2001 to 1.04 for 2007-2012. From this data, it is possible to conclude that the change in the way electrical safety was regulated has had a positive effect in reducing the number of electrical fatalities in Queensland.

However there is insufficient data to conclude on the degree to which regulation has influenced the decline in fatalities and feedback is encouraged from the public on this matter. However it is plausible to conclude that in order to maintain relatively low numbers of electrical fatalities, and endeavour to reduce them further, the effective regulation of electrical safety should continue.

[7] 'Electrical Safety Taskforce Final Report' Page 1.

There is also a wide consensus in international research that supports this approach. Research indicates that market failure, as it applies to electrical safety, is inadequately addressed by guidelines or standards alone[8]. Bruce J. Farquhar[9] asserts that personal and public safety as an accepted right is often used as justification in itself for regulatory intervention. Asch[10] believes that government safety regulation (e.g. electrical safety regulation) is vastly preferable to a purely private system of safety decisions. Given the immediate and lethal nature of electrical risk, this assertion arguably applies more to electrical safety than to many other safety frameworks. Any perceived cost savings for business from a deregulated safety environment are expected to be transferred to the community and government in terms of human capital costs as a result of increased electrocutions and injuries.

In 2002, Queensland moved from a prescriptive regulatory environment to a more robust regulatory framework based on a combination of performance-based legislation and education and awareness. It is clear that this approach has effectively lowered electrocution rates across Queensland. This is supported by a recent US study that has demonstrated that the most effective electrical safety strategies follow safety procedures and regulations set by regulatory bodies[11]. Other examples in support of regulating for electrical safety include experiences in the UK and Canada (Ontario) where electrocution rates decreased following increased regulation of electrical safety in 2005 (UK) and 2004 & 2007 (Canada)[12]. This approach is also consistent with the overall findings of the Taskforce on the Queensland environment.

[8] Mechanisms of paediatric electrical injury. New implications for product safety and injury prevention': *Harvard Medical School APAM* July 1997 Vol. 151, Issue 7.

[9] 'What Makes Regulation Work': *British Medical Journal* Dec 1998 Vol. 4, Issue 4.

[10] Asch, P.; 'Consumer Safety Regulation: New York'. Oxford University Press. 1988.

[11] 'Safety risk management for electrical transmission and distribution line construction' *Safety Science* 51 (2013) 118-126. Albert and Hallowell.

[12] UK Office for National Statistics mortality data; 2010 Ontario Electrical Safety Report published by the Electrical Safety Authority; 'Electrical Fatalities Among US Construction Workers JOEM' Vol 38, no 6, Ore and Casini; June 1996, and 'Fatal occupational electrocutions in the United States' Taylor, McGwin Jr, Valent, Rue 2002 Safety Association.

Option 2 – *Remake current Regulation*. This option proposes to remake in scope provisions of the existing regulation as the 2013 Regulation without change.

Overall minimum net benefit
The overall minimum net benefit of this option is $15.1 billion net present value (NPV)[13], 115 fewer deaths, and 12,300 fewer serious electrical incidents over 10 years, relative to Option 1. The total of $15.1 billion is calculated by summing the costs and benefits accruing to the business, community and government.

It is a *minimum* benefit for a number of reasons:

- there are benefits that have not been quantified for government
- there is an expected positive return for businesses associated with occupational health and safety (OHS) investment and not all returns on investment have been quantified due to the data limitations discussed previously [14]
- the benefits that have not been quantified for the community are likely to significantly outweigh the costs that have not been quantified for the community.

The reduction in fatalities and serious electrical incidents is based on the difference in five year moving averages per million before and after the introduction of the 2002 Regulation.

This option is expected to continue to deliver reductions in electrocution and electrical injury rates with similar net impacts experienced by business, the community and government, as is presently the case. While costs are imposed on the wider community to achieve electrical safety, it has previously been demonstrated they are offset by the benefits accrued. This option is not preferred however as it provides no scope to incorporate review findings, or reduce red tape and the associated regulatory burden.

Business

There is an estimated overall net benefit to business even though an exact monetary amount was not estimated due to some unquantifiable cost and benefit elements identified in Schedule 2. Despite these limitations, the remaining elements of the cost benefit analysis indicate an approximate net benefit of $220.2 million NPV over 10 years. This estimate is indicative only as some impacts identified in Schedule 2 and positive returns on investment for business OHS expenditure have not been quantified due to data limitations discussed previously. While businesses and industry pay for registrations, fees, entity contributions, training, paperwork and compliance; there would be an expected decrease in other costs including lost skills and worker productivity and insurance premiums for workers and property.

A net benefit of $220.2 million is derived from $711.3 million in benefits and $491.1[15] million in costs to business (NPV) over 10 years.

[13] 3% is a discount rate contained in the federal government's cost benefit analysis guidelines and used by the Victorian Government. For more information visit: http://www.finance.gov.au/obpr/proposal/handbook/appendix-E-cost-benefit-analysis.html A 3% discount rate is used for all net present valuations in this RAS and rounding errors are present. More information on calculating net present values can be found at http://www.financeformulas.net/Net_Present_Value.html.

[14] US Department of Labor; Occupational Safety and Health Administration, January 2012; Injury and Illness Prevention Programs White Paper, page 5; Liberty Mutual. (2001). A majority of U.S. businesses report workplace safety delivers a return on investment [News Release]. Boston, MA. Financial Decision Makers' Views on Safety, April 2009, http://www.asse.org/practicespecialties/bosc/docs/F2_Huangetal_0409.pdf. Robert Wood Johnson Foundation; October 2011, 'Return on investments in public health and prevention: A summary of groundbreaking research studies', page 1.

[15] There are rounding errors present.

Costs to business ($491.1 million) of having the 2002 Regulation compared to having no regulation include:

- electricity entity contributions, licensing and penalties ($137.1 million)
- safety management systems ($263 000)
- working requirements (an example is the supervision required of electrical trainees in their first six months $9.5 million)
- installation and maintenance of safety switches ($23.4 million)
- incident reporting ($897 000)
- safety response and associated requirements of electricity entities ($10.3 million)
- testing and 'tagging' of electrical equipment ($308.9 million)
- cathodic protection registrations and associated costs ($657 000).

Benefits to business ($711.3 million) of having the 2002 Regulation compared to having no regulation include:

- fewer indirect costs associated with electrocution and electrical injury such as production disturbance, lost skills, recruitment ($591.6 million)
- fewer fires ($119.7 million).

Electricity entity contributions, licensing fees and penalties

Electricity entity contributions for 2011-2012 were $12 861 300 and are updated and published annually in the 2002 Regulation. These contributions along with licensing fees and penalties cost businesses $16.1 million annually which equates to $137.1 million NPV over 10 years (based on 2011-2012 figures).

Safety management systems

The estimated cost to all prescribed entities for safety management systems is $263 000 NPV over 10 years. This estimate is based on eight prescribed electrical entities[16] paying $12 600 each in the first year to create safety management systems and audit plans and $2725 annually thereafter for the audits and paperwork costs associated with these provisions. Most of the initial costs are for skilled labour to generate a safety management system at $1000 a day for 10 days. Ongoing maintenance costs of the safety management system are based on the same rate with less time required.

Supervision of trainees

Supervision required of electrical trainees in their first six months is estimated at $9.5 million NPV over 10 years. This assumes an extra half hour of work per week by a more experienced trainee or electrical worker is required at $37 per hour[17] for each electrical trainee in their first six months of training. There are approximately 3114 new electrical apprentices each year (based on 2012 figures) with almost 20 weeks spent 'on-the-job' in their first six months.

Installation and maintenance of safety switches

The costs of the installation and maintenance of safety switches accruing to business is estimated at $23.4 million NPV over 10 years. This assumes 134 174 affected rental properties[18] costing $205 each to fit a safety switch over 10 years (figures derived from the Queensland Government's 2011 RAS *'Extension of mandatory requirements for fitting of safety switches in residential accommodation'*).

[16] A growth factor was not applied to the number of electricity entities as the numbers of prescribed entities in Schedule 6 of the 2002 Regulation have been relatively stable since 2002.

[17] The hourly rate is the average wage for electrical workers in Queensland derived from the total median salary package of an electrician in 2012 quoted at www.livesalary.com.au

[18] A growth factor was not applied to the number of rental properties as any new homes are subject to AS/NZS 3000 and will not be affected by the 2002 Regulation. There will be movement from owner-occupied to leased properties and vice versa, however the effects are assumed to be offsetting.

Incident reporting – non-electricity entities
Non-electricity entity businesses report approximately 1050 dangerous and serious electrical incidents annually at an estimated cost of $100 each for an hour of labour and incidentals such as telephone calls and paper, for example. This equates to $105 000 annually or $897 000 NPV over 10 years.

Incident reporting and 'make safe'– electricity entities
Electricity entities are also required to report certain electrical incidents and this is estimated to cost $172 000 annually based on 1720 reports costing $100 each. Entities must also *compile quarterly reports* for the Electrical Safety Office of incidents reported to them by the public. There are approximately 2000 of these requiring an estimated 10 minutes of labour at $100 per hour for each report entry costing a total of $33 333 per annum. In addition, electricity entities are required to *'make safe'* where necessary following notification. Assuming all 2000 publicly reported incidents require such action at an average cost of $500, this imposes approximately $1 million per annum on entities. There are occasions when entities must *transport and store unsafe electrical equipment*, however this only occurs where there is a serious electrical incident involving electrical equipment and not in all cases. In 2010-2011 there were 10 incidents and most of these did not require such action. Assuming 10% (or 1 incident) occurs each year requiring transport and storage the cost is estimated to be $2000. The total annual cost for incident reporting, making safe, transporting and storing certain unsafe electrical equipment is $1 207 333 annually or $10.3 million NPV over 10 years.

Testing and tagging of electrical equipment
The estimated cost of testing and 'tagging' of electrical equipment accruing to businesses is $308.9 million NPV over 10 years. This is based on a number of assumptions: All 145 910 businesses in the Electricity, Gas, Water and Waste Services, Construction, Manufacturing and Rural industries operate in hostile environments, (where testing and 'tagging' applies), and only 5% of 287 383 businesses in the remaining industries. The cost of a test is dependent on the number of items being tested (economies of scale for large jobs) and ranges between $9 and $12 per item[19]. The number of affected plug-in equipment varies by the size of the business ranging from 10 items per non-employing businesses to 400 items on average for businesses employing over 200 persons. Calculations also assume that approximately 1% of plug-in equipment in the Rural industry is over 20 amps and 2% in the Manufacturing industry. Items over 20 amps are not subject to this requirement and have therefore been excluded from calculations. The number of businesses by size in each of the industries is based on Australian Bureau of Statistics figures for 2010-2011[20].

Registration of affected cathodic protection systems
The fees, administrative and work costs associated with the registration of affected cathodic protection systems is estimated at $657 000 NPV over 10 years. The direct financial cost to businesses of registration is approximately $39 000 per annum or $333 000 NPV over 10 years. There are 150 cathodic protection system registrations on average at a cost of $260[21] each per annum. The remaining $324 000 for the associated administration and work costs imposed on businesses is based on estimates from a Victorian Regulatory Impact Statement[22] and adjusted for differences in population[23] and inflation[24].

