REGULATORY IMPACT STATEMENT

Electricity Safety (Management) Regulations 2009

August 2009

This Regulatory Impact Statement has been prepared in accordance with the requirements of the Subordinate Legislation Act 1994. Its purpose is to inform interested parties regarding a proposal to make new regulations. Comments are invited and should be should be forwarded by no later than ***5:00pm, 27 October, 2009*** *to:*

Mr Andrew Padanyi
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26 August 2009

Mr Andrew Padanyi
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Dear Mr Padanyi

ASSESSMENT OF REGULATORY IMPACT STATEMENT

Thank you for seeking an assessment of the Regulatory Impact Statement (RIS) on the proposed Electricity Safety (Management) Regulations 2009. The Victorian Competition and Efficiency Commission (VCEC) received the final version of the above RIS and draft regulations on 24 and 25 August 2009 respectively.

The VCEC assesses the adequacy of the RIS prior to the public consultation process as required under section 11 of the *Subordinate Legislation Act 1994*.

I advise that the RIS meets the requirements of section 10(3) of the *Subordinate Legislation Act 1994*.

The VCEC's assessment is based on the adequacy of the evidence presented in the RIS and is focused on the quality of the analysis rather than the merits of the proposal itself. Further evidence on the nature and size of the costs and benefits may emerge during the consultation stage and consequently change the conclusions reached.

In the interests of transparency, the VCEC recommends that you publish this assessment letter alongside the RIS when it is released for consultation as a number of other departments and agencies have done.

The VCEC is building a database of Victorian Government RISs and statements of reasons for change, and will be putting your material on our website when it is released. Please inform us when you have placed this RIS on your website. Please also provide us with an electronic copy of your statement of reasons for changes to the final regulations when they are provided to the Scrutiny of Acts and Regulations Committee (refer 5.53 Subordinate Legislation Act 1994 Guidelines, 17 January 2005).

If you have any questions, please contact RegulationReview@vcec.vic.gov.au.

Yours sincerely

Sam Abusah
Assistant Director
Victorian Competition and Efficiency Commission

Summary

Safety-related regulation of electricity operators in Victoria under the Electricity Safety Act 1998 and its associated regulations has historically been undertaken on a largely prescriptive basis. However, amendments made to the Act by the Electricity Safety (Amendment) Act 2007 have the effect of requiring operators in the transmission and distribution sectors to develop, and have approved by Energy Safe Victoria (ESV), an Electricity Safety Management Scheme (ESMS). These legislative amendments will come into place on 1 January 2010.

The ESMS requirement constitutes an example of "process-based" regulation. That is, it is based on mandating a risk management process, constituting risk identification, risk assessments and the implementation of risk controls, as well as record-keeping, auditing and updating requirements. The proposed regulations are essential to give full effects to the amending legislation. The regulations set out in detail the required content of an ESMS.

The expected cost impact of the proposed regulations has been estimated by surveying all seven of the Major Electricity Companies (MEC) that will be required to comply with the ESMS requirement. These survey responses indicate that the seven MECs are expected to incur costs associated with ESMS development, implementation, monitoring and review totalling $16.8 million in present value terms over the expected 10 year life of the proposed regulations. In addition, regulatory administration and enforcement costs of $0.6 million are expected to be incurred by ESV over the same period.

However, it should be noted that these constitute the gross costs associated with the proposed regulations. Five of the seven affected MEC are currently operating under voluntary ESMS arrangements that have been in place under the auspices of the Electricity Safety Act 1998 for several years. This group would inevitably have continued to incur ESMS related costs even in the absence of the recent legislative change in the legislation and the proposed regulations.

In addition to these direct compliance costs, it can be anticipated that substantive costs will be incurred as a result of the implementation of the risk controls determined to be appropriate through the risk identification and assessment process. The Essential Services Commission (ESC) has estimated these costs at approximately $140.8 million during the current five-year pricing period. This is equivalent to approximately $291.6 million over the expected 10 year life of the proposed regulations.

The implementation of the proposed regulations is expected to increase the substantive costs to a significant degree. This reflects both the fact that two MEC will be subject to ESMS requirements for the first time and the fact that ESV expects to require more detailed and wider ranging ESMS to be prepared under the new mandatory arrangements than have been adopted in practice under the current voluntary scheme. While no precise

quantification of the likely size of the substantive cost increases is possible, and indicative estimate is that the current level of substantive costs could increase by a factor of up to 100% following the implementation of the mandatory ESMS arrangements. Based on this assumption, the following table sets out the possible gross costs of the proposed regulations over ten years.

Table S1: Summary of expected costs of the proposed regulations

Cost category	**Amount (PV over 10 years) (% of total)**
Administrative costs – (incl. development of ESMS, implementation, auditing, review & updating)	$16.8 million (3.5%)
Substantive compliance costs (safety related expenditure pursuant to ESMS based risk assessments & risk control decisions)	$468.2 million[1] (96.4%)
Regulatory administration	$0.6 million (0.1%)
Total	**$485.6 million**

Again, however, is necessary to emphasise that these constitute the gross costs associated with the proposed regulations. That is, the affected parties already bear a significant proportion of these costs.

The adoption of the proposed regulations must be compared to a base case. Given the imminent sunsetting of the Electricity Safety (Network Assets) Regulations, the base case for this RIS could be defined as the situation that would exist in the absence of these regulations as well as the Electricity Safety (Management) Regulations. However, the alternative approach is to consider the base case as one in which the prescriptive requirements of the current Electricity Safety (Network Assets) Regulations 1999 would continue, rather than being allowed to lapse at the time of their sunsetting in late 2009 (as a result of the operation of section 5 of the Subordinate Legislation Act 1994). This latter approach is considered to better reflect the reality of the current policy context, in that the network assets regulations would be unlikely to be allowed to lapse in the absence of the proposed regulations.

The estimates prepared by the ESC suggest that the substantive costs to the electricity transmission and distribution sector of moving toward full compliance with the Electricity Safety (Network Assets) Regulations could be as great as $1.7 billion and would, almost certainly, substantially exceed the total costs incurred in complying with the proposed regulations. This means that the costs of the proposed regulations could be

[1] As noted in the above text, this estimate is indicative only and is subject to substantial uncertainty. However, it is derived from actual expenditure estimates supplied to, and published by, the Essential Services Commission.

interpreted as a saving of up to $1.2 billion on the cost of achieving full compliance with the current Electricity Safety (Network Assets) Regulations.

Three alternatives to the proposed regulations have been identified and assessed. The first of these alternatives is to include a significantly greater degree of prescription in the proposed regulations. The second of these alternatives is to adopt a significantly less prescriptive approach than that currently proposed. The third alternative is to extend the mandatory ESMS requirement to the generation sector and the traction sector (i.e. tram and train operators). While this third alternative is not currently authorised by the Electricity Safety Act 1998, detailed consideration was given to this option at the time of the development of the 2007 amendments to the Act. Consequently, this alternative has been assessed in this RIS in the interests of transparency and completeness.

As it has not been possible to develop a fully quantified analysis of expected costs and benefits, the proposed regulations and the three alternatives have been assessed using a Multi Criteria Analysis (MCA). Table S2, below, summarises the results of the MCA.

Table S2: Multi-Criteria Analysis Results Summary

	Cost	**Benefit (regulatory effectiveness)**	**Certainty of compliance**	**Total**
Proposed regulation	+4	+4	+4	**12**
Increased ESMS prescription	+3	+3	+5	**11**
Reduced ESMS prescription	+5	+3	+2	**10**
Broadened scope of ESMS	+2	+5	+4	**11**

Table S2 shows that the proposed regulations receive the highest total score, with 12 points. Both the alternative of broadening the scope of the ESMS requirement and that of adopting a more prescriptive set of ESMS regulations score 11 points. The option of adopting a less prescriptive ESMS requirements scores lowest, at 10 points. Given the above, the proposed regulations are preferred to any of the alternatives identified. It is therefore intended to proceed with the making of the proposed regulations.

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1. Introduction

The proposed Electricity Safety (Management) Regulations 2009 will replace the current Electricity Safety (Management) Regulations 1999, which are due to sunset in December 2009 as a result of the operation of section 5 of the Subordinate Legislation Act 1994.

The proposed regulations will make relatively limited substantive amendments to the existing regulations. However, the basis upon which the new regulations are applied in practice will differ from that currently adopted.

To date, the Electricity Safety Act 1998 and the regulations made under its authority have adopted a predominantly prescriptive approach to the regulation of the activities of electricity operators. However, Division 2 of Part 10 of the ESA allows for the development, on a voluntary basis, of Electricity Safety Management Schemes (ESMS) by an employer of electrical workers, a network operator or an owner of specific premises and the approval of the ESMS by Energy Safe Victoria (ESV). ESV may, in the context of approving a proposed ESMS, exempt the proponent (or "scheme operator") from the requirement to comply with certain aspects of Part 4 of the ESA and the relevant regulations relating to electrical installations and supply networks where appropriate. An ESMS can therefore replace strict compliance with the legislative/regulatory framework with a co-regulatory regime developed between ESV and scheme operator. A voluntary ESMS can therefore currently be considered as constituting an alternative compliance mechanism in respect of certain prescriptive regulation.

Practically speaking, few exemptions have been granted by Energy Safe Victoria (ESV) and the prescriptive regulatory regime remains the dominant element in safety compliance activity. Exemptions currently in place respect of one or more electricity companies relate to power line heights, underground assets, pole mounted transformers, tram line clearance, and a small number of other matters[2]

When an application for approval of an ESMS is made, ESV considers the proposed ESMS in light of requirements set out in section 111 of the ESA. Once satisfied that the ESMS meets the prescribed requirements and standards, ESV must recommend to the Governor in Council that the ESMS be accepted. One aspect of the assessment of any proposed ESMS under section 111 of the ESA is that the proposed scheme complies with the regulations relating to ESMS. These regulations are the Electricity Safety (Management) Regulations 1999.

The development of an ESMS continues to be voluntary. However, the provisions of the Electricity Safety Amendment Act 2007, which will come into effect on 1 January 2010, have the effect of making it compulsory for electricity transmission and distribution

[2] Specifically, exemptions have, to date, been granted in respect of *Electricity Safety Act 1998*, sections 44(2), 45(1)&(2)&(3)&A, Section 93; Electricity Safety (Network Assets) Regulations 1999, regulations 13(1), 14(1), 18, 20, 21(1)&(3), 22(2)(a)&(c), 23(4)&(6)&(11), 47(3); Electricity Safety (Installation) Regulations 1999, regulation 414(1)(a); Electricity Safety (Management) Regulations 1999, regulation 15(4).

businesses operating in Victoria to submit and operate under an approved ESMS. This means that the provisions of the proposed Electricity Safety (Management) Regulations 2009 will be of compulsory application to this group of electricity operators, whereas the provisions of the current regulations apply only where the electricity operator has voluntarily elected to develop an ESMS.

In practice, five of the eight currently licensed electricity transmission and distribution businesses operating in Victoria already have ESMS in place on a voluntary basis. All five are distribution businesses. However, the 2007 amendments to the Electricity Safety Act 1998 mean that all businesses defined to be Major Electricity Companies will be required to have an approved ESMS in place. This will effectively mean that the two distribution companies will need to develop ESMS and have them approved, while the five distribution businesses will need to review and revise their existing ESMS and have the revised ESMS accepted by ESV as conforming with the proposed regulations[3].

The underlying rationale for moving to a regime of compulsory ESMS requirements for certain electrical operators is that the nature of the risk profile in this area is such that it is likely to be more efficient and effective to rely more heavily on process-based regulation and, as a corollary, reduce the current extent of prescriptive regulatory requirements in this area.. Consistent with this rationale, the Electricity Safety (Network Assets) Regulations 1999 will not be re-made after they sunset in December 2009.

[3] Three of the eight currently licensed transmission and distribution businesses are transmission businesses. However one, VENCorp, owns no assets and will consequently be declared not to be a major electricity company (MEC) for the purposes of the ESMS provisions. In addition, while there are six distribution licences, two are held by one operator – Powercor – essentially for historical reasons. Thus, only one ESMS will be approved in respect of Powercor. Hence, the total number of MECs that will be required tooperate under approved ESMS will be seven. ***[ESV: As amended by you, this doesn't seem to add up – 8 businesses, less 1 declared not an MEC, less the fact that only 1 ESMS will be prepared to cover 2 Powercor licences suggests a total of 6 ESMS, not 7 as stated. Please review & clarify.]***

2. Nature and extent of the problem

2.1. Rationale for regulatory intervention

The management of electricity transmission and distribution assets is a complex operation, giving rise to a range of significant risks. The transmission and distribution system has been constructed and developed over several decades and some current distribution assets are eighty years old or more. As this observation indicates, the expected lifespan of many of the assets in question is extremely long. Inevitably, assets with such lengthy lifespans require significant periodic maintenance to be undertaken to ensure that they continue to function reliably and as intended.

The issue of ensuring that private assets are appropriately managed and maintained is generally considered as falling within the realm of responsibility of asset owners. However, a number of factors can be identified in respect of the electricity transmission and distribution sector which provide a rationale for regulatory intervention. These factors include the following:

Private vs public incentives

A priori, private economic incentives might be expected to ensure the appropriate maintenance of network assets to avoid liability due to loss to employees, the public and other parties occasioned by electrical network related harms, thus yielding sound safety performance. However, the current existence of an extensive regime of prescriptive regulation suggests that there is a recognised need for government oversight of performance – and the ability to require adequate standards – in this context.