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[19] Based on an internet search of prices for test and tag services.

[20] Taken from the Australian Bureau of Statistics publication 'Counts of Businesses – Summary Tables 2010-11' for Queensland, catalogue number 8161.0.55.001

[21] The cost of registration can be found in Schedule 7 of the 2002 Regulation and is updated annually.

[22] The Victorian RIS sourced from http://www.vcec.vic.gov.au/CA256EAF001C7B21/WebObj/Electricity_Safety_(Cathodic_Protection)_RIS[1]/$File/Electricity_Safety_(Cathodic_Protection)_RIS[1].pdf

[23] Data for adjustment calculations obtained from an Australian Bureau of Statistics publication 'Australian Demographic Statistics' catalogue number 3101.0 June 2009, edition. (Queensland's population as a proportion of Victoria's population is used as a multiplier on Victorian estimates).

Prevention of electrical injury and illness

Queensland businesses will continue to avoid approximately $591.6 million NPV in costs over 10 years associated with the prevention of electrical injury if the regulation is remade.

Ideally the basis for estimating the cost of electrical injuries being prevented by the 2002 Regulation is a comparison of the electrical injury rates before and after the introduction of the 2002 Regulation. However as data quality and comparability for the number and rate of serious electrical incidents (SEI) is not consistent, a variety of estimates of change in SEIs have been calculated and averaged to determine further estimates of cost savings associated with the prevention of electrical injury and illness.

As the quality of the SEI data is inconsistent over the period of interest this RAS uses 52% based on an average of a variety of estimates for electrical injuries, which are detailed in Table 1 below.

Table 1: Alternative approaches to calculating the percentage cost saving from regulation

Option	*Assumption*	*Cost saving (%)*
1	The change from when regulation was introduced (2002-03) to the most recent year (2011-12).	48.6
2	The change from 2002-03 when regulation was introduced to the average of the years from 2006-07 to 2011-12 (2003-04 to 2005-06 are excluded as they are assumed to be anomalous).	48.2
3	The change in fatality electrocution rates, as estimated in the RIS.	59.0
4	An average of the above three options.	51.9

With the lack of direct data measuring costs saved due to the prevention of electrical injury and death, a sensitivity analysis was conducted around the 52% decline estimate to give stakeholders an idea of how changes in a 52% decline in electrical injuries impact on the cost benefit of the 2002 Regulations. The scenarios tested were 42%, 52% and 62% of relevant costs being prevented by the 2002 Regulation to give stakeholders an idea of lower and higher declines compared to the middle or default scenario of 52%. The sensitivity analysis results are attached at Schedule 3.

If during consultation any stakeholders provide more reliable data to more accurately measure the impact of the 2002 Regulation on electrical injury rates then this will be incorporated into the final estimate.

The former Australian Safety and Compensation Council (ASCC) estimated the cost to the Australian economy of work-related injuries and diseases annually at $57.5 billion[25]; a figure that includes many costs such as production disturbance, lost skills, and recruitment. The cost savings to the economy of the 2002 Regulation is based on the following assumptions[26]:

- Fifty-two percent of the cost of work-related injuries and diseases are being prevented by the 2002 Regulation (based on scenario 2 in the sensitivity analysis).
- Forty-eight percent of costs still remain in the economy and this is represented by the

[24] Consumer Price Index data for the relevant periods were obtained from Queensland Treasury at www.oesr.qld.gov.au and used to determine multipliers for proportional adjustments for inflation.

[25] As determined and quoted from pages 2 and 34 of the publication 'The Cost of Work-related Injury and Illness for Australian Employers, Workers and the Community: 2005-2006, March 2009, by the Australian Safety and Compensation Council

[26] For Scenario 1 in the sensitivity analysis, the 2002 Regulation is assumed to have reduced costs by 42% and the ASCC figure represents the remaining costs, equal to 58% of total costs (including those saved) or $57.5 billion. Scenario 3 assumes 62% of costs have been saved and the ASCC estimate of $57.5 billion represents the remaining 38% of costs in the economy. The amount saved to the economy in Scenario 3 therefore is 62/38 times $57.5 billion.

$57.5 billion ASCC estimate.

- Forty-eight percent is therefore equal to $57.5 billion and Fifty-two percent is represented by 1.08 times this amount or $62.3 billion.

Queensland's share of the Australian population is 20% and this is applied to $62.3 billion and estimates Queensland's share of the workplace injury burden at $12.5 billion. Only 5.6% or $701.7 million of this burden is attributable to workplace electrical injury. Furthermore workplace electrical incidents only account for 17% of all electrical incidents[27] although it is estimated that the cost of a non-workplace incident is about half that of a work related incident[28]. Therefore the total projected cost estimate to the Queensland economy of all electrical injuries is $19.7 billion NPV over 10 years, and only 3% (or $591.6 million in Queensland) of this cost is borne by businesses[29].

Prevention of fires

A sensitivity analysis was conducted in the absence of data prior to the introduction of the 2002 Regulation to provide more information where there is uncertainty. A variety of scenarios were tested with assumptions of 42%, 52% and 62% of relevant costs being prevented by the 2002 Regulation. In the absence of better information, we are assuming the percentage cost savings to electrical injuries due to regulation would be proportional to those in the prevention of fires. Therefore, the middle case of 52% was used in the calculations of the cost savings for prevention of fires. The sensitivity analysis results are attached at Schedule 3.

Queensland businesses will avoid approximately $119.7 million NPV in costs over 10 years associated with the *prevention of fires* if the regulation is remade. The estimate is based on figures from the Electrical Equipment Safety System Final Regulation Impact Statement (EESS Final RIS) published by the Electrical Regulatory Authorities Council (ERAC) in May 2009. ERAC estimates the cost savings to the Australian economy of additional electrical equipment safety measures to be $498 million[30] annually; a figure that includes many costs such as property losses, lost output, fatalities, healthcare costs, loss of business, environmental costs, fire service response costs, coronial inquiries and other investigations costs. The amount of $498 million was multiplied by 1.08 to derive the scenario of 52% of cost savings attributable to all existing electrical equipment safety regulation in Queensland, (using similar methodology and assumptions as explained under the previous heading of Prevention of electrical injury and illness). Queensland's share of the Australian population is 20% and this is applied to $539.5 million to estimate the cost savings applicable to Queensland ($107.9 million per annum) and only 13% (or $14 million) of this cost is borne by businesses[31]. This equates to $119.7 million NPV over 10 years of cost savings to Queensland businesses for the prevention of fires associated with electrical equipment.

[27] Sourced from Electrical Safety Office data.

[28] The relative costs of home injury as a proportion of costs of work injury were obtained from page 1000 of the New Zealand research publication 'Estimation of the social costs of home injury: a comparison with estimates for road injury'; revised in November 2010 by Keall et al (University of Otago and New Zealand institute of Economic Research).

[29] As determined and quoted from pages 2 and 34 of the publication 'The Cost of Work-related Injury and Illness for Australian Employers, Workers and the Community: 2005-2006, March 2009, by the Australian Safety and Compensation Council.

[30] Data derived from page 7 Table 3 of the Electrical Equipment Safety System Regulatory Impact Statement published by the Electrical Regulatory Authorities Council (ERAC) in May 2009.

[31] Data derived from page 7 Table 3 of the Electrical Equipment Safety System Regulatory Impact Statement published by the Electrical Regulatory Authorities Council (ERAC) in May 2009.

Attempts to cost all elements of the 2002 Regulation (regardless of scope of the RAS) have been undertaken to gain a complete picture of the cost of the regulation to Queensland, however some parts affecting businesses could not be quantified. Some of these costs and benefits include:

- the additional cost of work processes that incorporate electrical safety regulation
- the indirect costs of licensing such as achieving and maintaining competency
- the costs of buying and maintaining personal protective equipment (PPE)
- the savings associated with cathodic protection systems of a regulated standard
- additional taxes paid to government due to increased employment when fewer workers are injured or killed (for example payroll tax)
- the distortion of choices in the economy due to increased tax collection in an expanding economy
- the increases in worker productivity and associated business profitability.

Community

The overall net benefit to the Queensland community is estimated at $5.1 billion NPV, 115 fewer deaths, and 12 300 fewer serious electrical incidents over 10 years. There is an expected reduction in suffering and dependency in the community with this option. Fewer fires and associated injuries and property damage will also contribute to community development and economic prosperity.

A financial net benefit of $5.1[32] billion is derived from $10 billion in benefits and $4.8 billion in costs to the community (NPV) over 10 years.

Costs to the community ($4.8 billion) of having the 2002 Regulation compared to having no regulation include:

- skilled labour premiums paid to electrical workers and businesses ($4.8 billion)
- installation and maintenance of safety switches in affected domestic residences ($44 million)
- incident reporting ($897 000).

Benefits to the community ($10[33] billion) of having the 2002 Regulation compared to having no regulation include:

- fewer indirect costs associated with electrocution and electrical injury such as more people able to participate in the workforce, less poverty, suffering and hardship ($9.7 billion); and
- fewer fires ($285.3 million).

Skilled labour premiums

Skilled labour premiums that currently accrue to electrical workers and businesses are paid by the community ($4.8 billion NPV over 10 years), in part due to the regulation of electrical work via the 2002 Regulation. The estimate is based on half the differential in wages between licensed electricians ($76 572 per annum) and labourers ($50 957 per annum) [34]. This is to reflect the skilled component of the premium; consumers would still demand some competency in electrical workers in the event of deregulation, keeping the price higher than for a labourer, for example. The calculated premium associated with the regulation is therefore $558.2 million per annum for approximately 80% of the 54 480 licensed electrical workers and contractors assumed to be using their licenses in Queensland. This equates to $4.8 billion NPV in costs to the Queensland community over 10 years.

[32] There are rounding errors present.

[33] There are rounding errors present.

[34] 2012 figures obtained from www.livesalary.com.au .

Installation and maintenance of safety switches
The costs of the installation and maintenance of safety switches accruing to the community is estimated at $43.5 million NPV over 10 years. This assumes 248 557 affected owner-occupied residences[35] costing $205 each to fit a safety switch over 10 years (figures derived from the Queensland Government's 2011 RAS *'Extension of mandatory requirements for fitting of safety switches in residential accommodation'*).

Incident reporting
Members of the public report approximately 1050 dangerous and serious electrical incidents annually at an estimated cost of $100 each for an hour of labour and incidentals such as telephone calls and paper, for example. This equates to $105 000 annually or $897 000 NPV over 10 years.

Prevention of electrical injury
The Queensland community will also continue to avoid approximately $9.7 billion NPV in costs over 10 years associated with the *prevention of electrical injury* if the regulation is remade. A sensitivity analysis was conducted in the absence of data prior to the introduction of the 2002 Regulation to provide more information where there is uncertainty. A variety of scenarios were tested with assumptions of 42%, 52% and 62% of relevant costs being prevented by the 2002 Regulation. The middle case of 52% was used in the calculations as the default for reasons stated previously. The sensitivity analysis results are attached at Schedule 3.

The former Australian Safety and Compensation Council estimated the cost to the Australian economy of workplace injuries and illnesses annually at $57.5 billion[36]; a figure that includes many costs such as lost skills and some medical costs. Queensland's share of the Australian population is 20% and this is applied to $62.3 billion ($57.5 billion multiplied by 1.08 to obtain the 52% estimate of costs saved using the same methodology and reasoning as in the business impacts) to estimate Queensland's share of the workplace injury burden at $12.5 billion. Only 5.6% or $698 million of this burden is attributable to workplace electrical injury however. Furthermore workplace electrical incidents only account for 17% of all electrical incidents[37] although it is estimated that the cost of a non-workplace incident is about half that of a work related incident[38]. Therefore the total projected cost estimate to the Queensland economy of all electrical injuries and illnesses is $19.7 billion NPV over 10 years, and 49% (or $9.7 billion in Queensland) of this cost is saved by the community[39].

Prevention of fires
A sensitivity analysis was conducted in the absence of data prior to the introduction of the 2002 Regulation to provide more information where there is uncertainty. A variety of scenarios were tested with assumptions of 42%, 52% and 62% of relevant costs being prevented by the 2002 Regulation. The middle case of 52% was used in the calculations as the default for reasons stated previously. The sensitivity analysis results are attached at Schedule 3.

[35] A growth factor was not applied to the number of owner-occupied properties as any new homes are subject to AS/NZS 3000 and will not be affected by the 2002 Regulation. There will be movement from owner-occupied to leased properties and vice versa, however the effects are assumed to be offsetting.

[36] Obtained from pages 2 and 34 of the publication 'The Cost of Work-related Injury and Illness for Australian Employers, Workers and the Community: 2005-2006, March 2009, by the Australian Safety and Compensation Council

[37] Sourced from Electrical Safety Office data

[38] The relative costs of home injury as a proportion of costs of work injury were obtained from page 1000 of the New Zealand research publication 'Estimation of the social costs of home injury: a comparison with estimates for road injury'; revised in November 2010 by Keall et al (University of Otago and New Zealand institute of Economic Research)

[39] Obtained from pages 2 and 34 of the publication 'The Cost of Work-related Injury and Illness for Australian Employers, Workers and the Community: 2005-2006, March 2009, by the Australian Safety and Compensation Council

With the remaking of the 2002 Regulation the community will continue to avoid approximately $285.3 million NPV in costs over 10 years associated with the *prevention of fires*. This estimate is based on figures from the EESS Final RIS published by ERAC in May 2009. ERAC estimates the cost savings to the Australian economy of additional electrical equipment safety measures to be $498 million[40] annually; a figure that includes many costs such as property losses, lost output, fatalities, healthcare costs, and environmental costs. The amount of $498 million is multiplied by 1.08 to calculate 52% of cost savings attributable to all existing electrical equipment safety regulation in Queensland, using the same methodology and reasoning identified in the business impacts. Queensland's share of the Australian population is 20% and this is applied to $539.5 million to estimate the cost savings applicable to Queensland ($107.9 million per annum) and 31% (or $33.5 million) of this cost is borne by the community[41]. This equates to $285.3 million NPV over 10 years of cost savings to the Queensland community for the prevention of fires associated with electrical equipment.

Non-financial benefits
Non-financial benefits include 115 fewer deaths and 12 300 fewer serious electrical incidents over 10 years. These estimates are based on the difference in average five year moving rates of electrocution and serious electrical incidents between 1996-1997 and 2000-2001 (before the introduction of the 2002 Regulation) and between 2007-2008 and 2011-2012, (after the introduction of the 2002 Regulation). The difference between the average rates of both five year periods is projected over 10 years to estimate the savings in lives and serious electrical incidents. The estimates compare two regulated periods in time and does not allow for lowering trends in electrocutions and serious electrical incidents. As a result, the estimates are considered understated and conservative.

Some costs and benefits identified in Schedule 2 have not been quantified due to lack of available data and are not included in the net financial benefit to the community of $5.1 billion. The benefits and costs to the community not quantified include:

- the savings associated with cathodic protection systems of a regulated standard;
- the lower insurance premiums associated with fewer electrical fires, deaths and injuries;
- more productive workers with greater ability to exploit job opportunities;
- increases in community participation and the resultant expansionary pressure on the Queensland economy and higher living standards;
- the extra tax revenue paid to government in an expanding economy;
- less welfare received due to fewer workers being injured and killed (for example GST, income tax and disability pension); and
- the associated distortion of choices in the economy due to the change in these transfers.

Government

The overall net benefit for government is estimated at greater than $9.8 billion NPV over 10 years. Major components of this benefit are a decreased number of fires and associated property damage along with more taxation revenue and a decrease in social support payments.

A financial net benefit of $9.8 billion is derived from $9.8 billion in benefits and no costs to government (NPV) over 10 years.

[40] Data derived from page 7 Table 3 of the Electrical Equipment Safety System Regulatory Impact Statement published by the Electrical Regulatory Authorities Council (ERAC) in May 2009.

[41] Data derived from page 7 Table 3 of the Electrical Equipment Safety System Regulatory Impact Statement published by the Electrical Regulatory Authorities Council (ERAC) in May 2009.

Benefits to government ($9.8[42] billion) of having the 2002 Regulation compared to the base case include:

- fewer indirect costs associated with electrocution and electrical injury such as more people able to participate in the workforce, less poverty and less need for social services ($9.3 billion)
- fewer fires ($515.4 million).

Prevention of electrical fatalities and injuries

The Queensland government will also continue to avoid approximately $9.3 billion NPV in costs over 10 years associated with the prevention of electrical fatalities and injuries if the regulation is remade. A sensitivity analysis was conducted in the absence of data prior to the introduction of the 2002 Regulation to provide more information where there is uncertainty. A variety of scenarios were tested with assumptions of 42%, 52% and 62% of relevant costs being prevented by the 2002 Regulation. The middle case of 52% was used in the calculations as the default for reasons stated previously. The sensitivity analysis results are attached at Schedule 3.

The Australian Safety and Compensation Council estimate the cost to the Australian economy of workplace injuries and illnesses annually at $57.5 billion[43]; a figure that includes many costs such as lost skills and some medical costs. Queensland's share of the Australian population is 20% and this is applied to $62.3 billion ($57.5 billion multiplied by 1.08 to obtain the 52% estimate of costs saved, using the same methodology and reasoning as in the business and community impacts) to estimate Queensland's share of the workplace injury burden at $12.5 billion. Only 5.6% or $701.7 million of this burden is attributable to workplace electrical injury however. Furthermore workplace electrical incidents only account for 17% of all electrical incidents[44] although it is estimated that the cost of a non-workplace incident is about half that of a work related incident[45]. Therefore the total projected cost estimate to the Queensland economy of all electrical injuries and illnesses is $19.7 billion NPV over 10 years, and 47% (or $9.3 billion in Queensland) of this cost is saved by the government[46].

Prevention of fires

A sensitivity analysis was conducted in the absence of data prior to the introduction of the 2002 Regulation to provide more information where there is uncertainty. A variety of scenarios were tested with assumptions of 42%, 52% and 62% of relevant costs being prevented by the 2002 Regulation. The middle case of 52% was used in the calculations as the default for reasons stated previously. The sensitivity analysis results are attached at Schedule 3.

With the remaking of the 2002 Regulation government will continue to avoid approximately $515.4 million NPV in costs over 10 years associated with the *prevention of fires*. This estimate is based on figures from the EESS Final RIS published by the ERAC in May 2009. ERAC estimates the cost savings to the Australian economy of additional electrical equipment safety measures to be $498 million[47] annually; a figure that includes many costs such as property losses, lost output, fatalities, healthcare costs, and environmental costs. The amount of $498 million is multiplied by 1.08 to calculate 52% of the cost savings

[42] There are rounding errors present.

[43] Obtained from pages 2 and 34 of the publication 'The Cost of Work-related Injury and Illness for Australian Employers, Workers and the Community: 2005-2006, March 2009, by the Australian Safety and Compensation Council.

[44] Sourced from Electrical Safety Office data.

[45] The relative costs of home injury as a proportion of costs of work injury were obtained from page 1000 of the New Zealand research publication 'Estimation of the social costs of home injury: a comparison with estimates for road injury'; revised in November 2010 by Keall et al (University of Otago and New Zealand institute of Economic Research).

[46] Obtained from pages 2 and 34 of the publication 'The Cost of Work-related Injury and Illness for Australian Employers, Workers and the Community: 2005-2006, March 2009, by the Australian Safety and Compensation Council.

[47] Data derived from page 7 Table 3 of the Electrical Equipment Safety System Regulatory Impact Statement published by the Electrical Regulatory Authorities Council (ERAC) in May 2009.

attributable to all existing electrical equipment safety regulation in Queensland as the remaining forty-eight percent is assumed to be the costs identified in the EESS Final RIS of $498 million. This is the same methodology and reasoning used in the business and community impacts sections. Queensland's share of the Australian population is 20% and this is applied to $539.5 million to estimate the cost savings applicable to Queensland ($107.9 million per annum) and 56% (or $60.4 million) of this cost is borne by the government[48]. This equates to $515.4 million NPV over 10 years of cost savings to the government for the prevention of fires associated with electrical equipment.

Some benefits identified in Schedule 2 have not been quantified due to lack of available data and are not included in the net financial benefit to government of $9.8 billion. These benefits include:

- the savings associated with cathodic protection systems of a regulated standard;
- the costs of responding to and investigating electrical fires;
- addressing market failure; and
- lower insurance premiums associated with fewer electrical fires, deaths and injuries.

The implication of these exclusions is that the net benefit determined for government is understated.

[48] Data derived from page 7 Table 3 of the Electrical Equipment Safety System Regulatory Impact Statement published by the Electrical Regulatory Authorities Council (ERAC) in May 2009.

Option 3 – *Make a new 2013 Regulation (with potential red-tape reductions)*. This option proposes to make a new regulation (the 2013 Regulation). Considerations include possible changes to government policy along with stakeholder feedback from this RAS and the application of the government's red tape reduction strategy.

Overall minimum net benefit
The overall net impact of this option is positive with $15.5[49] billion NPV greater than for Option 1 including 115 fewer deaths and 12,300 fewer serious electrical incidents over 10 years. The overall minimum net benefit of $15.5 billion is calculated by summing the net costs and benefits accruing to business ($568.6 million), the community ($5.1 billion) and government ($9.8 billion) identified for Option 3 in Schedule 2.

It is a *minimum* benefit as there are unquantified benefits for business. There is an expected positive return for businesses associated with OHS investment[50] and not all returns on investment have been quantified due to the data limitations discussed previously. The reduction in fatalities and serious electrical incidents is based on the difference in five year moving averages per million before and after the introduction of the 2002 Regulation. This option is preferred.

The costs and benefits of having a new 2013 Regulation compared to having no regulation, detailed below, are *in addition* to those cost and benefits identified at Option 2. Rounding errors are present in the estimates.