An apparent dynamic in the marketplace is that of seeking to respond to equity-holder demands for strong economic performances in the short to medium term in part by reducing longer-term maintenance expenditures. The substantial turnover in asset ownership experienced in Victoria in the relatively brief period since the restructuring and privatisation of the electricity industry provides evidence of the fact that the time horizons within which many network asset owners are making judgements on investment and return on asset issues may be quite short in relation to asset lifespans and optimum maintenance cycles.

The long asset lifecycles involved mean that the costs associated with reduced maintenance expenditure may, in many cases, not be borne for a number of years, while assets may have changed hands within this period. Thus, asset owners may have private incentives in the direction of limiting maintenance expenditures, reaping higher short-term returns and realising assets. ESV's experience in dealing with a range of asset owners in the context of exercising its responsibilities for safety regulation suggests to it that this dynamic is a quite a significant one in practice and that this has the potential to

result in deterioration in safety performance and increased maintenance costs in the longer term.

The ability to review an ESMS can provide ESV with substantial information on asset owner practices and approaches, while a regulatory requirement for ESMS to be approved by ESV ensures that the regulator can exercise significant influence in this area. By contrast, under the current voluntary ESMS arrangements, ESV has access to only selected aspects of the distribution companies' asset management plans[4] and, as a result, is unable to develop a clear overview of practices in this regard and a detailed understanding of relevant safety concerns. Moreover, the voluntary nature of current ESMS requirements means that ESV has only limited ability to influence of the substance of the safety management practices and procedures adopted by electricity operators.

The fact that transmission and distribution companies have asset management plans in place arguably suggests that they are adopting a strategic approach to asset management. However, the fact that ESV does not currently have full access to these plans means that it is not possible to verify whether these plans are sufficiently broad in scope to effectively address the safety and reliability risks discussed below, or whether they are being fully implemented by transmission and distribution companies. By contrast, a requirement to submit asset management plans as part of a mandatory ESMS requirement (as will occur once these proposed regulations are made and the provisions of the Electricity Safety Amendment Act 2007 come into force) will ensure that ESV is able to review and verify this material and ensure that it reflects appropriate risk management practices.

Public safety considerations

Electricity transmission and distribution assets are widely distributed throughout the State. Inevitably, therefore, members of the public have substantial exposure to these assets. Significant health and safety risks can arise as a result of failures in the assets or as a result of the interaction of the assets with other activities being undertaken by members of the public. Recognition of the significant nature of these risks to the public has led to the development of prescriptive regulation – specifically the *Electricity Safety (Network Assets) Regulations 1999* – to set appropriate safety standards in relation to a range of specific issues involving network assets.

2.2. Current regulatory approaches

[4] This reflects the fact that some voluntary ESMS are developed in support of applications for exemption from specific aspects of the network assets regulations and that, as a consequence, only those part of companies' asset management plans that are of direct relevance to the exemption request are generally supplied as supporting material.

Section 75 of the *Electricity Safety Act 1998* (ESA) establishes a general duty on network operators to conduct their operations safely and in accordance with any regulations made under the Act. Specifically, it states:

> ***75. General duties of network operator***
>
> *A network operator must take reasonable care to ensure that all parts of an upstream network or the supply network of a railway or tramway system that it owns or operates—*
>
> *(a) are designed, constructed, operated and maintained in accordance with the regulations; and*
>
> *(b) are safe and operated safely.*

The regulations made under the authority of the ESA include substantial detailed, prescriptive material. Consequently, the focus of the safety related activities undertaken by asset owners in pursuit of their general duties is on ensuring compliance with these prescriptive regulatory requirements.

This situation stands in stark contrast to the position under the Gas Safety Act 1997 (the GSA), also administered by Energy Safe Victoria. The GSA establishes a "process-based" regulatory regime, which requires operators to establish "Safety Cases", documenting a systematic, management-based approach to risk identification, risk assessment and the identification and adoption of appropriate risk controls.

As was noted above, while the basic form of the safety regulatory approach currently instituted under the ESA is prescriptive, ESMS can be adopted on a voluntary basis by asset owners and by employers of electrical workers. ESV may, in the context of approving a proposed ESMS, exempt the proponent (or "scheme operator") from the requirement to comply with certain aspects of Part 4 of the ESA and the relevant regulations relating to electrical installations and supply networks where appropriate. An ESMS can therefore replace strict compliance with the legislative/regulatory framework with a co-regulatory regime developed between ESV and scheme operator. A voluntary ESMS can therefore currently be considered as constituting an alternative compliance mechanism in respect of certain prescriptive regulation. Practically speaking, ESV has only granted a limited number of exemptions and the prescriptive regulatory regime remains the dominant element in safety compliance activity.

Given this context, ESV believes that the relatively high rate take-up of voluntary ESMS that has been observed to date suggests that electricity operators perceive clearly the benefits of moving toward a "process-based" approach to regulatory compliance, in preference to focusing on compliance with prescriptive regulatory requirements. In this context, it is important to note that the widely varying age (and, consequently, technical characteristics) of current electrical infrastructure means that full compliance with the prescriptive regulatory regime is extremely difficult, or even impossible to achieve in some areas (see below).

2.3. Prescriptive vs process based regulation

While many safety issues are addressed by the *Electricity Safety (Network Assets) Regulations 1999,* these regulations are essentially prescriptive in nature and are necessarily limited in some respects in their ability to ensure that safety issues are addressed systematically. Of particular importance in this regard are concerns as to the practicability of adopting prescriptive approaches to specifying the appropriate means of addressing the wide range of risks inherent in network asset operations.

It is increasingly widely recognised that, as a matter of practicality, it is essentially impossible to develop, implement and keep up-to-date prescriptive regulatory regimes that adequately addresses the range of safety issues thrown up by complex operations such as those of the electrical transmission and distribution networks. Particular concerns in this regard include the following:

Expertise

Designing prescriptive safety regulation requires a high level of expertise in relation to the specific nature of the assets that are to be regulated. Given the extreme complexity of the operations involved (as discussed below), it is impracticable for regulators to be expected to develop the required level of expertise among their staff. In practice, the network operators themselves or their contracted workers are the main repositories of the technical expertise required to determine the most appropriate means of ensuring safe operation. In this context, attempts to design specific, prescriptive regulatory standards can risk undermining safety performance by preventing the most appropriate approach being taken in certain circumstances.

Complexity

Complexity in these sectors makes it almost impossible for a typical regulator to draft prescriptive legislation that effectively ensures safe outcomes at all times, in all places, and in all circumstances. This complexity is inherent in many items and also arises both spatially and temporally. Particularly in the case of distribution networks, operators manage a complex mixture of assets constructed over many decades and, hence, containing materials, designs and technologies which span the range of technological developments over those decades.

The issue of complexity has a number of dimensions, including:

Network complexity

These assets must be seen as comprising not merely the collection of physical elements that go to make up the supply system but, rather, as encompassing an interconnected system containing many individual components, many of which involve sophisticated

electrical and electronic engineering design and construction. The safe and stable operation of these interconnected and interdependent assets relies on sophisticated electrical and electronic system control and data acquisition (SCADA) systems using the full current range of telecommunications technologies.

Spatial complexity

Spatial complexity arises from the differing environments traversed by the supply network. For example, network safety issues and priorities may differ according to whether the relevant network assets are located along an urban road, under a bridge, at a river crossing, at the intersection of different systems at rail crossings, in alpine environments, etc.

Temporal complexity

Temporal complexity arises from changes in materials/technology over time, for example, the move from bare single metal wire conductors to the many variations over time of cable insulation and construction. As an indicator of the speed and significance of the changes in this area, the leading edge of technological development currently is in cryogenically cooled superconducting cables. Temporal complexity also arises from the increasing inter-connectivity between electrical supply networks, which requires ever more sophistication in terms of management and control systems

The electricity network operators affected by the proposed regulations consist of both transmitters with electricity transmission towers and lines which operate at hundreds of thousands of volts (typically 220, 330,or 500 kilovolts) plus terminal stations etc across the state, and distributors with "pole & wire" distribution networks which operate at up to 66,000 volts, plus substations and associated facilities that are distributed widely across the state.

By contrast to the position faced by regulators seeking to design prescriptive regulatory requirements to manage safety performance in these contexts, the electricity industry not only has primary responsibility for the risks that inhere in their operations but also have the technical sophistication, management systems and financial resources to best manage those risks.

In addition to the current safety risks associated with these assets, safety management must also recognize the community's requirement for the businesses to maintain these assets in a safe and serviceable condition in the long term. In contrast to prescriptive regulatory regimes, process based regulation embracing ESMS can mandate the inclusion in safety management systems of asset management plans to ensure long term safety.

Major areas of non-compliance

As a result of the issue of temporal complexity, in particular, there are several substantial areas of widespread non-compliance with the current Electricity Safety (Network Assets)

Regulations. A substantial review conducted by the former Office of the Chief Electrical Inspector during the 2001-05 regulatory period identified the following areas of non-compliance[5]:

- Regulation 13 – Minimum distances between aerial lines and the ground, particularly those over driveways;
- Regulation 17 – Minimum distances between aerial lines and parts of tramway systems;
- Regulation 20 – Construction of underground lines – location of underground lines
- Regulation 22 – Substations – minimum distances for pole mounted substations
- Regulation 23 – Earthing and electrical protection – a low voltage network asset must be earthed so that the resistance of the neutral conductor of the service line is not more than 1 ohm to earth; and
- Regulation 27 – Inspection and testing – earth systems must be tested every ten years.

Reviewing the prescriptive regulatory regime

The above discussion has highlighted the problems arising from the use of a detailed, prescriptive regulatory framework as the central mechanism for ensuring high standards of safety are maintained across the transmission and distribution network. This raises the issue of whether a more direct response to the issues raised would not be to reform these regulations appropriately. This issue is particularly relevant in the context of the expected sunsetting, in 2009, of the relevant regulations (the *Electricity Safety (Network Assets) Regulations 1999*).

In particular, as discussed above, the ESMS requirement is an example of "process based" regulation, requiring a management-based approach to be taken to ensuring safety standards. It is not possible to achieve this change in general approach in the context of detailed, technical regulatory requirements. It is for this reason that the proposed mandatory ESMS provisions will completely replace the network assets regulations from the point of view of the affected operators.

At the same time, the ESMS approach cannot be completely substituted for the prescriptive approach. Developing, implementing and maintaining ESMS requires substantial management and technical expertise that are likely to be available only to relatively large-scale operators. For this reason, the scope of the mandatory ESMS requirement will be relatively narrow – it would infeasible and/or undesirable to require this approach to be taken by all electricity businesses.

Equally, where ESMS are not in place, it is necessary to have more detailed and specific regulatory requirements that set out clearly the requirements for safe operation for all

[5] Cited in *Electricity Distribution Price Review 2006-2010: Final Decision.* Essential Services Commission, October 2006. See Volume 1, pp 214-5.

other operators in the industry. . These requirements are set out in the Electricity Safety (Installations) Regulations, which mandate the Wiring Rules and other Australian and New Zealand standards. The Wiring Rules set out detailed requirements in relation to the minimum standards to be observed in carrying out electrical work as well as periodic inspection and maintenance of electrical installations. The Electricity Safety (Installations) Regulations 1999 are currently under review and it is anticipated that replacement regulations will be introduced in December 2009 concurrently with the proposed Electricity Safety (Management) Regulations 2009.

In sum, the above discussion set out the reasons for moving to a regulatory approach for the electricity sector which increasingly emphasises process based regulation over prescriptive regulation. Is anticipated that this change will both increase the effectiveness of the regulatory structure (i.e. improves safety outcomes and reliability measures) and increase its efficiency (i.e. achieve safety standards at a lower overall cost).

Box 1: Performance based regulation

This section has discussed the relative merits of prescriptive and process based regulation as means of dealing with the identified problem. It can be noted that there are three broad types of regulation: process based, performance-based and prescriptive. Thus, the question of why the option of adopting a performance-based regulatory approach inevitably arises.

This issue has not been discussed in detail because initial consideration of the relevant issues clearly indicates that it is not feasible to adopt a performance-based regulatory approach in the specific context under consideration. In particular, the context is one in which there are numerous sources of risk and numerous potential risk controls. Moreover, the risk environment is one in which accidents/incidents occur infrequently but have high potential consequences. This, in turn, means that the actual incidence of fatalities, injuries and property damage is highly variable from year to year.

All of these factors taken together mean that it would not be feasible to identify a comprehensive and specific set of performance measures against which the standards achieved by regulated parties could be assessed on a year to year basis. As the specification of such standards is fundamental to the adoption of a performance-based regulatory regime, it was concluded that such a regime would not be feasible in the current regulatory context.

2.4. Dimensions of the problem

Inadequate electrical safety performance among transmission and distribution companies can result in three major types of harm. These are:

- Death and injury due to electrocution

- Economic loss due to reliability problems
- Efficiency/cost of maintenance practices & impact on consumer prices

The proposed mandatory ESMS arrangements are expected to address all of these dimensions of the problem. The nature and extent of each of these dimensions of the problem are discussed in turn below.

Risks of death and injury due to electrocution

The operations of the major electrical transmission and distribution businesses are obviously substantial in scope and scale and necessarily give rise to a variety of risks. The inherent nature of electricity is such that there are substantial risks associated with its generation, transmission and distribution, as well as its final use.

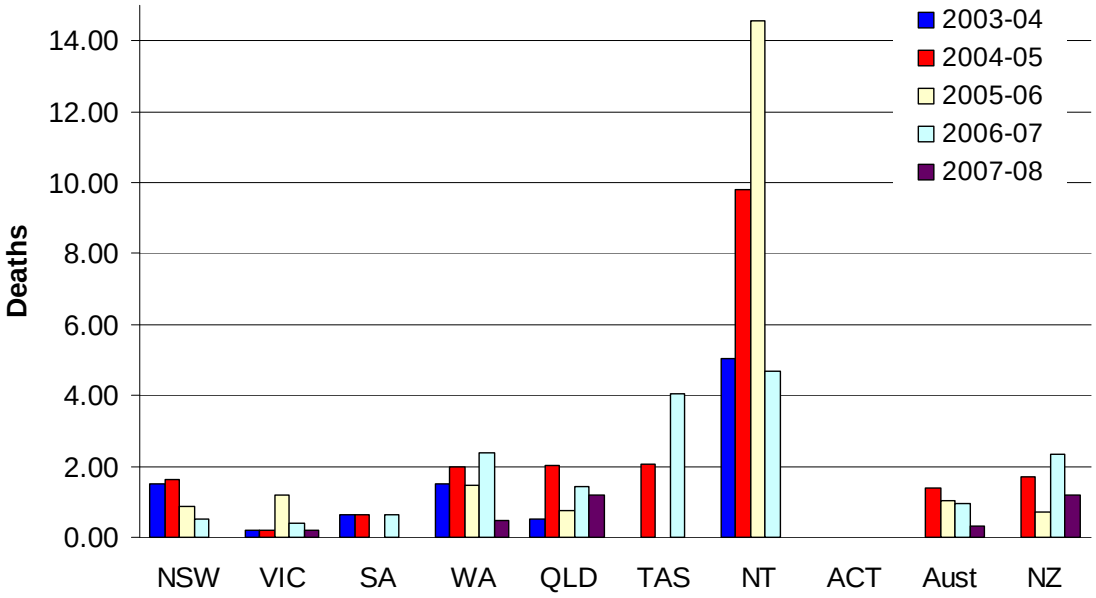
That said, safety management under the current regulatory regime has been associated with low and declining numbers of fatalities. Two electrical fatalities were recorded in 2007/8 and three fatalities in 2006/7. The average annual number of electrical fatalities in Victoria in the ten years to 2005/06 is approximately four, while the average annual number of electrical fatalities in the twenty years to 2005/06 is approximately seven[6]. However, the fact that seven fatalities occurred in 2005/06 after several years of near-zero fatalities is indicative of the continuing risks. Moreover, significant numbers of electrical safety incidents involving serious injuries also underline the risks involved.

Graph 1, below, summarises Victoria's death rate (i.e. fatalities per million population) from electrical causes since 2003-04 and compares this performance with that of other Australian states and territories and with New Zealand.

Graph 1 shows that Victoria's current electrical performance has, overall, been the best of any of the jurisdictions included in the graph. However, it also demonstrates the year to year volatility of the fatalities data, indicating the continued presence of substantial risks and the need for maintaining vigilance on safety issues, including through an appropriate safety regulatory system.

Graph 1: Electrical deaths per million population: 2003-04 to 2007-08

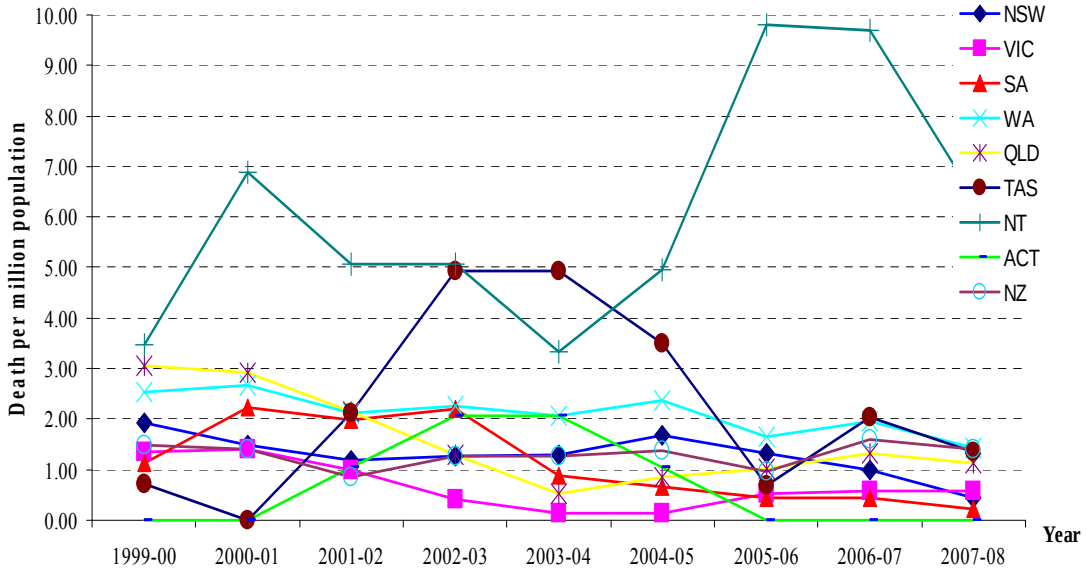
[6] Energy Safe Victoria, *Annual Report, 2005-06*, p 12.



Source: Electrical Regulatory Authorities Council (ERAC)[7]

Graph 2, below, provides trend data based on a three year moving average of the number of electrocutions recorded in each jurisdiction. This approach assists in smoothing year on year variations and helps to highlight longer term trends.

Graph 2: Trend in electrocutions per million population (3 year moving average)



[7] See: *Electrical Incident Data Australia and New Zealand 2007-08*. Available at www.erac.gov.au. Note that comparative data for the period after 2005-06 have not been published by ERAC.

Source: ERAC (ibid).

Graph 2 appears to demonstrate a gradually improving electrical safety trend in terms of fatalities in most jurisdictions, including Victoria[8], while Victoria's performance is consistently either the best among the jurisdictions or very close to this level. .

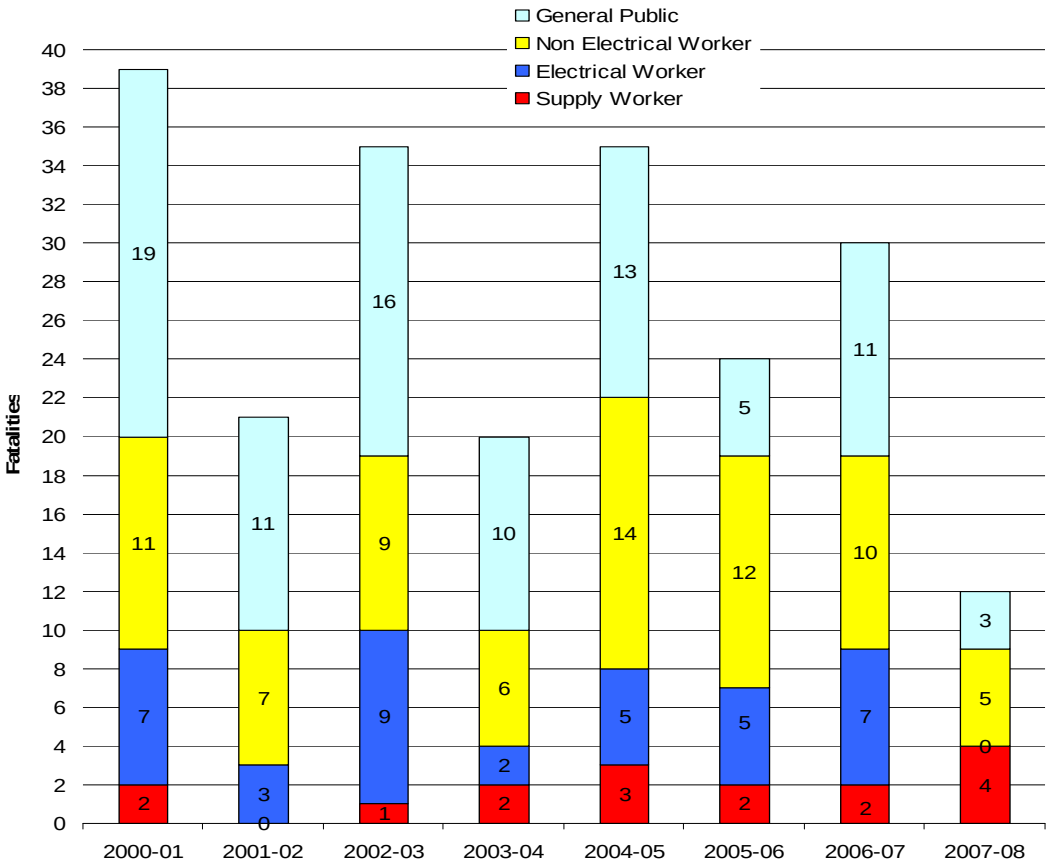
Graph 3, below, provides detail on the incidence of the fatalities recorded Australia-wide since 2000/01, distinguishing between the general public, non-electrical workers, electrical workers and supply workers[9]. Graph 3 shows that the general public has historically been the victims of the largest proportion of fatalities due to electrical incidents, while non-electrical workers[10] have constituted the next largest group by incidence. That said, there appears to be some evidence of a decline in the number of fatalities among members of the general public in recent years, which is believed to reflect the success of recent public education programs on the dangers associated with electricity.

[8] The small size of the electricity supply networks in the Northern Territory and Tasmania is likely to be a contributor to the apparently greater volatility of the data evident in those jurisdictions.

[9] Supply workers are workers employed by network operator. Electrical workers are other workers who are licensed to work with electricity.

[10] i.e. fatalities occurring in workplaces where the workers involved are not electrical workers.

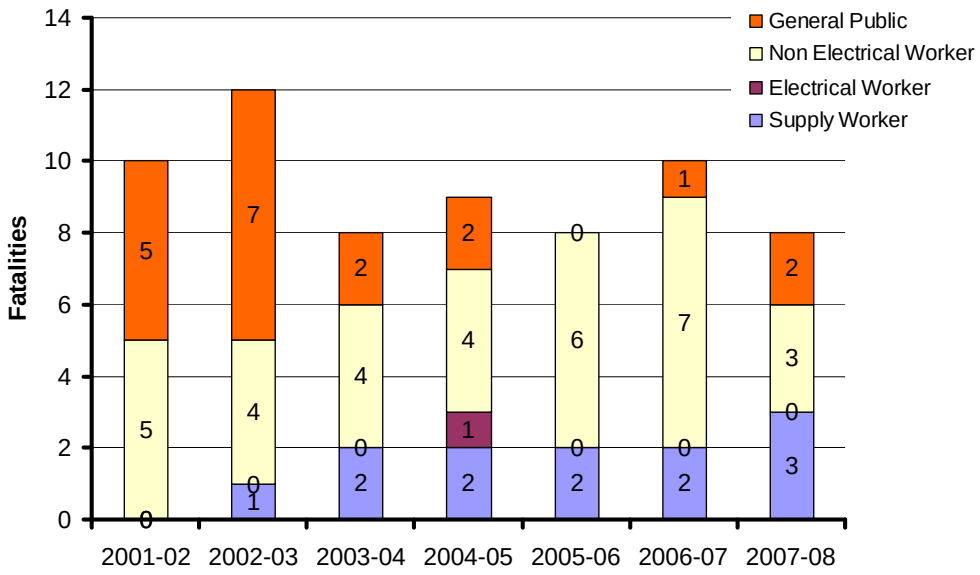
Graph 3: Incidence of fatalities, 2000-01 to 2007-08



Source: ERAC (ibid)

Graph 4, below, provides similar data for those deaths that are related to electricity supply assets. Two conclusions can be drawn from a comparison between Graphs 3 and 4. First, the majority of electrical fatalities are related to electricity supply assets and, at least potentially, relate to areas that can be influenced by risk management practices developed in the safety management system context. Second, the incidence of fatalities reflects a similar breakdown between categories of victim as for the broader fatality data.

Graph 4: Fatalities involving electricity supply assets2001-02 to 2007-08



Source: ERAC

In addition to fatalities, electrical incidents are also likely to lead to injuries and to property damage. While only limited data are available from the ESV database, the following summarises recent experience in this area.

Priority one electrical incidents

Electrical incidents reported to ESV are classified in terms of their priority level, for purposes of investigation and enforcement. Priority one electrical incidents are those which involve one or more of: a fatality due to electrocutions or an electrical incident; serious injury (defined as bodily harm that requires a person to attend hospital for treatment); damage to property other than Network Assets which exceeds $50,000.00; or a serious risk to public safety, including reverse polarity of an electrical circuit and when ESV is specifically requested to attend. (Public safety includes homes, workplaces etc). Table 1, below, provides data on the number of priority one incidents recorded since the implementation of a new database recording system in January 2001.

Table 1: Priority 1 electrical incidents notified since January 2001

Year	Number of incidents
2001/02	47
2002/03	516
2003/04	835
2004/05	940
2005/06	188

2006/07	141
2007/08	167

Notes:

1. 2001/02 figure is considered abnormally low, presumably due to underreporting as a result of the recent start-up of a new incident reporting process.
2. The definition of a priority one incident was changed substantially at the beginning of 2005/06 in order to ensure that scarce resources were more tightly focused on the highest priority incidents. This is the predominant reason for the major decline in incident numbers observed since this time.

Given the limited time period for which data are available and the data issues identified above it is not possible to observe any clear trends in the incident data contained in table 1. However, it can be noted that, under the former definition of priority one electrical incidents, the number of incidents recorded regularly exceeded one per day. Even under the current, considerably tighter, definition the number of incidents recorded average about 3 per week.