Business

The overall financial net impact on business is positive and $568.6 million NPV greater than for Option 1 (the base case) with a streamlining of provisions and a reduction in red tape and regulatory burden. These reductions in red tape and regulatory burden, and the savings they introduce, are outlined below.

Removing arbitrary requirements not based on risk management principles, as is the case currently where training persons are prevented from doing certain work despite their background or circumstance.
There is an expected saving of $9.5 million NPV in increased productivity over 10 years resulting from the proposed deregulation of s209(1) and s209(1A). This estimate assumes these provisions incur an extra half hour of work per week by a more experienced trainee or electrical worker at $37 per hour[51] for each electrical trainee in their first six months of training. The calculation is based on 3114 new electrical apprentices each year with almost 20 weeks spent 'on-the-job' in their first six months.

Registration fees and associated administration and work to owners of affected cathodic protection systems.
The savings of registration fees and associated administration and work to owners of affected cathodic protection systems is estimated at $657 000 NPV over 10 years based on Electrical Safety Office data (registrations and revenue) and estimates from Victoria (business administration and work cost estimates).

[49] There are rounding errors present.

[50] As determined in a US Department of Labor; Occupational Safety and Health Administration, January 2012; Injury and Illness Prevention Programs White Paper, p5; Liberty Mutual. (2001). A majority of U.S. businesses report workplace safety delivers a return on investment [News Release]. Boston, MA. Financial Decision Makers' Views on Safety, April 2009, http://www.asse.org/practicespecialties/bosc/docs/F2_Huangetal_0409.pdf . Robert Wood Johnson Foundation; October 2011, 'Return on investments in public health and prevention: A summary of groundbreaking research studies', page 1.

[51] The hourly rate is the average wage for electrical workers in Queensland derived from the total median salary package of an electrician in 2012 at www.livesalary.com.au .

Savings associated with compliance with Australian Standards instead of regulated standards are unquantifiable (refer to Victorian Regulatory Impact Statement on Cathodic Protection 2009); however, it is believed the impact in this regard will be minimal. An unquantified[52] benefit to business is a decrease in the amount of distortion of market choices in the economy due to the removal of these registration fees.

Removing the requirement for non-electrical workers assisting electrical workers to be trained in rescue and resuscitation.
There is a cost saving of $29.3 million NPV over 10 years to industry for employers not needing to have workers trained in rescue and resuscitation to assist with documented low risk electrical work. This estimate is based on 23 960 people affected (19 460 electrical apprentices and 4500 non electrical workers using a proxy of 10% of licensed electrical workers), the cost of the course ($70) and opportunity cost of the time spent on the course (3 hours @ $24 per hour in lost income).

Replacing the test and tag requirements with provisions for plug in electrical equipment up to 20 amps to be protected by a safety switch and visually inspected for defects prior to use. Plug-in equipment above 20 amps can have either safety switch protection or be tested and tagged.
The estimated cost of division 5 accruing to businesses is $308.9 million NPV over 10 years. This is based on a number of assumptions: All businesses in the Electricity, Gas, Water and Waste Services, Construction, Manufacturing and Rural industries operate in hostile environments and only 5% of businesses in the remaining industries. The cost of a test is dependent on the number of items being tested (economies of scale for large jobs) and ranges between $9 and $12 per item[53]. The number of affected plug-in equipment varies by the size of the business ranging from 10 items per non-employing businesses to 400 items on average for businesses employing over 200 persons. Calculations also assume that approximately 1% of plug-in equipment in the Rural industry is over 20A and 2% in the Manufacturing industry. The number of businesses by size in each of the industries is based on Australian Bureau of Statistics figures for 2010-2011[54].

Distribution entities to report annually on incidents in which low voltage (LV) conductors fall to the ground and remain energised. Occasions resulting in a mass failure (for example, a cyclone) would be excluded from this requirement.

It is understood that the additional information required under this proposal is already collated by affected entities (Energex and Ergon Energy) as part of their safety management systems. Entities already report to the Regulator on a quarterly basis and therefore information already available to the entities is proposed to be included in these reports as additional records. Accordingly, the compliance costs to distribution entities associated with this proposal are expected to be negligible.

Changes to the provisions above and deferring to risk management principles covered in WHS legislation increases flexibility for businesses and lowers costs. Similarly the removal of the requirements to register cathodic protection systems will have a direct and positive impact on businesses without increased exposure to electrical safety risk. Fewer business costs overall without a reduction in electrical safety would lead to improved economic outcomes in Queensland.

[52] The benefit is not quantified due to a lack of available data.

[53] Based on an internet search of market prices for test and tag services.

[54] Figures including business sizes by industry obtained and derived from an Australian Bureau of Statistics publication 'Counts of Businesses – Summary Tables 2010-11', cat number 8161.0.55.001, for Queensland.

Community

The overall net impact on the Queensland community is estimated to be an improvement over Option 1 by $5.1 billion NPV, 115 fewer deaths and 12,300 fewer serious electrical incidents over 10 years, with the same costs and benefits as outlined under Option 2.

Government

The overall net benefit to government is estimated to be $9.8 billion NPV greater over 10 years than for Option 1. A financial net benefit of $9.8 billion (rounded to the nearest tenth of a billion) is derived from $9.8 billion in benefits (the same benefits as detailed in Option 2) and (significantly smaller) costs of $50 000 to government (NPV) over 10 years.

Drafting and consultation associated with remaking the regulation is an estimated one-off cost to government of $50 000 and expected to be met within existing budgets.

Summary Impact Assessment table (Table 2)

Net impact on business, the community and government of the three options			
	Option 1 No Regulation	Option 2 Remake Current Regulation	Option 3 Make a new 2013 Regulation (with potential red-tape reductions)
Net impact on **Business** over 10 years	Base Case*	Net benefit greater than: • $220.2 million NPV	Net benefit greater than: • 568.6 million NPV
Net impact on **Community** over 10 years	Base Case	Net benefit greater than: • $5.1 billion NPV • 115 fewer deaths • 12 300 fewer serious electrical incidents	Net benefit greater than: • $5.1 billion NPV • 115 fewer deaths • 12 300 fewer serious electrical incidents
Net impact on **Government** over 10 years	Base Case	Net benefit greater than: • $9.8 billion NPV	Net benefit greater than: • $9.8 billion NPV
Total Net impact over 10 years	Base Case	Net impact greater than: • $15.1** billion NPV • 115 fewer deaths • 12 300 fewer serious electrical incidents	Net benefit greater than: • $15.5 billion NPV • 115 fewer deaths • 12 300 fewer serious electrical incidents

* *Option 1 is cost neutral because it is the Base Case from which the incremental costs and benefits of each alternative have been determined.*

** *There are rounding errors in the table.*

7. CONSULTATION

Public consultation is a critical part of any regulatory development process and should cover all of the options proposed in the RAS.

Consultation on the electrical safety RAS will need to involve a wide range of stakeholders, including the electricity entities, industry associations, unions, community and consumer groups, and other government agencies.

To date some initial consultation has already occurred with the Electrical Safety Board which consists of representatives from employers, workers and the community in relation to the 10 year review of the 2002 Regulation and the development of this RAS. The Electrical Safety Board will be further consulted during their meeting in early 2013.

In addition, public consultation will occur following the release of the RAS for a period of 28 days.

Notice about the public release of the RAS will be provided to a wide range stakeholders through the following:

- Publication on the Queensland Government's *Get Involved* website
- Publication on the Department of Justice and Attorney-General (Electrical Safety) website
- A proposed Ministerial Media Release
- Other direct communication tools used by the Department including *Esafe* (25 000 subscribers – safety professionals), and *ESOutlook* (32 000 subscribers – electrical industry)
- Proposed publication in relevant trade journals or industry websites (such as the *Master Electrician* magazine published by the Electrical Contractors Association and *NECA news* published by the National Electrical and Communications Association)
- Social media tools such as the Electrical Safety Office Twitter account (which has several hundred followers)
- Advertising in print media as appropriate to reach Queensland households.

In addition, the Department of Justice and Attorney-General will meet directly with key stakeholders to discuss the RAS following its public release.

8. PREFERRED OPTION

The preferred option is Option 3 which proposes to make the 2013 Regulation with potential red-tape reductions. Despite the non-regulatory incentives for high safety standards, the maintenance of a robust regulatory structure around electrical safety is considered essential for a number of reasons.

First, the incidence of incidents involving electricity in Queensland is relatively low compared to other Australian jurisdictions. This suggests the substantial regulatory structures in place in Queensland are effective in reducing risks and harm.

Second, while there is a relatively low number of electricity-related accidents in Queensland and Australia, they do still occur and it is likely that most of these deaths are still preventable. As a result this issue remains a public policy concern.

Third, while it could be argued that there is a relatively low likelihood of an incident occurring, the severity of the consequences associated with any electrical incident that does occur will result in extreme outcomes. On that basis, governments generally adopt more stringent interventions where catastrophic outcomes are possible, as this is consistent with the expressed expectation of the community.

9. CONSISTENCY WITH OTHER POLICIES AND REGULATION

Competition Principles Agreement

The preferred Option 3 (make a new 2013 Regulation) does not preclude inclusion of possible changes flowing from national harmonisation initiatives (including the national model Work Health and Safety legislation and the National Occupational Licensing System), along with consideration of stakeholder feedback on the provisions proposed for inclusion in the replacement 2013 Regulation. Overlaying this is the application of the red tape and compliance burden reduction focus.

Clause 5 (1) of the Competition Principles Agreement requires that legislation should not restrict competition unless it can be demonstrated that the objectives of the regulation can only be achieved by restricting competition, and the benefits of the restriction to the community as a whole outweigh the costs.

The Preferred Option (Option 3) is not inconsistent with clause 5 of the Competition Principles Agreement.

Fundamental Legislative Principles

The *Legislative Standards Act 1992* requires that legislation has sufficient regard to rights and liberties of individuals and the institution of Parliament. The review of the 2002 Regulation and proposed making of the 2013 Regulation will not alter the rights and liberties of individuals from those existing under the current electrical safety legislative framework.

The making of the proposed 2013 Regulation is not inconsistent with the policy objectives of any other legislation.

10. IMPLEMENTATION, EVALUATION AND COMPLIANCE SUPPORT

This RAS will be released for public comment for a period of 28 days and further targeted consultation may be undertaken as a result of specific feedback.

If the preferred option (Option 3) is progressed, it is expected that existing approaches to implement and enforce the 2002 Regulation will continue. The Electrical Safety Office is responsible for administering the proposed replacement 2013 Regulation and the 2013 Regulation will be enforced by electrical safety inspectors. Enforcement and compliance is undertaken in accordance with the National Compliance and Enforcement Policy found at: www.safeworkaustralia.gov.au/sites/SWA/about/Publications/Documents/618/National%20Compliance%20and%20Enforcement%20Policy.pdf

The key measure used to evaluate Queensland's electrical safety performance is electrical fatality data. The target in the Electrical Safety Plan is to have the Queensland electrical fatality rate to be below the national average.

SCHEDULE 1 – Summary of parts of the 2002 Regulation

Part no. Sections	Description	Addressed in RAS?	Recommended option for included parts (or rational for out-of-scope provisions)
Part 1 ss. 1-7	Preliminary – includes title, commencement date, etc.	No	Contains machinery and administrative provisions only (which are not required to be reviewed).
Part 2 ss. 8-24A	Electrical Work	Yes (with some exclusions)	This part is addressed in the RAS; however, some sections are considered out-of-scope (see below). Option 3 recommended – remake with changes.
Division 2 Division 5 s. 20	Live electrical work. Testing and maintenance of test instruments and safety equipment. Isolation and lock-out procedures for electrical work.	No	These provisions are out-of-scope as the content is addressed under national model WHS legislation.
Part 3. ss. 25-57A	Licensing	No	This part is out-of-scope as the content relates to the proposed NOLS.
Part 4 ss. 58-64A	Working around electrical parts	No	This part is out-of-scope as the content is addressed under national model WHS legislation.
Part 5 ss. 65-94G	Electrical installations, defects and earthing, electric lines, and installation of approved safety switches in domestic residences.	Yes (with some exclusions)	This part is addressed in the RAS; however, some sections are considered out-of-scope (see below). Option 2 recommended – remake without change.
ss. 65-69	Performing electrical work	No	These sections are out-of-scope as the content relates to the proposed NOLS.
ss. 81A-81K	Installation of ceiling insulation	No	These sections are out-of-scope as they commenced on 1 October 2010.
ss.82-94G	Workplace electrical installations	Yes	This part is addressed in the RAS. Option 3 recommended – remake with changes.
Part 6 ss. 95-126A	Electrical Equipment	No	This part is out-of-scope as the content is addressed under the EESS.
Part 7 ss. 127-148	Works of an electrical entity	Yes	This part is addressed in the RAS. Option 2 recommended – remake without change.
Part 8 ss. 149-164	Electricity supply	Yes	This part is addressed in the RAS. Option 2 recommended – remake without change.
Part 9 ss. 165-166	Safety management systems (SMS) and prescribed electricity entities requirements for SMS.	Yes	This part is addressed in the RAS. Option 2 recommended – remake without change.
Part 10 ss. 167-169	Accredited auditors	Yes	This part is addressed in the RAS. Option 2 recommended – remake without change.
Part 11 ss. 170-193	Cathodic Protection systems	Yes	This part is addressed in the RAS. Option 3 recommended – remake with changes.
Part 12 ss. 194-202	Incident notification and reporting	Yes	This part is addressed in the RAS; however, some sections are considered out-of-scope (see below). Option 3 recommended – remake with changes.
ss.196-198	Incident notification and reporting timeframes and requirements	No	These sections are out-of-scope as the content is addressed under national model WHS legislation.
Part 13 ss. 207-211B	Miscellaneous provisions	Yes	This part is addressed in the RAS. Option 3 recommended – remake with changes.
Part 14 ss. 212-222	Transitional provisions	No	Contains machinery and administrative provisions only (which are not required to be reviewed).

SCHEDULE 2 – Costs and benefits analysis summary

Option 2 – Remake Current Regulation

Option 2	Costs	Benefits	Net Impact
Business – electrical trades, supply industry, electrical retailers	Electrical Safety Office (ESO) funding arrangements – currently funded by industry (for example electrical entity contributions, licensing fees, penalties, etc) - approximately $137 million NPV over 10 years. Cathodic protection system registrations are included below. Costs relating to testing and legislative compliance of cathodic protection systems are unquantifiable. However administrative, work proxy and direct financial registration costs have been estimated at $657 000 NPV over 10 years. Licensing – fees covered in ESO budget ($138 million above) but the administrative and time costs for industry are not. Nor are the costs of training and skills maintenance to industry. Costs of buying, maintaining and testing personal protective equipment. Electricity distribution network costs associated with safety management systems - approximately $263 000 NPV over 10 years. Industry costs associated with current working requirements (i.e. working live and observing, training including rescue and resuscitation requirements, testing, record keeping, reporting, etc). The cost of testing, inspection and tagging of electrical equipment requirements, costing $308.9 million NPV over 10 years. Supervision and work restrictions associated with trainees in their first six months, costing an estimated $9.5 million NPV over 10 years. Safety switch requirements relating to retrofitting costing approximately $23.5 million NPV over 10 years. Cost savings associated with testing safety switches (negligible). Entities required to report incidents, 'make safe', transport and safely store certain equipment costing approximately $10.3 million NPV over 10 years. Non-entity incident reporting requirements costing an estimated $897 000 NPV over 10 years.	Decreased workers compensation premiums due to lower rates of electrocution/ electrical injuries. Lower property and public indemnity insurance premiums. Fewer indirect costs accruing to business associated with electrocution and electrical injuries, such as production disturbance, human capital costs, approximately $592 million NPV over 10 years. Fewer fires and associated property damage saving approximately $119.7 million NPV over 10 years. Less corrosion of significant structures such as bridges, buildings, piers etc. If all relevant significant structures such as bridges, buildings, piers, etc were to be considered; this figure would be significantly higher. More productive workers. Greater output and investment resulting in expansionary pressure on the Queensland economy more profitability.	Estimated net benefits of approximately $220.2 million NPV over 10 years to business. Indicative estimate only due to unquantifiable yet significant costs and benefits identified. Despite these limitations, elements identified and research indicates a positive return on OH&S investment[55].

[55] US National Safety Council estimate ROI 1:3-6; US Liberty Mutual Survey of financial executives estimates ROI 1:2+. This assumes positive marginal returns.

Option 2	Costs	Benefits	Net Impact
Community	Incident reporting costs to consumers (approximately $897 000 NPV over 10 years). Relatively higher labour costs for electrical work estimated to be $4.76 billion NPV over 10 years. Safety switch requirements relating to retrofitting costing approximately $44 million NPV over 10 years. Costs associated with testing (negligible). Private generating plant, private electric line maintenance and earthing requirements expired – minimal associated costs. More taxes paid to government and less welfare received due to increased employment and consumption with fewer workers injured and killed (for example GST, income tax and disability pension). Distortion of choices in the economy due to extra taxation paid by members of the community.	Approximately 115 electrocutions and 12 300 serious electrical incidents saved over 10 years (and many more dangerous electrical events). Fewer fires and associated injuries and property damage saving approximately $285.3 million NPV over 10 years. Less corrosion of significant structures such as bridges, buildings, piers, etc. Lower insurance premiums (for property, life, income, etc). Decreased dependency, human capital costs, medical and funeral costs etc, saving approximately $9.7 billion NPV over 10 years. More productive workers with greater ability to exploit job opportunities and increased community participation. Greater consumption and investment resulting in expansionary pressure on the Queensland economy and higher living standards in communities.	Estimated net benefit of $5.1 billion NPV over 10 years. At least 115 fewer electrocutions and 12,300 fewer serious electrical incidents over 10 years.
Government		Government's obligation to address externalities and market failures relating to electrical safety would be fulfilled. (Imperfect information/ measurement of electrical risk and the proper appropriation of associated costs of electrocution and electrical injury). Fewer fires and associated property damage, fire responses, coronial investigations saving approximately $515.4 million NPV over 10 years. Less corrosion of significant structures such as bridges, buildings, piers, etc due to cathodic protection requirements. Fewer social service costs, including workers compensation and health services, to victims and their dependents valued at approximately $9.3 billion NPV over 10 years. More government revenue from increases in tax collection (such as payroll tax, GST and income tax) and fewer welfare payments (such as disability pension).	Estimated net benefit of $9.8 billion NPV over 10 years.

Option 3 – *Make a new 2013 Regulation (with potential red-tape reductions)*

The costs and benefits identified in this table are in addition to those identified for Option 2

Option 3	Costs	Benefits	Net Impact
Business – electrical trades, supply industry, electrical retailers	Proposed increase to scope of electricity entity quarterly reporting requirements (negligible cost).	Proposed changes to current working requirements; less onerous rescue and resuscitation requirements saving approximately $29.3 million NPV over 10 years; fewer restrictions on the type of work undertaken by electrical training persons saving approximately $9.5 million NPV over 10 years. Proposal to point to a cathodic protection standard instead of prescribing standards through the regulation and abolish registration requirements. Cost savings relating to cathodic protection systems including testing and legislative compliance are unquantifiable. However administrative and work proxy and direct financial registration cost savings have been estimated at approximately $657 000 NPV over 10 years. Decrease in the amount of distortion of market choices in the economy due to removal of registration fees. Proposal to replace model inspection, testing and tagging requirements with provisions for equipment to be protected by a safety switch and to be regularly visually inspected to identify defects prior to use for everything up to 20A. Plug ins above 20A to have either safety switch protection or to be tested and tagged. Savings estimated at $308.9 million NPV over 10 years.	Net impact is expected to be at $568.6 million NPV better off over 10 years compared with Option 1.
Community	(As per option 2)	(As per option 2)	Net impact is expected to be $5.1 billion NPV and at least 115 fewer deaths and 12,300 fewer serious electrical incidents over 10 years better than for Option 1.
Government	Drafting and consultation costs of new 2013 Regulation. One-off cost of approximately $50 000.	(As per option 2)	Net impact is expected to be $9.8 billion NPV better than for Option 1.

PART B

IN-SCOPE ELEMENTS OF ELECTRICAL SAFETY REGULATION

In accordance with the terms of reference for the review, all in-scope provisions of the 2002 Regulation are considered for continued relevance and the associated costs and benefits have been identified.

The review has been undertaken in full consideration of the Queensland Government's red tape reduction strategy for reducing the regulatory burden for employers and consumers.

The following pages contain an analysis of those parts of the 2002 Regulation being considered against the proposed options.

Where possible, comment has been directed at the 'Part' level of the 2002 Regulation; however, where required, divisions or individual sections have been analysed. In each instance, the subject provision is discussed in context and the preferred option and its costs and benefits are analysed to provide stakeholders with a clear view of the issues.

The following three options apply to the in-scope parts of the 2002 Regulation:

- **Option 1** – *No Regulation*
  Under this option, the 2002 Regulation would expire on 1 September 2013, without replacement.

- **Option 2** – *Remake current Regulation*
  Under this option, the part of the 2002 Regulation would be remade (as part of a new regulation) without any changes.

- ***Option 3*** – *Make a new 2013 Regulation (with potential red-tape reductions)*
  Under this option, the part of the 2002 Regulation is reviewed and changes proposed for inclusion in the 2013 Regulation.

The preferred option for each part is presented along with the associated costs and benefits.

Electrical Safety Regulation 2002 – Part 2
Electrical work

This part provides the requirements for the performance of electrical work.
It addresses:

- higher risk activities such as live electrical work and high voltage live line work (divisions 2 and 3)
- testing of electrical work (division 4)
- testing and maintenance of test instruments and safety equipment (division 5)
- isolation and lockout procedures (division 6)
- documentation requirements (division 7)
- enforcement provisions for misrepresentations regarding electrical work (division 8).