The above discussion provides an overview of the risks of death and injury associated with electricity network operations. It is anticipated that the implementation of mandatory ESMS will, by improving the overall standards of safety management of the network assets by their operators, contribute to a reduction in this incidence of fatalities and injuries.

However, it is important to recognise that mandatory ESMS can have an impact on only some of the major risk types that are associated with electrical network assets and that constitute the underlying causes of the death and injury data summarised above. The following discussion provides an overview of the major risk types and indicates which risks are likely to be addressed through the implementation of mandatory ESMS requirements.

Overview of the safety risks associated with electricity supply networks

The proposal to make mandatory a requirement to develop and implement an ESMS is to be applied to a group of seven electricity transmitters and distributors. The risks of death and injury associated with these aspects of electricity network supply operations may arise directly via electrocutions or indirectly by virtue of fires caused by electricity, including the smoke generated by bushfires.

Electrocution risks are borne by electricity industry workers operating and maintaining the assets, by other workers (e.g utility and construction workers) who work in the vicinity of overhead and underground electrical assets, and by the public who live and travel in the public spaces occupied by these assets.

Principal risk types

The principal risk types associated with transmission and distribution infrastructure are as follows:

- **Transmission lines falling from towers.** There have been twelve instances of this problem in the last ten years, of which ten can be classified as being maintenance-related[11]. This problem poses clear electrocution risks to the general public where it occurs in a populated area, due to the presence of live, high-voltage cables at ground level.
- **Unsafe connections to customers premises.** Incorrect or "reverse polarity" connections may mean that the buildings or fixtures become electrically "live", posing a substantial risk of electrocution for occupants or visitors.
- **pole fires** can be the cause of distribution lines falling and creating an electrical hazard to persons. They can also be the cause of a larger fire**.**
- **defective/degraded earthing systems** can result in unsafe situations in customers' installations, posing an electrocution threat to occupants.
- **low power lines** which can be contacted by persons, vehicles or construction machinery.
- **flash burns and electric shocks** incurred by supply industry workers,
- **supply network faults** causing unsafe situations in customer installations,
- **maintenance problems** in respect of aging supply assets.
- **Structural fires**. A large proportion of house fires reported to ESV are ascribed by the fire authorities to an "electrical fault". While the majority of these faults are likely to be due to the deterioration of electrical installations with age, a significant proportion of these fires is also believed to be due to faulty installation work[12].

Specific risks identified as being of primary concern

The above constitutes an overview of the major risks inherent in electricity supply networks. However, a central issue is to consider those risks that continue to be of major concern given the existing regulatory arrangements. An audit of the electrical safety practices of the Victorian electricity supply networks was published in 2003[13], which identified the following as major generic risks that continue to be of concern:

- Non compliance with minimum service line heights over roadways.

[11] See Appendix 3.

[12] Evidence able to establish the relative contributions of the two broad causes of electrically related structural fires is typically destroyed in the fire, preventing any substantive data being made available.

[13] *Audit of Electrical Safety Practices: Electrical Supply Networks – Status Report. November 2003.* Office of the Chief Electrical Inspector, November 2003, pp iii – iv.

- Maintenance of Victorian Network Electricity Assets.
- Compliance with safe work practices.

The Report stated:

> *While the audit confirmed that the Network Operators are generally complying with the requirements of the Act and Regulations, certain areas of non-compliance are common across the networks. The areas of non-compliance are generally consistent across the industry and in most cases are long standing.*
>
> *It was the view of the Auditor that the Network Operators had been aware of the majority of the non-compliance issues, but had chosen not to actively address them over the past few years.*

Moreover, in relation to the maintenance of network assets, the report stated:

> *To ensure that the standards of network safety are maintained, future maintenance strategies will require greater emphasis on predictive failure behaviour and Reliability Centred Maintenance approaches. This is because the majority of the network construction was undertaken in the 1950's and 1960's. (p iv)*

That is, the review effectively found that the current age profile of Victoria's transmission and distribution system is such that the nature and extent of the safety risks that will be confronted by network operators, regulators and the public can be expected to increase significantly in coming years. This implies that safety outcomes (i.e. the number of deaths and injuries experienced) would be expected to deteriorate over time, possibly significantly, in the absence of improvements to current risk management and control strategies.

The report authors also makes clear their belief that systematic, pro-active management based approaches to risk identification and management will constitute the most effective response in the context of increasing risks due to the ageing of the supply infrastructure. These recommended approaches to maintenance are clearly favoured under the ESMS approach to risk management. More generally, in the specific context of the electricity supply network, there is a clear potential for a compulsory ESMS requirement to better ensure that the general duties established by Section 75 of the ESA are translated into practice effectively.

Table 2, below, summarises the expected change in the treatment of each of the main risk types identified above as a result of the implementation of the mandatory ESMS proposal. Column 2 of the table indicates whether, and to what extent, each risk is currently being addressed under voluntary ESMS arrangements, where operators have these in place. Column 3 indicates whether each risk type would be expected to be

covered under a mandatory ESMS and indicates how the treatment of that risk via ESMS would vary from current arrangements.

Table 2: Treatment of risk types under voluntary and mandatory ESMS

Risk	Voluntary ESMS	Mandatory ESMS
Transmission Lines falling from the tower	These events are occurring: for example, SP AusNet have had 4 instances in recent times of conductors falling from their towers. SP AusNet & Basslink do not have an ESMS to address transmission lines falling from the tower. Thus, the current regime is not addressing the ongoing routine maintenance and safety standards of the lines to ensure that these events are avoided.	Mandatory ESMS would be expected to address this risk in all cases.
Unsafe connections to customer premises	*Reverse Polarity* Processes and procedures are in place to undertake a check test after the work has been completed to ensure that the correct wiring polarity has been connected. This could be applied with or without an ESMS – mandatory or voluntary. *Service wire* The integrity of the Service wire connected to the customer's premises is a major cause of electrical shock within electrical installations, in particular homes. Despite this, the testing and replacing of these services has been given a low priority under the existing management schemes. The management scheme is used to try to avoid addressing the issue (and cost)	No change. Mandatory ESMS will be expected to substantively address these issues, which have been identified by ESV as material risks.

	rather than improving safety of the public.	
Pole Fires	These risks are generally not addressed under voluntary ESMS. If addressed, such risks are generally treated operationally, eg. periodic washing of insulators.	Situation would be essentially unchanged in hazardous bushfire areas. In other areas, mandatory ESMS will address the issue by requiring a more risk-based approach including asset management aspects
Defective / deteriorated earthing system	There are presently prescriptive requirements in relation to the testing of earths. Network operators are currently seeking exemptions.	These risks would be addressed under a compulsory ESMS.
Low Power Lines	Network operators are currently seeking exemptions under voluntary ESMS arrangements to enable existing low service lines to remain where additional actions are taken. The types of precautions include a break off device that ensures that the cable is cut at the supply end if it is struck by a vehicle.	Low power lines would be expected to be addressed on a risk management basis in all mandatory ESMS. Practical responses are likely to be similar to present arrangements.
Flash Burns & Electric Shocks	No difference between voluntary and compulsory ESMS.	
Maintenance Problems	This is the asset management issue. Voluntary schemes tend to focus on "cherry picking" the issues that are of benefit to the network operators.	Compulsory schemes are aimed at minimising as far as practicable risks to the community and addressing the appropriate management and maintenance of all assets. A more comprehensive approach is therefore expected to be taken.
Structural Fires	Not relevant to network items apart from portion involving high voltage injection from the assets. This could be operational or asset management related issues.	

	Refer to items above.	

Costs of achieving compliance with the network asset regulations

Substantial parts of the electricity transmission and distribution network do not comply with various elements of the Electricity Safety (Network Assets) Regulations 1999. This non-compliance reflects the fact that the existing stock of network assets has been installed over a period of decades and that safety standards have evolved over this period. It must also be noted that the electricity sector was a government monopoly prior to the 1990s, so that formal regulation did not exist prior to this time[14].

The safety risks associated with instances of non-compliance with the regulated standards by network assets vary significantly according both to the type of non-compliance and the location of the non-compliant asset (and related circumstances). Given this, the approach of ESV to compliance issues has been to attempt to take a risk-based approach to requiring electricity network operators to improve the compliance of existing assets with the regulations over time.. The current proposal to adopt mandatory ESMS is the logical extension of this approach.

However, in recent years, electricity distribution businesses have argued strongly that the substantial non-compliance of their network assets with the regulatory requirements requires them to undertake a significant program of additional capital expenditures to move toward full, or "literal" compliance with the Electricity Safety (Network Assets) Regulations, and that these expenditures should be reflected in the decisions of the economic regulators responsible for price setting in the industry.

The Essential Services Commission (ESC) discussed these arguments in its March 2005 *Electricity Distribution Price Review Position Paper*, in the following terms (p 60):

> *Each distributor proposed additional expenditure to comply with the Electricity Safety Act 1998 and its associated regulations. The distributors proposed costs based on two different scenarios:*
>
> *• a risk management approach in which exemptions to the regulations are approved by the Office of the Chief Electrical Inspector (OCEI) and compliance is achieved over multiple regulatory periods; and*
>
> *• a literal compliance approach in which there are no exemptions to the regulations and compliance is achieved within the 2006-10 regulatory period.*

[14] Relevant standards were, instead, set out in State Electricity Commission design, construction and service manuals.

The costs proposed under these two scenarios are summarised in Table 4.2. of the EDPR Position Paper, reproduced below:

Table 4.2: Capital expenditure to comply with electricity safety regulations, $million, real $2004

	AGLE	CitiPower	Powercor	TXU	United Energy	Total
Risk management approach	23.1	20.0	80.6	57.3	45.2	**226.2**
Literal compliance	270.0	143.0	741.0	480.0	74.0	**1708.0**

The argument presented by the distribution businesses was that, while the relevant regulations had not changed in recent years, their interpretation by OCEI (now ESV) had changed, and that this had resulted in:

> *"... a very significant increase in the amount of work, and expenditure, that is required for the distribution network to be compliant with the regulations."*[15]

However, ESV does not believe that these statements accurately reflect its regulatory approaches in recent years. ESV has not systemically pushed the businesses toward literal compliance with the specific requirements of the network asset regulations for their existing assets, as demonstrated by the fact that prosecutions have been mounted in only rare cases and then mainly for breaches of the ESA Section 75 general duty, rather than for breaches of the regulations *per se*. In general, while ESV is aware of non-compliance issues, it has consistently taken the policy position that existing asset non-compliance should be dealt with on a risk assessment basis. This is consistent with its current proposal to adopt a mandatory ESMS process to guide future activity in this area.

Some distributors also noted in their submissions to ESC that there was significant legal doubt as to the ability of (the then) OCEI to grant exemptions from aspects of the network asset regulations pursuant to its approval of a voluntary ESMS and argued that this was a further factor underpinning the need for distribution companies to increase capital expenditures to move toward "literal compliance". CitiPower argued that:

> *There has been considerable debate between distributors and the OCEI on the ability of the Victorian Government to grant large scale exemptions from compliance with specific safety regulations (and thus avoid large cost imposts that would need to be funded by customers), under the umbrella of an Electricity Safety Management Scheme (ESMS).*[16]

TXU argued that each of the distribution businesses faces significant legal risks as a result of this issue and that the only way to avoid these risks was to move toward literal compliance with the regulations.

[15] AGLE submission, p3, quoted in ESC (2005), p60.

[16] CitiPower submission, p17, quoted in ESC (2005), p 61.

In the event, the ESC did not accept the above arguments put forward by the distribution businesses and did not, as a consequence, build additional capital expenditure, as would be required to move toward literal compliance with the network asset regulations, into the pricing model. Instead, it argued that:

> ***Electrical Safety Compliance***
>
> *All distributors proposed capex for electrical safety compliance under the regulations, including the implementation of their electricity safety management plans. Although there is doubt in some or all distributors' minds over whether they ought to rely on their plans as opposed to budgeting to undertake sufficient work to bring all the network into compliance (referred to elsewhere as the literal compliance option), it appears that all distributors consider that, from a technical and safety standpoint, the safety management plan approach is a pragmatic solution to the issues that have been identified.* ***We considered that our assessment ought to be based on the implementation of these plans, not on literal compliance costs, and we have followed that approach [emphasis added[17]].***

In its draft decision, the ESC commented that:

> *"The distributors have all agreed, during discussions with the Commission and its consultants that literal compliance with the safety regulations is not a practical approach to addressing the compliance risk"*[18]

Thus, the Essential Services Commission has not allocated sufficient funding to enable the network operators to comply with the current regulations. Instead the price review relies on each of the network operators having an ESMS that analyses and addresses the risks at hand. The mandatory ESMS proposal thus also addresses the problem of needing to ensure that network operators have comprehensive ESMS in place in order to ensure that the continued non-compliance with the prescriptive network assets regulations which is the inevitable, and clearly foreseen, outcome of the above decision in relation to electricity pricing does not lead to substantially compromised safety performance. That is, the current voluntary ESMS do not effectively identify and treat all areas of existing non-compliance with the network asset regulations. By contrast, the mandatory ESMS would require all substantial risks associated with the network assets to be identified and addressed.

Reliability issues

[17] Electricity Distribution Price Review 2006: Principal Technical Consultant's Final Report in the Executive Summary (page viii)

[18] Electricity Distribution Price Review 2006-10, Draft Decision, p 261.

Clearly, where safety-related incidents occur, interruptions to electricity supply frequently also occur. In addition, deficiencies in network asset maintenance can, in many cases, lead to interruptions of electricity supply in circumstances in which there are no significant safety-related implications. Improve network asset maintenance can be expected to address of both of these issues.

Asset owners clearly do face private incentives to maintain the reliability of electricity supply. These include both the fact that their basic revenue stream derives from the sale of electricity and the fact that regulators are able to impose penalties in respect of interruptions to supply which exceed specified target levels. Data from the 2006 *Electricity Distribution Businesses: Comparative Performance Report*[19] indicates that penalties are being levied on distribution businesses that fail to reach reliability targets set by the regulator. Reliability targets are set in terms of the total duration of supply outages, the number of supply outages and the time taken to reconnect power after an outage has occurred. The following table summarises payments made by the distribution businesses in 2004 and 2005, together with the relevant reliability indicators.

Table 3: Penalty payments due to below target reliability performance

Payments due to long supply restoration time						
Distributor	Number		Number per 1000 customers		Amount paid ($)	
	2004	2005	2004	2005	2004	2005
AGL	200	18	0.7	0.1	16 000	1 440
CitiPower	56	6	0.2	0.0	4 480	480
Powercor	2 655	5 932	4.2	9.2	212 400	474 560
SP AusNet	4 665	4 299	8.3	7.5	373 200	343 920
United Energy	199	199	0.3	0.3	15 920	15 920
All distributors	**7 775**	**10 454**	**3.3**	**4.4**	**622 000**	**836 320**

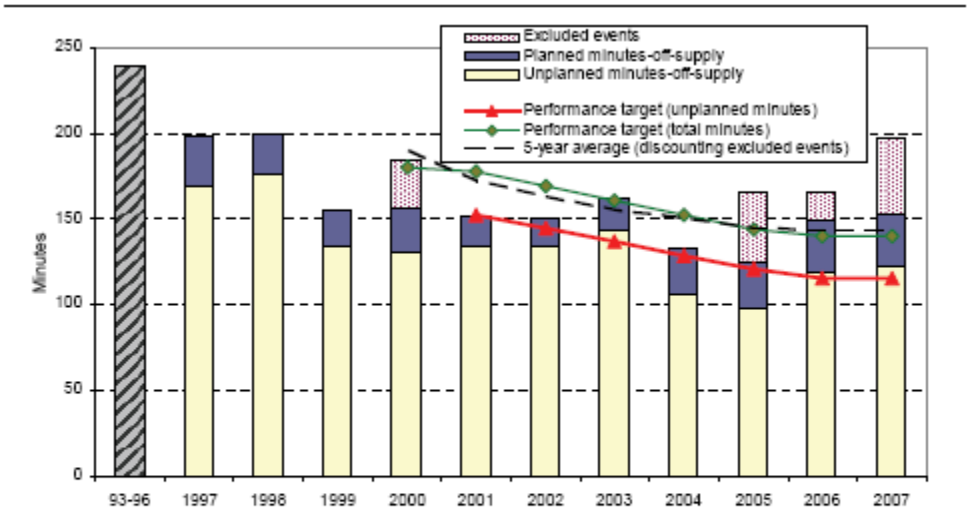
Payments due to low supply reliability						
Distributor	Number		Number per 1000 customers		Amount paid ($)	
	2004	2005	2004	2005	2004	2005
AGL	0	0	0.0	0.0	0	0
CitiPower	0	0	0.0	0.0	0	0
Powercor	619	641	1.0	1.0	49 520	41 280
SP AusNet	5 668	2 927	10.0	5.1	453 440	234 160
United Energy	0	6	0.0	0.0	0	480
All distributors	**6 287**	**3 574**	**2.7**	**1.5**	**502 960**	**275 920**

[19] Essential Services Commission, October 2006, p 52.

Table 3 shows that distributors collectively paid $275,920 in penalties due to underperformance on supply reliability in 2005, down from $502,960 in 2004 and $836,320 in penalties due to unduly long supply restoration times in 2005 (up from $622,000 in 2004). In total, reliability related penalties were above $1 million in each year. However, while these penalties are not insignificant, these private incentives are still likely to be insufficient to ensure optimal reliability performance. This conclusion follows from a comparison of the penalties levied on distribution companies and the cost to customers of supply interruptions, as calculated by VENCorp.

Analysis by VENCorp, summarized below, indicates that the cost to consumers of supply interruptions substantially exceeds that incurred by transmission or distribution companies through penalties and loss of electricity sales. Consequently, there is a potential for regulatory intervention to ensure enhanced reliability performance.

Graph 5: Average total minutes off supply per customer – all distributors



Notes: Excluded events include load shedding due to lack of generation capacity, transmission network failures and exceptionally large storms.

Prior to 2000, the minimum standard for supply reliability was an average of 350 minutes-off supply in total (250 minutes for urban customers and 500 minutes for rural customers). Prior to 2001, distributors' performance targets were not separated into planned and unplanned outages

Source: Essential Services Commission[20]

The Essential Services Commission publishes comparative performance reports for the electricity distribution businesses[21] which provide a range of data on the extent of

[20] Electricity Distribution Businesses: Comparative Performance Report 2007, p2. ESC (2008)

[21] See *Electricity Distribution Businesses: Comparative Performance Report 2004*. Essential Services Commission, July 2005. See: http://www.esc.vic.gov.au/public/Energy/Regulation+and+Compliance/Performance+Reports/Electricity+

interruptions to electricity supply. Graph 5, above, is taken from the most recent ESC report on this issue and shows the historical performance of Victorian electricity distributors on these measures. Graph 5 shows that there has been a generally improving trend over a ten year period, but that there have been some increases in the number of minutes of both planned and unplanned outages per customer over the past two years. ESC describes these changes as follows:

> *Discounting the effects of abnormal events outside the distributors' control, the distributors achieved good results in both 2004 and 2005, when the total of planned and unplanned minutes-off-supply per customer improved by a total of 25 per cent. However, the total rose again, by 20 per cent in 2006 and a further 2 per cent in 2007. Unplanned and total minutes-off-supply in the last two years were actually above target, by 4 per cent and 7 per cent respectively in 2006, then by 6 per cent and 9 per cent in 2007….*
>
> *The trend in performance, as shown by the 5-year moving average of planned plus unplanned minutes-off-supply (dashed line), has levelled out, having been 144 minutes per customer on average in 2005, 2006 and 2007. (ESC 2008, pp 2-3)*

Interstate comparisons show that the average number of minutes off supply per customer (planned plus unplanned, but excluding abnormal events) of 153 minutes in Victoria in 2006 – 07 compares relatively unfavourably with New South Wales. While a single average outage duration per customer figure is not published, IPART reports that the urban distributors had average (normalised) outage durations of 94 and 102 minutes, while the rural distributor reported an average of 242 minutes[22].. A simple average of these three figures is 146 minutes, similar to the Victorian figure. However, given that the non-metropolitan distributor almost certainly has significantly fewer customers, the average per customer figure would be significantly below that reported for Victoria.

Queensland data show that Energex customers experienced 160.3 minutes in both planned and unplanned outages in the year to December 2006[23].

Victoria's reliability performance thus seems to be broadly similar to that of Queensland, but somewhat less favourable than that of New South Wales. The scope for further improvement is also suggested by two other factors. First, review graph 5 suggest that there has been a gradual decline over several years in the average number of minutes of unplanned outages per customer, but that this decline has been reversed in recent years.

Distribution+Businesses+-+Comparative+Performance+Report+2004/Electricity+Distribution+Businesses+-+Comparative+Performance+Report+2004.htm

[22] NSW Electricity Information Paper No 3 *Reliability and Quality of Supply to Electricity Customers in New South Wales.* Independent Pricing and Regulatory Tribunal (IPART), 2008, p 3.

[23] Planned and unplanned outages were not reported separately. Data for the second Queensland distributor (Ergon Energy) were affected by Cyclone Larry, so do not provide a relevant comparison. See: *Electricity Distribution: Service Quality performance for the December Quarter 2006.* Queensland Competition Authority.

Second, graph 5 also shows that average reliability performance fell short of the targets set by ESC in three of the past five years[24]. ata also show that the majority of electricity distribution businesses are consistently failing to meet of the performance targets that are set in relation to reliability measures as part of the price regulation process. ESC data show that three of the five distribution businesses substantially underperformed high reliability levels in each year from 2001 to 2004 inclusive, while the remaining two distribution businesses either met their targets or slightly underperformed them during this period[25].

The issue of reliability of supply embraces both quantity measures, as discussed above, and quality measures: consumers may suffer losses if the supplied electricity voltage is either too high or too low. In the former case, damage to equipment or a shortening of its life spent maybe likely to result. In the latter case, equipment may not function correctly. ESC also collected data in relation to quality of supply and has reported that the distributors appear to have issues to address in this regard[26]. However, trend and comparative data are not available at present due to the recent implementation of standardised reporting requirements. Clearly, however, improved network asset management can be expected to enhance performance in this respect as well as in relation to quantity of supply.

Data published by VENCorp and ESC allow indicative estimates of the costs of unplanned supply outages to be calculated. In its 2003 publication *Electricity Transmission Network Planning Criteria*, VENCorp estimated the average cost to consumers of electricity not supplied. The VENCorp estimate was that the value of the losses sustained by customers as a result of a non supply of electricity average $29,600 per MWh[27]. This estimate is expressed in 2002 dollars and is equal to $35,672 in 2009 dollars[28].

Data from ABARE show that total electricity consumption in Victoria during 2003/04 was equal to 55,000 GWh. This is equal to approximately 150 GWh per day. The most recent average of 120 minutes of unplanned electricity supply interruptions per customer is equal to approximately 8.3% of one-day. Thus, it can be estimated that the average amount of electricity not delivered per annum is equal to:

150 GWh x 8.3% = 12.5 GWh.

12.5 GWh is equal to 12,500 MWh. Thus, the total value of the electricity not supplied due to unplanned electricity outages is equal to:

12,500 x $35,672 = $445.9 million.

---

[24] i.e. the five years to 2007.

[25] ESC 2005, op. cit., p 64.

[26] Ibid, pp 66-70.

[27] *Electricity Transmission Network Planning Criteria.* VENCorp, Melbourne, July 2003, p 2.

[28] CPI index value March 2009/March 2002 = 163.6/136.0 = 1.20. $29,600 x 1.20 = $35,672.

It can also be noted that the 2003 VENCorp estimate, on which this valuation has been based, is now regarded as being conservative in nature. This reflects the fact that it takes into account only a relatively narrow range of the costs that are accrued as a result of unplanned outages. More recent estimates suggest that the total costs to users of unplanned outages may be as high as $60,000 per MWh[29]. If this higher estimate is accepted, the total cost to consumers of unplanned outages may be as high as $750 million per annum.

Moreover, the issue of reliability includes both the question of interruptions to supply and that of variation in supply quality. The ESC summarises this issue as follows:

> *A poor quality electricity supply can be likened to a water supply that has low pressure or does not meet water purity standards. The most important indicator of quality from the customer's perspective is voltage, which can be likened to the pressure of a water supply. Electrical equipment may not work properly if the electricity voltage is low, and if the voltage is high, equipment may be damaged or may fail prematurely. For this reason, distributors must supply electricity to customers at a voltage within the range specified in the Electricity distribution code*[30].

Of course, reliability problems occur for a number of reasons. Of particular importance is the role of adverse weather events in prompting such outages. However, a proportion of these outages is attributable to network asset maintenance issues.

Complete data on the contribution of equipment failures to reliability problems is not available. However, the ESC data indicates that asset reliability issues make a significant contribution in this regard. For example, the ESC reports that there were 86 over voltage events in 2004 as a result of poor voltage regulation. By comparison, there were 120 over voltage events due to voltage surge and 227 over voltage events due to lightning[31]. This clearly indicates that asset reliability issues are a significant contributor to problems in relation to the quality of electricity supply.

While aggregate data are not published by ESC in relation to explanations for unplanned electricity supply outages, it does provide an overview of explanations for particular outages provided to it by the distribution businesses. The following examples indicate to the nature and extent of asset reliability issues in this regard:

AGL advises that:

[29] These estimates are have been developed in the context of the assessment currently being undertaken of the impact of the 16 January 2007 supply interruption. The assessment is yet to be completed and as such the estimates are indicative only and not public

[30] ESC (2005), p 66.

[31] Totals cited in relation to poor voltage regulation and the lightning relate to only four of the five electricity distribution companies. See ESC (2005), p 69.

- *Broadmeadows (BD) experienced a total loss of supply due to a capacitor bank circuit breaker failure and a 22 kilovolt (kV) busbar loss initiated by an underground cable fault in January.*

- *Somerton (ST) experienced 14 sustained feeder outages, nine of which were to due to high voltage equipment failure, including four underground cable faults.*

- *Flemington (FT) experienced 13 sustained outages, eight of which were due to tree branches contacting high voltage overhead conductors. Others outages included two from animal strikes, two due to equipment failure and one due to the Showground flag contacting a high voltage overhead conductor.*

Powercor advises that:

- *Wemen (WMN) was severely affected by a transmission network failure and several pole fires, which contributed to the loss of the 66 kV supply to this zone substation Charlton (CTN) was severely affected by the outage of the 66 kV radial supply to this zone substation due to a pole failure*[32].

In sum, while precise data are unavailable, the above indicates that failures of network assets constitute a significant contributing factor toward overall electricity supply reliability issues. To the extent that this is so, it can be expected that the implementation of mandatory ESMS will be effective in addressing the problem of electrical supply reliability by improving asset management and maintenance practices.

Summary statement of the problem

In sum, the mandatory ESMS proposal has been developed primarily as a safety related initiative which seeks to address the problem that network asset operators are not using best practice, management based approaches to ensuring that dangers to workers and the public arising from network assets are minimized. Thus, while it is acknowledged that the level of fatalities and injuries associated with network assets is currently low, it is expected that the introduction of mandatory ESMS will further lower the incidence of fatalities and injuries.