Proposed option - OPTION 3

It is proposed to continue to regulate this part with changes.

Certain aspects of electrical work, such as 'live' work, although undertaken by licensed electrical workers, carry a high risk of injury or death. To minimise this risk it is important to ensure that such work is only performed when necessary and in as safe a manner as possible. It is also important for the safety of electrical workers that control measures are in place to minimise the risk of electric shock as far as is reasonably practicable through effective isolation and lockout procedures. Furthermore, in the interest of safety of all persons it is imperative that electrical work is tested to ensure it is electrically safe. This part provides a regulatory framework that underpins these aims and for these reasons it is proposed to continue to regulate this part.

For the purpose of this RAS, the following divisions/sections are excluded as they are currently subject to review through the national harmonisation of work health and safety legislation:

- *Division 2 - Live electrical work (ss. 9 – 12).*
- *Division 5 - Testing and maintenance of test instruments and safety equipment (ss. 16 – 18).*
- *Division 6 - Isolation and lock-out procedures for electrical work (ss. 19 – 20).*

The following recommendations are proposed.

Provisions to be re-made unchanged

Division 1 – Preliminary (ss. 1 – 7) - No change
This is an administrative division that provides a purpose/application statement of the part.

Division 3 – High voltage live line work (s. 13) - No change
This division addresses high voltage live line work requirements. In particular it requires this work be performed under a high voltage live line work management plan complying with the relevant ENA guidelines. It underpins essential electrical safety requirements for workers.

Division 4 – Testing of work (ss. 14 – 15) - No change
This division addresses requirements for the testing of electrical work and the provision of certificates of electrical safety upon completion of the work. Testing is an essential electrical safety requirement. Supporting documentation provides an additional consumer protection outcome.

Division 7 – Documents about electrical work (ss. 22 – 23) - No change
This division addresses administrative requirements for documentation relating to electrical work. These are administrative provisions to ensure electrical work documentation required under the Act or to be issued to electricity entities is signed by appropriate persons.

Division 8 – General provisions (ss. 24 – 24A) - No change
This division provides for enforcement action to be taken against persons engaging in minor breaches of misleading conduct without requiring recourse to court action.

Recommended changes

Division 6 – Other requirements - Remake s. 21 with changes

s. 21 - *Rescue and resuscitation training*
The requirements for CPR and rescue training for licensed electrical workers are addressed in other regulatory requirements such as licence eligibility and 'live work' requirements and these will not be impacted.

The requirements of this section to ensure workers assisting licensed electrical workers are trained in rescue and resuscitation should be determined by risk management principles and in consideration of overarching duties of care. Work such as assisting in fixing cable trays or conduit in place represents forms of low risk electrical work captured by this requirement. It is therefore proposed that this section is remade with the changes to reflect that that the requirement for resuscitation and rescue training does not apply where a documented risk assessment identifies that the particular work to be undertaken is low risk electrical work.

Cost / benefit of recommended changes

There is a cost saving of $29.3 million NPV over 10 years to industry for employers not needing to have workers trained in rescue and resuscitation to assist with documented low risk electrical work. This estimate is based on 23 960 people affected (19 460 electrical apprentices and 4500 non electrical workers using a proxy of 10% of licensed electrical workers), the cost of the course ($70) and opportunity cost of the time spent on the course (3 hours @ $24 per hour in lost income).

Cost / benefit

The costs of divisions 3 and 4 have not been estimated due to a lack of available data. These divisions relate directly to occupational prevention of injury and electrocution and costs associated with their application are expected to deliver a positive return on investment of between 200-600%[56] in terms of minimising future costs to the business associated with premiums and lost time of workers, as examples.

The costs of divisions 1 and 7 are negligible. The costs of Division 8 are incurred where there is non-compliance with other parts of the regulation and therefore costs have not been estimated.

[56] US National Safety Council estimate ROI 1:3-6; US Liberty Mutual Survey of financial executives estimates ROI 1:2+. This assumes positive marginal returns.

Electrical Safety Regulation 2002 – Part 5
Electrical installations

This part provides a range of requirements relating to electrical installations. It addresses requirements for:

- performing electrical work
- defects and earthing
- electric lines forming part of an electrical installation
- installation of safety switches in domestic residences
- installation of ceiling insulation
- workplace electrical installations.

Proposed option – OPTION 3

It is proposed to continue to regulate this part with changes.

The repair of defective electrical equipment, maintenance of electric lines and the installation of safety switches are fundamental to electrical safety in both industrial and domestic environments.

For the purpose of this RAS, the following Divisions is excluded as it was subject to recent amendment:

- *Division 4A - Installation of ceiling insulation (ss. 81A – 81K)*

The following recommendations are proposed.

Provisions to be re-made unchanged

Division 1 – Performing electrical work (ss. 65 – 69) - No change
This division underpins electrical safety by requiring electrical workers to comply with industry accepted standards for electrical work. It also requires electrical work on particular electrical equipment to only be performed by licensed electrical workers due to the higher risk associated with either the nature of the equipment or the environment into which it is installed.

Division 2 – Defects and earthing (ss. 70 -71) - No change
This division requires that a person in control of electrical equipment, given written notice about a defect to that equipment, must takes reasonable steps to ensure the defect is fixed. It also provides requirements on a person in control of a low voltage installation to ensure the earthing system is effective. Both of these provisions are seen as fundamental safety requirements that should be maintained.

Division 3 – Electric lines (ss. 72 – 76) - No change
This division applies to the person in control of an electrical installation. It contains requirements to ensure the ongoing safety of electric lines, other than those owned by electricity entities, which have other regulatory requirements provided in Part 7.

Division 4 – Installation of safety switches in domestic residences (ss. 77 – 81) - No change

This division provides mandatory requirements for safety switches in domestic residences, including rental properties. It also provides restrictions on electrical work that may be performed on domestic residences where safety switches are not installed.

It is widely accepted that increased coverage of households by safety switches has increased electrical safety in homes and that this regulatory practice should continue for the safety of all Queensland residents.

A proposal to extend the coverage of safety switches in Queensland homes has been the subject of a previous RAS which is pending further consideration by Government.

Recommended changes

Division 5 – Workplace electrical installations – Remake with changes

Safety switches
Queensland already has comprehensive safety switch requirements for all socket outlets up to 20 amps in high risk work environments. The 20 amp threshold reflects the rating of the vast majority of plug-in electrical equipment used in workplaces. Equipment with higher ratings is unlikely to be portable or otherwise moved during operation. The national model WHS laws will extend safety switch installation requirements to all socket outlets in high risk work environments, including those rated above 20 amps. This requirement is expected to significantly impact on Queensland businesses, particularly in the rural and manufacturing sectors. This significant impact on Queensland industry was noted by Safe Work Australia in its National RIS[57].

It is proposed to vary the safety switch requirement for fitting of safety switches to socket outlets not exceeding 20 amps, which is consistent with the current Queensland requirements.

Inspection, testing and tagging
Currently workplaces in Queensland have various testing and tagging requirements determined by the type of work carried out (the work type ie manufacturing work, rural work, etc). The work type also determines the type of electrical equipment requiring testing (*specified electrical equipment*, limited again to 20 amps). The national model removes work types and specified electrical equipment definitions and requires inspection, testing and tagging of all plug-in electrical equipment used in *higher risk work environments*. Higher risk work environments means situations when equipment is supplied with electricity though a socket outlet and is used in an environment where the normal use exposes it to operating conditions that are likely to result in damage to the equipment or a reduction in its expected lifespan (exposure to moisture, heat, vibration, mechanical damage, corrosive chemicals or dust).

Again, this requirement is expected to significantly impact on Queensland businesses, especially the rural and manufacturing sectors.

Queensland's existing test and tag requirements have been in place for a number of years. However, regulation has not kept pace with technological innovations. Increased penetration of safety switches and the double insulation of electrical equipment have significantly lowered the electrical safety risks associated with working with electrical equipment.

Accordingly, it is proposed to replace current test and tag requirements for all socket outlets up to 20 amps with provisions for plug-in equipment to be protected by a safety switch and to be

[57]Safe Work Australia 'Decision Regulation Impact Statement for National Harmonisation of Work Health and Safety Regulations and Codes of Practice' 2011. pp 116 – 117.

visually inspected prior to use to identify defects. This visual inspection requirement is consistent with AS/NZS 3760.

This proposal acknowledges that the use of safety switches in conjunction with a regular visual inspection process provides an effective control measure against the risk of electric shock when using the type of electrical equipment addressed by this regulation. Furthermore, it provides businesses with a more cost-effective way of managing the electrical risk. It does not preclude businesses who believe their workplaces carry higher risks from continuing to implement a full test and tag regime.

Electrical equipment supplied through a socket outlet at greater than 20 amps is to have either safety switch protection or to be tested and tagged (as safety switches will not be mandated for equipment rated above 20 amps).

Cost / benefit

Division 2 – Performing electrical work
The costs to the community of division 2 are incurred where there is non-compliance with other parts of the regulation and therefore costs have not been estimated. The cost implication to the community of division 3 is minimal.

Division 4 – Installation of safety switches in domestic residences
The estimated cost of division 4 accruing to both business and the community is $78.5 million NPV over 10 years. This assumes 382 730 affected Queensland residences paying $205 each to fit a safety switch over 10 years. Figures derived from the Queensland Government's 2011 RAS 'Extension of mandatory requirements for fitting of safety switches in residential accommodation'.

Division 5 – Workplace electrical installations
The estimated cost of division 5 accruing to businesses is $308.9 million NPV over 10 years. This is based on a number of assumptions: All businesses in the Electricity, Gas, Water and Waste Services, Construction, Manufacturing and Rural industries operate in hostile environments and only 5% of businesses in the remaining industries. The cost of a test is dependent on the number of items being tested (economies of scale for large jobs) and ranges between $9 and $12 per item[58]. The number of affected plug-in equipment varies by the size of the business ranging from 10 items per non-employing businesses to 400 items on average for businesses employing over 200 persons. Calculations also assume that approximately 1% of plug-in equipment in the Rural industry is over 20A and 2% in the Manufacturing industry. The number of businesses by size in each of the industries is based on Australian Bureau of Statistics figures for 2010-11[59].

[58] Based on an internet search of prices for test and tag services.
[59] ABS cat number 8161.0.55.001 'Counts of Businesses – Summary Tables 2010-11' for Queensland.

Electrical Safety Regulation 2002 – Part 7
Works of an electricity entity

This part prescribes ways of discharging the electrical safety obligations of electricity entities. It addresses:

- earthing and protection (division 2)
- substations (division 3)
- electric lines and control cables (division 4)
- termination requirements for low voltage overhead service lines (division 5)
- service lines (division 6)
- the maintenance of works (division 7).

There are no excluded provisions in this part.

Proposed option - OPTION 2

It is proposed to continue to regulate this part without changes.

The regulation reflects similar requirements in all states for the safe operation of the works of electricity entities.

The following recommendations are proposed.

Provisions to be re-made unchanged

Division 1 – Compliance with this part (ss. 127 – 128) - No change
This division is an administrative division.

Division 2 – Earthing and protection (ss. 129 – 133) - No change
This division addresses systems of earthing, connection of high voltage circuits to earth, performance of works and protection of earth conductors.

Division 3 – Substations (s. 134) - No change
This division relates to the requirements applying to substations forming part of the works of an electrical entity.

Division 4 – Electrical lines and control cables (ss. 134A – 143) - No change
This division relates to the measurement of vertical and horizontal distances of electrical lines and control cables from the ground and structures.

Division 5 – Termination requirements for LV overhead lines (s. 144) - No change
This division addresses requirements relating to the termination of low voltage overhead service lines.

Division 6 – Service lines generally (ss. 145 – 146) - No change
This division sets down requirements relating to fuses and the disconnecting of service lines.

Division 7 – Maintenance of works (ss. 147 – 148) - No change
This division relates to the inspection and maintenance of insulation and the trimming of trees near overhead lines.

Recommended changes

There are no recommended changes for this part as it is proposed to be re-made unchanged.

Cost / benefit

This part establishes a regulatory basis for enforcement of the electricity distribution entity obligation to comply with the relevant Australian Standards and Energy Networks Association guidelines. It does not of itself impose costs as the electricity distribution network is built and maintained to these standards.

Electrical Safety Regulation 2002 – Part 8
Electricity supply

This part provides requirements surrounding electricity supply.
It addresses:

- connection of an electrical installation to a source of electricity (division 1)
- private generating plant and interconnection to works of an electricity entity (division 2)
- electrical installation testing and certification (division 3)
- requests to distribution entities regarding examination of electrical work and advice regarding the need to change electricity metering (division 4).

This part requires that all electrical installations are tested to ensure they are electrically safe prior to initial connection, or reconnection (after the performance of electrical work), to works of an electricity entity. High voltage and hazardous area installations are also required to be inspected by an accredited auditor before connection. Similarly, electrical installations with serious defects are prohibited from being connected to works of an electricity entity. These requirements should be retained as they serve to ensure unsafe electrical installations are not connected to the electricity network.

This part also established requirements on persons whom have private generating plant to ensure it is safely interconnected with the electricity network. Regulation in this area is critical to ensure the safety of persons where private generating plant is utilised in conjunction with entity works.

This part also prescribes requirements for testing and certification by licensed electrical contractors to electricity entities and consumers to ensure safety is not compromised. These requirements are necessary to prescribe sufficient scope for the testing, certification and interconnection of electrical installations with the works of an electricity entity and to underpin effective certification by licensed electrical contractors of the fitness of an electrical installation for connection to supply by electricity entities.

There are no excluded provisions in this part.

Proposed option - OPTION 2

It is proposed to continue to regulate this part with no changes.

The following recommendations are proposed.

Provisions to be re-made unchanged

Division 1 – Connection to a source of electricity (ss. 149 - 155) - No change
This division addresses requirements relating to the connection (including disconnection and reconnection) of electrical installations. In particular examination and testing prior to initial connection and after electrical work has been performed on the installation and in relation to not connecting an installation with a serious defect. It also specifies inspection requirements for high voltage and hazardous area installations. This division also addresses disconnection and reconnection of low voltage electrical installations (including for the purpose of eliminating an exclusion zone).

Division 2 – Private generating plant (ss. 156 – 157) - No change
This division addresses requirements relating to the use of private generating plant including for emergency supply and in relation to interconnection with works of an electricity entity.

Division 3 – Testing (ss. 158 – 162) - No change
This division provides requirements relating to the testing of an electrical installation by an electrical contractor and a distribution entity. In particular it requires the provision of a certificate of testing and compliance by an electrical contractor following electrical work on an electrical installation.

Division 4 – Requests and advice to distribution entities (ss. 163 – 164) - No change
This division deals with requests and advice to distribution entities. In particular, it relates to requests by electrical contractors in relation to inspections of an electrical installation by a distribution entity and advising distribution entities of electrical work that will result in a need for a change to the metering of an electrical installation.

Recommended changes

There are no changes recommended for this part as it is proposed to be re-made unchanged.

Cost / benefit

The costs of divisions 1, 3 and 4 have not been estimated due to a lack of available data. Most of the provisions relate directly to occupational prevention of injury and electrocution and as a result the costs associated with their application are expected to deliver a positive return on investment of between 200-600%[60] by minimising future business liabilities. For example; lost working time and skills, higher workers' compensation premiums, etc. The remaining administrative provisions, such as the requirement to provide a certificate of testing and compliance by an electrical contractor in certain circumstances, are not expected to take an electrical contractor more than 10 minutes in each instance. This equates to approximately $11 (based on $68.50 per hour or the average commercial hourly rate of electricians in Queensland[61]) and likely to be passed onto customers as fees for labour.

The costs of division 2 are negligible.

[60] US National Safety Council estimate ROI 1:3-6; US Liberty Mutual Survey of financial executives estimates ROI 1:2+. This assumes positive marginal returns.

[61] Queensland Government 2011 Regulatory Assessment Statement 'Extension of mandatory requirements for fitting of safety switches in residential accommodation'.

Electrical Safety Regulation 2002 – Part 9
Safety management systems

This part outlines the requirements for electricity entities such as Energex and Ergon Energy to have safety management systems in place. It provides detail to support Part 5 of the Act; Safety management systems for electricity entities.

It also prescribes the requirements for a safety management system which must contain details of the system's safety objectives, systems and procedures for meeting these objectives, performance criteria and ways of maintaining adherence to the performance criteria.

Further, the system must provide for:

- annual auditing by an accredited auditor at the expense of the entity
- submission of an annual audit plan to the chief executive
- a certificate of the annual audit from an accredited auditor
- making modifications to the system or the audit plan and being audited in accordance with the reasonable requirements of the chief executive.

Work is progressing as part of Council of Australian Governments national harmonisation initiatives on the development of a national standard for electrical supply authorities' safety management systems. Any decision to adopt this standard on its completion will be a matter for separate consideration by the Queensland Government.

There are no excluded provisions of this part.

Proposed option - OPTION 2

It is proposed to continue to regulate this part without changes.

Prescribed electricity entities are businesses which have a large exposure/reliance on electricity or own significant electricity assets, such as electricity supply authorities or electrified rail owners. The nature of these businesses presents them with a significantly higher exposure to electrical risk. For this reason these businesses need to have a comprehensive policy framework in place to manage this risk; a safety management system. This requirement is consistent with those applying in six Australian jurisdictions.

The following recommendations are proposed.

Provisions to be re-made unchanged

Division 1 - Prescribed electrical entities (s. 165) - No change
This division sets down the characteristics of a prescribed entity.

Division 2 - Requirements for safety management systems (s. 166) - No change
This division sets down what a safety management system consists of and what must be done with it after it is put into effect.

Recommended changes

There are no changes recommended for this part as it is proposed to be re-made unchanged.

Cost / benefit

The estimated cost to all prescribed entities for Division 2 is $263 000 NPV over 10 years. This estimate is based on eight prescribed electrical entities paying $12 600 each in the first year to create safety management systems and audit plans and $2725 annually thereafter for the audits and paperwork costs associated with these provisions. Most of the initial costs are for skilled labour to generate a safety management system at $1000 a day for 10 days. Ongoing maintenance costs of the safety management system are based on the same rate with less time required. Division 1 is administrative only and imposes no costs.

Electrical Safety Regulation 2002 – Part 10
Accredited auditors

This part provides for the function of an accredited third party auditor whose role is to independently verify certain higher risk electrical installations. Accredited auditors also audit safety management systems for *prescribed electricity entities* required under Part 9 of the 2002 Regulation.

These audit processes:

- ensure that appropriate specialist expertise is available to assess the electrical safety compliance of specific higher risk electrical installations, prior to connection or reconnection to a source of electricity
- that safety management systems comply with the requirements of the Regulation.

An auditor may be accredited for all or any of the three categories providing the requirements are met.

There three categories of accredited auditor are:

- high voltage installation auditor
- hazardous area installation auditor
- safety management systems auditor.

Both the Act and the 2002 Regulation set down specific requirements relating to the appointment and conduct of accredited auditors. The work of these auditors is monitored through administrative reporting requirements. Accredited auditors are also monitored in respect of their processes and to remove any possible conflict of interest issues.

There are no excluded provisions in this part.

Proposed option - OPTION 2

It is proposed to continue to regulate this part without change.

High voltage and hazardous area installations, by nature, carry a higher risk of incident if electrical work is not performed in accordance with the required standards. The potential harm associated with the presence of higher voltages or explosive environments requires electrical work on such installations to be performed in accordance with stringent electrical safety standards. The accredited auditor process ensures an appropriate level of compliance through independent compliance assessment by industry specialists.

Prescribed electricity entities are businesses who have a large exposure/reliance on electricity or own significant electricity assets, such as electricity supply authorities or electrical rail owners. The nature of these businesses presents them with a significantly higher exposure to electrical risk. For this reason these businesses need to have a comprehensive policy framework in place to manage this risk; a safety management system. Independent auditing of these systems ensures they adequately address this risk.

The following recommendations are proposed.

Provisions to be re-made unchanged

Section 167 – Application requirements - No change
This section addresses the application requirements for appointment as an accredited auditor.

Section 168 – Refund of application fees - No change
This section addresses the refund of fees if an application under section 167 is refused or is withdrawn.

Section 169 – Term of office - No Change
This section provides for the term of office as accredited auditor.

Recommended changes

There are no changes recommended for this part as it is proposed to be re-made unchanged.

Cost / benefit

The commissioning of high risk electrical installations and the conduct of associated systems of work without independent verification would represent an unacceptable level of risk to the community. While the fees charged for such audits are commercial in confidence, the impact on industry for this part is minimal when considered in relation to the very high costs of the installations involved and the potential of associated risks and likely result in non compliance with primary electrical safety duties of care. The demand for services and fees commanded by accredited auditors is expected to offset any regulatory costs, such as registration fees and training, required of an accredited auditor.

Electrical Safety Regulation 2002 – Part 11
Cathodic protection systems

Cathodic protection systems are utilised to prevent property from being destroyed or damaged by the effects of corrosion. Such systems are integral to the safety of structures like building reinforcement, buried metallic pipeline and cables. They protect structures and metalwork by using the metal to be protected as a cathode in an electrochemical process created by an extra low voltage electric current which facilitates corrosion in sacrificial anode material which completes the system.

Cathodic protection systems present a low risk to the electrical safety of persons whether they are licensed electrical workers or other workers, consumers or the general public. They do however have the potential to cause significant acceleration of corrosion in neighbouring structures if poorly maintained or operated incorrectly. For this reason, their operation has been the subject of the extensive regulatory requirements listed below.

This part covers:

- the requirements for the design and installation of cathodic protection systems; division 2 (sections 173 and 174)
- operating and testing requirements for cathodic protection systems; divisions 3 and 4 (sections 175 to 181)
- system requirements for cathodic protection systems; division 5 (sections 182 to 185)
- registration of registrable cathodic protection systems; division 6; including:
  - application for registration (sections 187 and 188)
  - term of the registration (section 189)
  - changes to details on the registration (section 190)
  - changes to the registered system (section 193).