However, while the primary driver of the mandatory ESMS proposal has been a safety based one, the proposal is also expected to address two other significant problems associated with the operation of network assets. First, it is expected that the adoption of mandatory ESMS will address the problem of the extremely high compliance costs that would otherwise potentially be incurred by network asset owners in order to bring all aspects of their asset base into full compliance with the prescriptive *Electricity Safety (Network Assets) Regulations 1999*. Secondly, it is expected to make a relatively small but nonetheless important contribution to improving the reliability of supply of electricity

[32] ESC (2005), pp 49-50.

and therefore reducing the current substantial costs experienced by consumers as a result of unplanned electricity supply outages.

3. Objectives of the proposed regulations

Regulation one of the proposed regulations state that they are objective is:

> *"...to provide for the requirements, procedures, fees and other matters relating to the acceptance of electricity safety management schemes."*

As discussed in the preceding section, the objective of moving to a system of compulsory ESMS is to improve electrical safety in Victoria, providing better protection from death and injury to electrical workers, consumers and the public.

The move to ESMS is expected to contribute to the achievement of this objective by improving the effectiveness and efficiency of the safety regulation applied to the electricity industry in Victoria, adopting more flexible, process-based regulation and consequently reducing reliance on detailed prescriptive regulation.

The proposed regulations will assist in the achievement of this objective by spelling out in sufficient detail the necessary inclusions in ESMS and providing for a range of supporting matters.

4. Nature of the proposed regulations and the proposed enforcement regime

This section summarises the substantive elements of the proposed regulations. A copy of the regulations is attached to this Regulatory Impact Statement (RIS) as Appendix 1.

4.1. Summary of the proposed regulations

Overview

The regulations consist of four substantive elements. First, Division 1 of Part 2 of the regulations deals with the required content of an Electricity Safety Management Scheme. Second, Division 2 of Part 2 deals with the required content of the safety management system of an ESMS. Broadly speaking, the Electricity Safety Management Scheme can be regarded as setting out the framework within which the safety management system will operate. The relationship of these two items to each other is clarified further below.

Part 3 of the regulations deals with record-keeping and reporting requirements. Part 4 of the regulations sets out fees payable and also establishes provisions by which ESV may exempt an operator's Electricity Safety Management Scheme from any of the requirements of the regulations.

Electricity Safety Management Schemes

Electricity safety management schemes must formally identify both the person responsible for the relevant electricity supply network or installation and the person responsible for the electricity safety management scheme itself. It must describe the electrical work or electrical installation to which it relates in sufficient detail as to allow ESV to identify its location, extent and scope and assess the risks that are associated with it.

The regulations also require that a formal safety assessment be undertaken and specify the required content of that safety assessment. The scheme should also identify all elements of the regulations made under the authority of the Electricity Safety Act 1998 and from which the scheme operator seeks exemption.

Safety Management Systems

The ESMS must specify a formal safety policy, as well the name of the person responsible for the implementation of the policy. It should also specify all published technical standards that apply in respect of the design, construction, commissioning, installation, operation, maintenance and decommissioning of a supply network or in connection with electrical work to be carried out by the persons authorised by an employer operator.

The ESMS must also cover the safety aspects of any electrical work being undertaken on an electrical installation or electrical equipment, including addressing both the formal safety assessment and the issue of published technical standards, as well as specifying the access authority system that will be used. The ESMS must also incorporate an asset management plan.

An ESMS must include a response plans designed to address all reasonably foreseeable emergencies and must include an internal monitoring and auditing plan key. Key performance indicators must also be specified that will allow the degree of compliance with the ESMS to be monitored and assessed. An incident recording and assessment system must be included and staffing and training issues must also be addressed.

Records and reporting

Part 3 of the regulations specifies that the record-keeping and reporting requirements must be in place. The range of records to be kept is set out. This includes both the ESMS, any revisions to it and any audits of it that are undertaken. In addition, details of any investigations of incidents and any reports provided to ESV must be kept.

Specific requirements for reporting of serious electrical incidents are also specified. Certain kinds of serious incidents are required to be reported as soon as possible. Reporting must include the nature of the incident, where and when it occurred, because of

the incident, whether emergency services attended, what remedial actions were taken and what actions are being taken to prevent a repetition of the incident.

General provisions

Part 4 of the regulations specifies an application fee and an annual administration fee, as well as making provision for a fee rebate to be paid in certain circumstances.

Part 4 also allows ESV to exempt any electricity operator from the need to comply with any aspects of the regulations in relation to Electricity Safety Management Schemes upon application from the operator. These exemptions may be made subject to any conditions that ESV sees fit.

Transitional provisions

On commencement of the ESMS provisions of the Electricity Safety (Amendment) Act 2007 on 1 January 2010, a new section 164 will be inserted into the Electricity Safety Act 1998 which provides that existing (voluntary) ESMS will be deemed to be accepted ESMS for the purposes of the new ESMS requirements.

5. Expected costs of the proposed regulations

The costs associated with the proposed regulations can be considered in three broad categories. Firstly, there are the costs to electricity transmission and distribution businesses of developing ESMS and associated systems, as required by the regulations and maintaining these systems over time. Secondly, there are the costs to ESV of administering the regulations and managing compliance. Thirdly, there are the substantive costs to the affected electricity businesses of undertaking risk reduction activities as identified under the ESMS that they have developed. Each of these categories of costs is considered in turn below.

5.1. Costs of developing ESMS and maintaining compliance with the proposed process requirements

5.1.1. Overview and methodology

As noted above, the five distribution companies that will be required to comply with the proposed regulations have already implemented ESMS under the current, voluntary arrangements. Consequently, these operators are well placed to estimate the costs that they are likely to bear in complying with the proposed regulations. In addition, the two transimission companies that will be required to comply are well advanced in the process of developing ESMS. Given this, all of the affected operators were surveyed to obtain their estimates of the relevant compliance costs.

A detailed questionnaire was developed which sought information on the expected cost of compliance with each of the substantive provisions of the proposed regulations. A copy of this questionnaire is attached as appendix 2. A draft copy of the proposed regulations was also provided to these electricity operators to assist in developing their estimates, while telephone support was also made available to assist in ensuring that questions were appropriately interpreted.

Questionnaire responses were received from all of the relevant electricity operators. The responses received generally demonstrated highly consistent estimates, both in terms of the aggregate time inputs estimated for the preparation of an ESMS and in terms of the estimates of which specific tasks constituted the major contributors to these overall cost estimates. This degree of consistency between the estimates obtained from different electricity businesses provides grounds for a relatively high level of confidence in the data, notwithstanding that, with relatively few players in the industry , there can of necessity only be a relatively small number of questionnaire responses to analyse.

In one case where the estimated time inputs for development of an ESMS were somewhat lower than for the remaining respondents, follow-up questioning clarified that this reflected the relatively limited scale of the operations of the respondent and that the estimates made were consistent, in relative terms, with those received from other respondents.

Given the above, average costs were calculated using all of the questionnaire responses received. That is, it was not necessary to rule out any of the responses on the basis of them constituting "outlier" results that could not be reconciled with other responses.

5.1.2. Electricity transmission businesses

As noted above, questionnaire responses were received from both of the electricity transmission businesses that will be required to submit an ESMS under the revised act and the proposed regulations. Both respondents provided detail on the estimated cost of developing an ESMS from a zero base. This reflects the fact that neither of the transmission businesses currently has an ESMS in place under the present voluntary arrangements, but that both are well advanced in undertaking the tasks that will be required in order to reach compliance with the proposed regulations. Therefore, the estimates provided reflect, to a substantial degree the actual experience of these companies. On the other hand, it was noted that a not insubstantial degree of uncertainty regarding final compliance costs necessarily exists, given that final versions of the regulations and of relevant guidance material are, necessarily, currently unavailable.

The average time estimated to be required to develop an ESMS was 2,256 person hours. In addition, ongoing compliance activity was estimated to require 875 hours per annum on average. Estimated average hourly rates for the staff involved in developing ESMS and undertaking ongoing compliance activity were between $60 and $105.71[33]. The average of estimated hourly wage costs, calculated across all respondents (i.e., including both transmission and distribution businesses) was $73.62. The approach of adopting an average across all respondents was taken due to the fact that there was no observable difference in weight cost estimates in the two sectors, together with the fact that no theoretical difference to any such reason to exist could be identified.

Initial development of ESMS

Given this estimate of hourly wage costs, the direct cost of developing an ESMS is estimated to average:

2,256 x $73.62 = $166,087

[33] One respondent provide an estimate of $185 per hour, including on costs. Using the VCEC standard on cost estimate of 75%, this figure was adjusted to provide an estimate of $105.71 per hour in direct wage costs only.

on average for each transmission business. This represents the direct wage costs paid by the transmission business only. The full cost of developing the required ESMS includes these direct wage costs plus applicable on costs. Using the VCEC recommended estimate of on costs as constituting 75% of direct wage costs on average, this suggests that the total cost of developing an ESMS averages:

$166,087 x 175% = $290,652

Respondents were also asked to estimate any cash costs incurred in obtaining consultancy services to assist in the development of the ESMS. The average cost estimated by electricity transmission businesses was $150,000. Thus, the estimated total cost of developing a new ESMS is equal to ($290,252 + $150,000) = $440,252 on average for each electricity transmission business.

Ongoing compliance activity (annual cost)

Adopting the same methodology as used above, the direct wage cost of annual ongoing compliance activities in respect of ESMS averages:

875 hours x $73.62 = $64,418

The total in-house cost of this ongoing compliance activity, including on costs, therefore averages:

$64,418 x 175% = $112,731

Average concultancy costs of $12,500 are added to this to obtain an estimated annual compliance cost averaging $125,331.

5.1.3. Electricity distribution businesses

Questionnaire responses were received in respect of all five electricity distribution businesses that will be required to have ESMS in place under the revised act and the proposed regulations. In this sector, all responses received related to the cost of undertaking a major five-year review and revision of an existing ESMS. This reflects the fact that all five distribution businesses have an ESMS in place at present under the current voluntary arrangements. As noted above, the responses received demonstrated a high degree of consistency. The estimated time required to undertake the review and updating task varied between 2667 hours and 3198 hours, a difference of only about 20%. The average time taken to complete these tasks is estimated at 2975 hours.

Similarly, the estimated time required to undertake annual compliance activities on an ongoing basis varied between 1500 hours and 2067 hours. The average time taken to complete these tasks is estimated at 1856 hours.

Major review and revision of ESMS

Adopting the methodology used above in respect of electricity transmission businesses, the average direct wage cost of completing a five yearly review and revision of an existing ESMS is estimated to average:

2975 x $73.62 = $219,020

Including on costs estimated at 75%, the total internal costs incurred are estimated to average:

$219,020 x 175% = $393,294.

In contrast to the position with the transmission businesses, none of the respondents indicated that major external consultancy costs would be incurred in undertaking review and revision of their ESMS. This difference may reflect on the simulated experience of these operators of ESMS requirements. Average consultancy costs per operator among the distribution businesses were estimated at $5000.

Thus, the expected cost of undertaking a major review and revision of the existing ESMS in order to reach compliance with the proposed regulations is:

$393,294 + $5,000 = $398,294.

Ongoing compliance activity (annual cost)

As noted above, the average time estimated to be required annually in order to comply with ongoing compliance obligations is 1856 hours. Consequently, the direct wage costs associated with ongoing compliance activities can be estimated as:

1,856 hours x $73.62/hr = $136,638

Addition of a 75% on cost allowance yields an estimated total annual cost of ongoing compliance activities of:

$136,638 x 175% = $239,118

As no external consultancy costs were estimated to be incurred in undertaking ongoing compliance activities, this represents the estimated full annual cost of ongoing compliance activities for each distribution business.

5.1.4. Industry-wide costs over a ten-year period

Section 115 of the Electricity Safety Act 1998 currently requires that all electricity operators that have an approved ESMS in place must submit a revised ESMS to ESV at five yearly intervals. In addition, as a result of the 2008 amendments to the Act, a new Part 10 will commence operation on 1 January 2010. Under the new arrangements, the 5-year review requirement for major electricity companies is specified in new section 108. Furthermore, MECs will be required, under new section 107, to submit a revised ESMS to ESV if they make significant changes to an accepted ESMS or otherwise modify key aspects of the ESMS or its subject matter in a way that significantly increases the overall level of risk. Corresponding revision requirements on voluntary ESMS operators are specified in new sections 119 and 120.

Thus, transmission businesses will be required to develop an ESMS and have it accepted by ESV in the first year of operation of the proposed regulations, and will subsequently have to undertake a major review and revision of the ESMS in the sixth year of operation of the proposed regulations. As Victorian regulations have a maximum 10 year life, due to the operation of the Subordinate Legislation Act 1994, later review and revision activity will only be required if the regulations are subsequently remade.

Thus, from the point of view of cost estimation, the transmission businesses will incur the costs of initial development of the ESMS in year one, the costs of a major review and revision in year six and the ongoing compliance costs in each of the 10 years of the operation of the proposed regulations. The need for a major review of the ESMS in year six arises from the fact that section 108 of the Act requires that ESMS be reviewed at least five yearly.

The survey data obtained from the transmission businesses relates to both the cost of initial development and approval of the ESMS and to the annual ongoing compliance costs. However, no direct estimates of the cost of a major review and revision to the ESMS have been provided. For the purposes of the following costing calculations, it has been assumed that the cost of a major review and revision of an existing ESMS is equal to 50% of the estimated cost of initial development of the ESMS. This is consistent with the approach taken in a number of previous RIS in respect of regulations mandating safety management systems and/or safety cases[34] and is, in turn, consistent with the general advice provided by a range of companies required to comply with these provisions in different contexts.