In relation to installation and design of cathodic protection systems; section 174 requires that a system be designed and installed in accordance with the cathodic protection standard.

The cathodic protection standard *AS/NZS 2832.1 Cathodic protection of metals – Pipes and cables* specifies requirements for the cathodic protection of buried or submerged metallic pipes and cables. *AS/NZS 2832.1* specifically covers the following which relate to cathodic protection:

- pertinent aspects of the design of structures requiring cathodic protection
- coatings for use on submerged and buried structures
- measuring techniques and equipment
- the design of cathodic protection systems
- the installation of cathodic protections systems
- the control of interference currents on foreign structures
- the cathodic protection of structures subject to stray direct current and telluric effects
- the operation and maintenance of cathodic protection systems
- electrical hazards associated with the cathodic protection of buried structures.

These requirements are duplicated in Part 11 of the Regulation.

There are no excluded provisions.

Proposed option – OPTION 3

It is proposed to continue to regulate cathodic protection systems with changes.

A problem with the present approach is the possibility that the nominated standard may change and the 2002 Regulation not be amended to reflect this, resulting in a conflict between what is required under the 2002 Regulation and what is required under the quoted standard, (e.g. *AS/NZS 2832.1*).

It is also possible that the requirements of the standard may not be met owing to an un-amended 2002 Regulation. This could pose a danger to the safety of property and a conflicted regulatory environment.

Rather than continue to maintain prescriptive regulatory requirements, it is proposed that this part be allowed to expire with the exception of requiring owners of such systems to ensure they are designed installed and tested in accordance with the nominated cathodic protection standard. This amendment reduces the volume of regulation while still maintaining the level of regulatory protection to property provided by these systems when operated correctly.

To further reduce the cost and regulatory burden on Queensland businesses operating such systems, it is also proposed to remove the requirements to register these systems. A cathodic protection system installed, designed and tested in accordance with the relevant standards, which the proposed amended regulation will provide for, poses little appreciable electrical risk to either the operator of the system or others.

It is argued that registration of these systems provides no increase in the level of electrical safety. Issues of non-compliance can be addressed as part of regular workplace compliance audits and on a complaint management basis, without the need for registration. This approach is consistent with the approach taken in several other Australian jurisdictions.

The following recommendations are proposed.

Recommended changes

Allow the current provisions of Part 11 to expire without replacement, with the exception of s174 (*Correct design and installation of cathodic protection system*).

Section 174 - Recommended change

Currently s174 requires a person who owns a cathodic protection system to ensure the system is designed and installed in accordance with the requirements of the cathodic protection standard.

It is proposed to retain this section, redrafted, to require the owner of a cathodic protection system to ensure it is designed, installed and tested in accordance with the requirements of the cathodic protection standard.

Cost / benefit of recommended changes

The administrative cost and work savings associated with registration to owners of affected cathodic protection systems is estimated at $657 000 NPV over 10 years based on estimates from Victoria. Savings associated with compliance with Australian Standards instead of regulated standards are unquantifiable (refer to Victorian Regulatory Impact Statement on Cathodic Protection 2009); however, it is believed the impact in this regard will be minimal.

Electrical Safety Regulation 2002 – Part 12
Incident notification and reporting

This part provides requirements for incident notification and reporting.
It addresses:

- incident notification requirements and reporting timeframes for serious electrical incidents (SEI) and dangerous electrical events (DEE)
- actions by an electricity distribution entity when advised of electric shock or reasonable safety concerns regarding electrical equipment
- arrangements for the quarterly reporting of electric shock statistics by electricity distribution entities
- requirements for the storage of certain electrical equipment by an electricity distribution entity after a serious electrical incident.

Proposed option – OPTION 3

It is proposed to continue to regulate this part with a change.

Under this part, serious electrical incidents and dangerous electrical events are required to be reported to the regulator. This part also addresses general electrical safety concerns through the requirements that electricity distribution entities respond initially to an incident to “make safe” and also to respond appropriately to an electrical safety concern raised by their customers.

The requirements of this part support the functions of the electrical safety regulator and are vital in ensuring an effective electrical safety regime. Without regulatory requirements for the timely notification of serious electrical incidents and dangerous electrical events, the information available to the regulator would be very limited. Additionally, the investigative role of the regulator would be severely impeded. Incident investigation is a fundamental function of the regulator, as investigation outcomes frequently inform electrical safety improvement initiatives that aim to avert similar future incidents.

For the purpose of this RAS, the following sections are excluded as they are currently subject to review through the national harmonisation of work health and safety legislation and are not for consideration:

- *Section 196 – Employer or self-employed person to advise chief executive of serious electrical incident or dangerous electrical event.*
- *Section 197 – Recording serious electrical incident or dangerous electrical event.*
- *Section 198 – Distribution entity to advise chief executive of serious electrical incident or dangerous electrical event.*
- *Section 201 - Scene not to be interfered with.*

The following recommendations are proposed:

Provisions to be re-made unchanged

Section 194 – No change
This is an administrative provision that provides definitions for the part. It provides meanings for specific terms used in the part

Section 195 – No change
This is an administrative provision that provides scope for terms used in this part. In particular it clarifies how to identify the distribution entity 'responsible' for taking action is relation to a serious electrical incident or dangerous electrical event.

Section 199 – No change
This section addresses distribution entity requirements when advised of an electric shock by a customer.

Section 200 – No change
This section provides for three monthly reporting of incident records by distribution entities.

Section 201A – No change
This section addresses the storage of electrical equipment (that is entity works) by an electricity entity following a serious electrical incident.

Section 202 – No change
This section addresses requirements surrounding actions to be taken by a distribution entity in the interest of electrical safety.

Recommended changes

A new requirement is proposed for inclusion in this part that would require distribution entities to report annually on incidents in which low voltage (LV) conductors fall to the ground and remain energised. Occasions resulting in a mass failure (for example, a cyclone) would be excluded from this requirement. This proposal addresses a coronial recommendation and would also serve to improve the information available to the regulator in relation to identifying any trends relating to an electricity network's operation and performance that may affect safety.

The information proposed for reporting annually to the electrical safety regulator about such incidents is proposed to include the following:

- the number of incidents and their geographical locations
- the likely causes of incidents and the remedial actions taken
- any negative trends identified that may adversely impact safety.

The change is considered important to the functions of the electrical safety regulator in investigating serious electrical incidents and dangerous electrical events along with the ability to access quality information that informs improvements in electrical safety outcomes.

Cost / benefit of recommended changes

It is understood that the additional information required under this proposal is already collated by entities as part of their safety management systems. Accordingly, the compliance costs to distribution entities associated with this proposal are expected to be negligible.

Cost / benefit

Sections 194 and 195 are administrative only. The costs imposed in section 199 and 202 are estimated at up to $10 million NPV over 10 years (excluding incident reporting which is included in the costs of section 200). This estimate is based on 2000 incidents per annum required to be 'made safe' by an electricity entity at a cost of $500 on average for section 199, and approximately 1750 incidents that required reporting at a cost of $100 for each report on average for section 202. Section 200 is estimated to cost $284 000 NPV over 10 years based on three monthly reporting at 2000 incidences per annum requiring 10 minutes of labour at $100 per hour for each report entry. Section 201A is estimated at $17 000 NPV over 10 years based on one incident occurring per annum at a cost of $1000 for transport and $1000 for storage each time.

The total estimated cost for all these sections over 10 years is up to $10.3 million NPV.

Electrical Safety Regulation 2002 – Part 13
Miscellaneous provisions

This part addresses a range of miscellaneous provisions including:

- electrical safety contributions made by distribution entities (ss. 203 -206)
- incidental provisions related to mines, petroleum plants and prescribed workplaces (ss. 207, 207A)
- obligations for supervising electrical trainees or apprentices (s. 209).

Proposed option - OPTION 3

It is proposed to continue to regulate this part with changes.

This part provides for a range of miscellaneous matters not addressed in other parts. Although incidental, these provisions address particular issues of electrical safety not related to the purpose of other Parts. It also provides a range of definitions and administrative matters necessary to underpin aspects of the electrical safety framework established by the 2002 Regulation.

The following recommendations are proposed.

Provisions to be re-made unchanged

Division 1 – Electrical safety contribution (ss. 203 – 205) - No change
This is an administrative division that support the payment of electrical safety contributions.

Division 2 – Mines, petroleum plants and prescribed workplaces (ss. 207 – 207A) - No change
This division addresses specific regulatory applications of the 2002 Regulation on sites such as mines or petroleum plants. It also defines "prescribed workplaces" to underpin s18(2)(d) of the Act.

Recommended changes

Division 3 – Other matters (ss. 208 – 211B) - Recommended change
s209 – Obligation of employer about supervising training person

It is proposed to remove subsections 209 (1) and s. 209 (1A). These provisions restrict training persons in their first six months of training from working in the immediate vicinity of live high voltage exposed parts or where there is a risk of contact with live low voltage exposed parts.

These requirements are unnecessarily restrictive as they impose an arbitrary time based approach rather than supporting the risk management and competency approach required by the legislation. In many cases workers bring previous industry experience into a new role subject of the training being undertaken. They may be non-licensed trade assistants or other classes of worker previously authorised to work in these environments or holders of other classes of electrical licences seeking to cross skill.

Further, there is the risk that these sections can be interpreted to mean that an apprentice or trainee is automatically competent to work in the hazardous environments referenced once they have completed the first six months of their training, irrespective of the work undertaken in that period. This may be at odds with the overarching statutory employer's obligation to ensure that persons working in such environments are electrically safe regardless of their employment status. Equally, the removal of the regulatory provision does not diminish this obligation in respect of inexperienced apprentice of trainee.

The requirements of subsections 209(2), (3) and (4) are proposed for retention as they provide a specific requirement to ensure that training persons are adequately supervised by an electrical worker suitably licensed to undertake the work.

Cost / benefit of recommended changes

There is an expected saving of $9.5 million NPV in increased productivity over 10 years resulting from the proposed deregulation of s209(1) and s209(1A). This estimate assumes these provisions incur an extra half hour of work per week by a more experienced trainee or electrical worker at $37 per hour[62] for each electrical trainee in their first six months of training. The calculation is based on 3,114 new electrical apprentices each year with almost 20 weeks spent 'on-the-job' in their first six months.

[62] The hourly rate is the average wage for electrical workers in Queensland derived from the total median salary package of an electrician in 2012 at www.livesalary.com.au .

Cost / benefit

Division 1 imposes a cost of approximately $109.7 million NPV on distribution entities over 10 years based on 2011-12 figures. Division 2 is administrative only and does not impose additional costs. Sections 209 (2-4) of Division 3 does impose a cost which is recouped by the lower wages of electrical trainees. The cheaper labour reflects the lower productivity (including a duty of care to supervise for electrical safety while training) of electrical trainees.

The total estimated cost for these remaining sections over 10 years is up to $109.7 million NPV.