Given the above, table 4 summarises the expected costs to electricity transmission businesses of complying with the proposed regulations over their expected 10 year life.

Table 4: Expected cost of ESMS requirements over 10 years – transmission

[34] See for example the RIS prepared in respect of the Occupational Health and Safety (Major Hazard Facilities) Regulations, which estimated these costs as likely to fall within the range 35% - 65% of the initial development costs of the SMS. An estimate of 50% is thus consistent with an approximate midpoint of this range.

	Cost per business	Total (transmission sector)
Initial ESMS development	$440,252	$880,504
Annual compliance cost	$125,331	$250,662
5 yearly review of ESMS	$220,126	$440,252
Total cost (PV over 10 years)	**$1,646,766**	**$3,293,531**

Table 4 shows that each transmission business will incur costs of approximately $440,252 in connection with initial development of the ESMS, as well as annual compliance costs of $125,331. In year six of the operation of the regulations, a cost of $220,126 will be incurred to undertake a major review and revision of the ESMS. The total cost incurred in relation to ESMS development and compliance activity is expected to be approximately $1.6 million per transmission business in present value terms over the expected 10 year life of the proposed regulations. This is equal to approximately $3.3 million for the transmission sector as a whole.

Table 5, below, provides an equivalent information in respect of the electricity distribution sector. The position of this sector differs from that of the transmission sector in that all operators currently have ESMS in place under the present voluntary arrangements. Consequently, the initial task faced by distribution businesses is that of undertaking a major review and revision of their existing ESMS to ensure compliance with the new regulations, rather than to develop an ESMS from a zero base. Given this, the year one cost faced by each distribution business to complete a major review/revision is estimated to be the same as the year six cost of completing the required five yearly review.

Table 5: Expected cost of ESMS requirements over 10 years – distribution

	Cost per business	Total (distribution sector)
Initial ESMS review/revision	$398,294	$1,991,470
Annual compliance cost	$239,118	$1,195,590
5 yearly review of ESMS	$398,294	$1,991,470
Total cost (PV over 10 years)	**$2,697,488**	**$13,487,438**

Table 5 shows that each distribution business will incur initial costs of $398,294 in respect of the review and revision of their existing ESMS to reach compliance with the proposed regulations. They will also incur costs averaging $239,119 annually in terms of ongoing compliance costs. In addition, a five yearly review of their ESMS will be required to be conducted in year six, at a further cost of $398,294. The total cost per distribution business over the 10 year life of the proposed regulations is expected to average $2,697,488 in present value terms. Consequently, the total cost over 10 years for the transmission sector as a whole is expected to be $13,487,438.

These costs can, in an important sense, be regarded as being the minimum costs of complying with the ESMS requirements of the regulations, since they are based on estimation of the costs that will be incurred only by incumbent electricity transmission and distribution businesses. Clearly, to the extent that new entry occurs in the industry, additional costs will be incurred.

Experience since the privatisation of the industry in the 1990s shows that there has been significant entry, particularly in the distribution sector. However, this has in most cases involved the sale of existing distribution businesses to new owners. In such contexts, additional ESMS related costs would not be likely to be incurred. Moreover, the restructured and privatised industry can now be considered to be "mature" in nature, suggesting that there may be a relatively low rate of entry in the future.

In any case, the rate of future entry is inherently unpredictable. Therefore, it has not been considered feasible to incorporate additional costs in respect of ESMS development and implementation by prospecting of new entrants in the estimates derived above.

5.2. Regulatory administration costs – ESV

ESV, as the responsible regulator, exercises a number of functions in relation to the approval of ESMS. The assessment of network operator ESMSs commences prior to the arrival of the formal documentation at ESV. Once a prospective scheme operator decides to develop a scheme, contact is maintained with ESV staff throughout its development. The key areas in which ESV staff are involved are the following:

Assessment of proposed ESMS

- Providing views on relevant technical matters as required.
- Responding to requests for site-visits, both to assist the regulator in formulating a clear understanding of the operation of the scheme in its specific context and to assist the operator in promoting and explaining the importance of the scheme to relevant staff members (including union representatives). This forms part of the staff consultation process undertaken by prospective scheme operators.
- Liaison with 'independent validators' to agree on the required scope of scheme validation activity to be undertaken.
- Reviewing independent validators preliminary report
- Conducting a formal assessment of the scheme documentation, including reviewing the final report of the independent validator
- Preparation of documentation for sign-off.

The timeframe for completion of these activities is around 15 to 30 business days (spread over a period of 12 to 18 months), depending on the complexity of the scheme. This does

not include meetings with other relevant ESV personnel throughout the development of the scheme. This is estimated to be 6 internal meetings of 1 – 2 hour duration, involving up to 4 ESV personnel.

The required inputs from ESV are necessarily significantly reduced in cases in which the task is that of reviewing a revised ESMS submitted by an existing operator.

Post assessment tasks

ESV continues to be involved in ESMS related activities after the approval of the scheme. This subsequent involvement can include providing further assistance in promoting the ESMS throughout the scheme operators' site(s), conducting audit activities and monitoring and reviews periodic scheme KPI reports from scheme operators.

Average costs of ESV activities

ESV has estimated the internal resource requirements for completion of the major tasks identified above based on current practice in relation to voluntary ESMS and its assessment of the extent of the additional work required to complete the assessment process for ESMS that will conform to the requirements of the proposed regulations. The estimated time inputs in respect of each task are as follows[35]:

- Assessment of ESMS, including follow-up activities: 25 person days (year 1)
- Assessment of ESMS following major reviews: 12.5 days (year 6)
- Assisting in scheme implementation as required: 2 days (year 1)
- Auditing: 3 days (annually from year 2)

The above time estimates relate to operators who currently do not have an ESMS in place. For those with voluntary ESMS in place, the expected impact of the new mandatory ESMS requirements will be to increase existing costs in these areas by an amount equal to 50% of the above.

ESV advises that the hourly rate to be applied to the above activities is $160, with this total incorporating all direct and indirect labour elements and overhead costs. Total costs to ESV are summarised in Table 6 below.

Table 6: Costs to ESV in relation to mandatory ESMS requirements

Activity	Cost
Assessments	$239,400 (years 1 & 2)
Assessment of updated ESMS	$171,000 (years 6 & 7)

[35] Typical figures have been estimated, based on the ranges set out in Appendix 2.

Assist implementation	$12,434 (year 1)
Auditing	$28,728 (annual from year 3[36])
Total (NPV over 10 years)	**$563,908**

Table 6 shows that the incremental cost to ESV in association with the assessment of ESMS is expected to be equal to $239,400 in each of years one and two, while annual auditing costs of $28,728 will be incurred from year 3. The present value of the costs expected to be incurred by ESV over 10 years is estimated to be equal to $563,908.

ESV is currently funded through a number of mechanisms, with costs being recovered from the regulated industry in line with government policy. While there is no strict hypothecation of specific income to the funding of particular activities, in respect of ensuring the safety of electricity distribution and transmission, a large part of ESV's funding is received through a levy on the distribution businesses, which raised $3.5M in 2007/08[37].

In general, it is expected that the incremental costs to ESV of the mandatory ESMS proposal will be recovered from the regulated industry, in line with government fees and charges guidelines. It should be noted that there may also be some offsetting cost reductions due to related changes in ESV activities which may reduce the true incremental costs of the ESMS proposal below those identified above. This will occur to the extent that mandatory ESMS arrangements reduce the need for ESV to undertake other compliance and enforcement activities.

5.3. Summary of ESMS related costs

The following table summarises the identified costs to industry of developing and maintaining mandatory ESMS and the costs to ESV of administering the ESMS related requirements of the legislation and regulations. These costs represent the direct costs of complying with the regulated requirements in relation to ESMs. However, the substantive costs of carrying out electricity safety-related work as a result of the adoption of ESMS must be added to these totals. These costs are discussed in the following sections.

Table 7: Costs of preparing, maintaining and assessing ESMS

	Per company	**Total**
Total cost (PV over 10 years - transmission)	$1,646,766	$3,293,531

[36] $16,416 in year 2.

[37] See ESV Annual Report 2007/08, p 57.

Total cost (PV over 10 years – distribution)	$2,697,488	$13,487,438
Regulatory administration (ESV)		$563,908
Total ESMS related		**$17,344,887**

5.4. Substantive compliance costs

The costs discussed above include all costs associated with undertaking risk identification and assessment measures and developing appropriate risk controls, as well as the administrative costs involved in documenting all of the above steps, submitting the required documentation to ESV and obtaining approval for the resulting ESMS. They also include the costs of maintaining necessary records and meeting the reporting obligations established under the proposed regulations.

However, these costs exclude the substantive compliance costs that can be expected to arise as a result of compliance with the ESMS requirements. This approach is consistent with that taken in respect of the RIS analysis of the Occupational Health and Safety (Major Hazard Facilities) Regulations, discussed above, and reflects both a conceptual and a practical issue.

Conceptually, the question of whether these costs are attributable to the ESMS requirement arises. Section 75(b) of the ESA states that:

> "*A network operator must take reasonable care to ensure that all parts of an upstream network or the supply network of a railway or tramway system that it owns or operates….are safe and operated safely".*

This general duty, already contained in the Act, would appear to be the basis for all substantive, safety related measures taken by operators. While ESMS can be expected to be the vehicle by which necessary safety expenditures are identified and prioritised, they arguably do not substantively affect the extent of the duty placed on the operator to operate safely by virtue of this section of the Act.

Considered from another perspective, the mandatory ESMS requirements will, for the Major Electricity Companies required to comply with them, supersede completely the existing requirement to comply with the Electricity Safety (Network Assets) Regulations[38]. The expected costs of complying with the mandatory ESMS requirements (including the substantive costs of risk reduction measures) are expected to be significantly lower than the costs of achieving "literal compliance" with these regulations. Hence, in this sense, the requirements can be considered to be cost reducing.

[38] under section 112 in new Part 10 of the Electricity Safety Act 1998, which will commence operation on 1 January 2010.

Practically, there are substantial difficulties involved in identifying and quantifying the substantive costs arising from the implementation of ESMS. Firstly, the costs involved are necessarily largely specific to individual operators, since it can be expected that both risks identified and appropriate risk controls will differ significantly between operators.

Secondly, it is arguable that any additional substantive compliance costs arising as a result of the implementation of ESMS effectively result from ESMS leading to a higher level of practical compliance with existing duties than was the case under the purely prescriptive regulatory regime. That is, the systematic nature of the ESMS process means that existing regulatory duties will be more reliably identified and met than would otherwise the case. Thus, while costs incurred will be lower than the notional costs of achieving literal compliance with the network assets regulations, they may well be higher than the costs of safety compliance work *actually* being undertaken at present. To the extent that additional substantive compliance costs result from this dynamic, it can be argued that they should not, conceptually, be considered to be costs that result directly from the ESMS requirements. Rather, they should be attributed to the existing prescriptive regulatory regime and the general duty.

That said, it is anticipated that significant additional safety-related expenditures will occur following the implementation of the mandatory ESMS requirements. Moreover, notwithstanding the conceptual points raised above in respect of the attributability of these expenditures to the ESMS requirements, the analysis in this RIS does point to expected benefits in respect of safety and reliability as a result of the adoption of mandatory ESMS. Hence, consistency argues for the acknowledgement of these expected additional expenditures as constituting the effective "cost" of obtaining those benefits.

Given the substantial uncertainties involved in estimating these costs, it is appropriate to have regard to the detailed analysis conducted by the ESC in the context of its periodic pricing reviews. In the Final Decision of its 2006-2010 review, the ESC noted that capital expenditure of $34.2 million and operating expenditure of $138 million, summing to a total expenditure of $172.2 million[39] had been included in its pricing decision for the previous regulatory period (2001-2005) for compliance with the electricity safety regulations (Vol 1, p303). This can be regarded as the "base case", indicating the amount which electricity distributors were expected to spend to move toward compliance during that period. It should be noted that these expenditures relate to compliance with the network asset regulations only, as the pricing decision predates the implementation of any voluntary ESMS arrangements pursuant to the December 1999 changes to the Act.

The following tables are reproduced from the Final Decision of the ESC's 2006-2010 pricing review. They summarise the operating and capital expenditure, respectively, that ESC has allowed in respect of compliance with electricity safety requirements. ESC notes that it reached its decision on the basis of distributors adopting a risk management

[39] All dollar figures quoted in this section are at 2004 prices, consistent with the approach adopted by ESC in its 2006-2010 pricing review. Conversion to 2009 dollars occurs in the Conclusions section.

approach to improving safety, based on the implementation of approved voluntary ESMS and the expected approval of exemptions that had been sought as part of these ESMS.

According to ESC:

> *The step changes in operating expenditure proposed by the distributors to improve compliance with these inspection and testing requirements appear reasonable. (p222).*

Thus, the incremental costs associated with the implementation of voluntary ESMS approved by ESC for the current (2006-2010) regulatory period total $22.0 million. In addition, ESC approved forecast capital expenditure in respect of improved safety compliance as set out in the following table.

The capital expenditure set out in the table totals $118.8 million over the 2006-2010 period. Combined with the operating expenditure highlighted above, this represents total expenditure of approximately $140.8 million over the five year period. This can be seen as the expected cost of complying with electrical safety requirements, as set out under the voluntary ESMS over the current regulatory period.

However, ESC makes an important qualification in respect of the interpretation of this data, arguing:

> *In assessing the capital expenditure proposals, the Commission notes that $168.3 million (in 1999 dollars) was included in aggregate in the distributors' capital expenditure forecasts for the 2001-05 regulatory period for compliance with environmental, safety and legal obligations*[40]*.* ***The distributors have significantly underspent relative to this forecast. [emphasis added]*** *(p303)*

Similarly, in respect of operating expenditures, the ESC notes that:

> *"…the distributors were provided with expenditure of $138 million (in 2004 dollars) for compliance with these [network assets] regulations over the 2001-05 regulatory period. Whilst some distributors appear to have undertaken works in the current period, other distributors have not. This illustrates the tenuous link between a legal obligation and the expenditure allowance.*

As a result, it makes the point that:

> *The expenditure allowance provided by the Commission neither guarantees nor prevents compliance with obligations. It is entirely up to the distributors to respond to their obligations accordingly. (p217).*

[40] As noted above, of this amount, $34.2 million (in 1999 dollars) was included for compliance with the electricity safety regulations.

This point is of particular relevance, in that it indicates that expenditures approved by ESC in respect of regulatory compliance may not, in fact, be made. However, the ESC estimates remain the best available means of estimating the likely substantive compliance costs in respect of the mandatory ESMS proposal.

As noted above, approved safety-related expenditures total $140.8 million over the five year review period, a slight reduction on the $172.2 million approved in 2001-2005. However, this relates to the cost of achieving compliance with voluntary ESMS. As indicated elsewhere, it is expected that the mandatory ESMS and associated asset management plans will require a substantially broader-based approach to risk management to be undertaken than that addressed in these existing voluntary ESMS, implying that significantly greater expenditures will be required in order to achieve compliance. At the same time, the fact that implementation of mandatory ESMS is to coincide with the sunsetting of the prescriptive network assets regulations is expected to change the *allocation* of expenditures between different uses, as spending becomes better directed toward managing the most significant safety risks, rather than being cognisant also of the need to manage regulatory/commercial risks associated with failures of "literal compliance" with the regulations. Consequently, the net effect of the mandatory ESMS proposal is expected to be twofold: an increase in the *productivity* of the expenditures undertaken, together with some increase in the size of total safety-related expenditures.

In terms of the latter effect, another conceptual issue arises: as noted above, the distribution companies have substantially under-spent the amounts allocated in respect of safety related expenditure in the 2001-2005 pricing review. By contrast, ESV believes that one impact of mandatory ESMS will be to provide a greater degree of assurance that identified expenditures are actually undertaken. This is expected to occur because the mandatory ESMS are expected to be more detailed and comprehensive in nature, implying that expenditure commitments will be more specific and more readily monitored and enforced. Thus, one driver of any observed increase in expenditure will be the greater practical "enforceability" of mandatory ESMS. That is, it is expected that effective compliance with ESMS obligations will increase.

Given the above, the size of the uncertainties surrounding the estimation of additional expenditures on substantive compliance with ESMS is apparent. However, given the greater scope and level of detail that will be expected to be included in the mandatory ESMS, it is likely that substantive compliance costs will also be significantly increased, vis-à-vis the levels currently observed under the voluntary ESMS arrangements. An additional factor is that the two transmission businesses, which do not currently have ESMS in place, will be required to adopt ESMS under the proposed regulations. As a purely indicative estimate, it is suggested that the substantive compliance costs associated with mandatory ESMS may be of the order of be twice those of the voluntary ESMS. This would suggest additional compliance costs of the order of $140.8 million over five years. Thus, the total expenditure to be undertaken in order to achieve substantive compliance with the requirements of the ESMS developed under the Act and these proposed regulations may be of the order of $281.6 million over five years, or $56.3

million per annum on average. This is equal to approximately $468.2 million over ten years in present value terms.

5.5. Cost summary

The following table summarises the costs identified in respect of the proposed regulations. The table shows that the great preponderance of the expected costs are the substantive costs of actions taken to improve safety performance, whereas the estimated "administrative" costs of developing, adopting, auditing, reviewing and updating ESMS are very modest by comparison, constituting only around 3.4% of the total estimated cost. Regulatory administration and enforcement expenses are also estimated to be comparatively very modest, accounting for only 0.1% of total costs. These proportions suggest a highly efficient regulatory structure.

Table 8: Summary of expected costs of the proposed regulations

Cost category	Amount (PV over 10 years) (% of total)
Administrative costs – (incl. development of ESMS, implementation, auditing, review & updating)	$16.8 million (3.5%)
Substantive compliance costs (safety related expenditure pursuant to ESMS based risk assessments & risk control decisions)	$468.2 million[41] (96.4%)
Regulatory administration	$0.6 million (0.1%)
Total	**$485.6 million**

Table 8 shows that the estimated costs arising from the proposed regulations could approach $0.5 billion over 10 years. As indicated in the preceding section, this would represent a significant increase in current risk-reduction related expenditures by the affected MECs. The potential for such an increase arises from the expectation that the ESMS that will be approved over time under the new mandatory scheme will have broader scope and be farther-reaching than under the current, voluntary arrangements. Moreover, the mandatory nature of the ESMS suggests that ESV will be better placed to ensure that actions are taken consistent with the ESMS that have been approved.

However, in practical terms, the ability of the new regulatory regime[42] to yield more extensive risk reduction activity and, hence, increased regulatory costs will be

[41] As noted in the above text, this estimate is indicative only and is subject to substantial uncertainty. However, it is derived from actual expenditure estimates supplied to, and published by, the Essential Services Commission.

[42] i.e. comprising the amendments to the Act establishing mandatory ESMS and the proposed regulations.

substantially dependent on the approach taken by the Australian Energy Regulator in relation to future price resetting decisions.

The above indicates that, measured against a notionally unregulated base case – i.e. one in which neither the current voluntary ESMS arrangements nor the current Electricity Safety (Network Assets) Regulations 1999 existed, the costs associated with the proposed regulations could be up to $0.5 billion in present value terms over ten years. However, in practical terms, this does not represent a relevant benchmark. The current intention to allow the network asset regulations to sunset without replacement is entirely predicated on the assumption that process based regulation centred on the mandatory ESMS requirement will be adopted. That is, in the absence of process-based regulation of this form, a continuation of the existing prescriptive regulatory arrangements would be required in order to ensure adequate safety levels. As discussed above, the costs of moving to full compliance with the prescriptive network assets regulations – or their successors. These costs have been estimated by the ESC as being equal to $1.7 billion over the same period, or more than three times the costs of the proposed regulations. Given this, it is argued below that the adoption of mandatory ESMS can be seen as involving substantial cost savings, vis-à-vis the requirement that would otherwise exist to move to full literal compliance with the network assets regulations.

5.6. Offsetting cost savings

While Sections 5.1. and 5.2., above, have identified significant costs likely to be associated with the introduction of mandatory ESMS requirements, it is also anticipated that there will be significant offsetting cost savings. These savings result from reductions in the costs that would otherwise be incurred in complying with the requirements of the Electricity Safety (Network Assets) Regulations 1999 and their successor regulations.

As noted above, substantial parts of the electricity transmission and distribution network do not comply with various elements of the Electricity Safety (Network Assets) Regulations 1999. This reflects the fact that very large proportions of the current electricity infrastructure was built well before these regulations came into effect.

In recent years, electricity distribution businesses have argued strongly that the substantial non-compliance of their network assets with the regulatory requirements requires them to undertake a significant program of additional capital expenditures to move toward full, or "literal" compliance with the Electricity Safety (Network Assets) Regulations, and that these expenditures should be reflected in the decisions of the economic regulators responsible for price setting in the industry. The cost differences implicit in these two approaches are substantial, as indicated in the following table, which summarises the electricity distributors' estimates, as presented to the ESC in the context of the 2006-2010 pricing review:

Table 4.2: Capital expenditure to comply with electricity safety regulations, $million, real $2004

	AGLE	CitiPower	Powercor	TXU	United Energy	Total
Risk management approach	23.1	20.0	80.6	57.3	45.2	**226.2**
Literal compliance	270.0	143.0	741.0	480.0	74.0	**1708.0**

As noted in Section 3, above, the final decision in the current pricing review approved a smaller figure than that set out above in respect of compliance with safety regulations. A total of $118.8 million in capital expenditure and $22.0 million in operating expenditure was approved in respect of compliance with voluntary ESMS. It was also suggested that the adoption of mandatory ESMS requirements could double the necessary expenditure figure to $281.6 million over five years.

However, were this expenditure undertaken and the mandatory ESMS to be approved as required, the distributors would be fully exempt from the need to comply with the network safety regulations. If the alternative to this expenditure is seen as being the need to achieve "literal compliance" with those regulations, it is arguable that the adoption of the mandatory ESMS requirement implies a saving of over $1.4 billion over five years in regulatory compliance costs, while still achieving appropriate levels of safety.

That is, if required to achieve full compliance with the network assets regulations, distributors could be expected to continue to argue in the context of future price re-sets that continuing uncertainty as to their legal position should result in additional allowance being made in the pricing structure for them to recoup the costs of moving toward literal compliance. Were such arguments to be accepted, even in part, by the Australian Energy Regulator, the result would be significant increases in electricity prices for consumers.

By formalising and standardising the ESMS arrangements, requiring all transmission and distribution businesses to adopt ESMS and providing, as a result, a complete exemption from the need to comply with the network asset regulations, the mandatory ESMS proposal will effectively prevent this substantial, but contingent, cost increase from being a factor in the context of future electricity price resets.

Clearly, it cannot be stated with complete certainty that of the electricity distribution businesses would necessarily succeed, to any extent, in convincing the Australian Energy Regulator to provide for additional expenditures in respect of improved literal compliance with the prescriptive regulations. Consequently, the benefit associated with avoiding additional cost pressures being placed on electricity prices must be seen as a contingent benefit. However, given the above discussion there appears to be a high probability that at least some additional costs would be incurred in the future were the mandatory ESMS proposal not to proceed. While the recent amendments to the Electricity Safety Act 1998 have made provision for mandatory ESMS, the proposed regulations are an essential requirement to operationalise these provisions, since only a fully credible and functional ESMS requirement provides appropriate justification for the exemption being provided from the network asset regulations..

As Table 4.2. indicates, there is a very substantial difference between the alleged costs of achieving "literal compliance" with the Electricity Safety Act and the network asset regulations and the estimated costs of adopting a risk management based approach. The capital costs of achieving the former were estimated at $1.7 billion in total for the five distribution businesses, compared with $226 million for adoption of the "risk management approach". Thus, the difference is equal to $1,475 million, in 2004 dollars..

6. Expected benefits of the proposed regulations

6.1. Overview

The implementation of the proposed regulations will operationalise the mandatory ESMS regime that was provided for as a result of the 2007 amendments to the Electricity Safety Act 1998. Hence, consideration of the benefits of the proposed regulations must be based on the question of what results will be obtained from the move to mandatory ESMS. As noted above, five of the seven affected operators already have ESMS in place, while the remaining two do not. However, even for those operators who currently have voluntary ESMS in place, the move to mandatory ESMS is expected to lead to significant benefits, for several reasons which are discussed below.

6.2. Safety related benefits

The proposed mandatory ESMS arrangements will, fundamentally have the effect of moving the regulatory regime governing electrical safety from being an essentially prescriptive regime to one that becomes process based, for the group of electrical transmission and distribution companies that will be subject to these requirements. This reflects the fact that, once the new regulatory arrangements are in place, operators who have an approved ESMS will be completely exempted from the requirement to comply with the network assets regulations. By contrast, operators who have had ESMS approved under the current, voluntary arrangements remain subject to the prescriptive requirements of the network assets regulations except to the extent that they have been successful in obtaining specific exemption. As noted above, few exemptions have been granted, so that all operators who currently have voluntary ESMS continue to be subject to the great bulk of the existing prescriptive regulations.

As in many areas of policy analysis, there are substantial difficulties in undertaking quantitative analysis of the expected benefits of the proposed legislation. Conceptually, the fact that most of the group of operators that will be subject to the proposed mandatory ESMS requirements have already implemented ESMS on a voluntary basis could provide a basis for comparing the performance of those who have implemented ESMS, with those who have not. However, this option is not available in practice, since those with voluntary ESMS in place are all distribution companies, while those who do not currently have ESMS in place but will be required to implement them are all transmission companies.

Alternatively, it could be feasible to conduct a time-series analysis, comparing the safety performance of one or more network operators before and after their adoption of voluntary ESMS. However, in practical terms, this option is also infeasible. The

difficulties involved in attempting these comparisons are reflective of several factors, notably:

- the substantial differences in the operations of the various affected parties and the large number of other factors that go to determine overall electrical safety performance;
- the fact that a number of the hazards involved are of the low-risk/high consequence variety, leading to the probability that random variation in performance will obscure any underlying differences in safety performance; and
- the fact that the current voluntary ESMS regime has been implemented relatively recently, so that the required five yearly audit/reviews, which could be expected to generate significant performance data, have yet to be completed in most cases.

Moreover, the mandatory ESMS regime is expected to result in ESMS with a broader scope and a greater degree of rigour being developed and implemented, vis-à-vis the current voluntary ESMS. Thus, even if substantial data relating to the performance of the existing ESMS were available, they would not provide a very reliable basis on which to project the likely performance of the proposed mandatory ESMS regime. That is, there are expected to be more significant benefits associated with the mandatory ESMS than is the case with the current voluntary ESMS arrangements, so that even were the performance of the voluntary ESMS to be found to be relatively poor, this would not necessarily rule out the prospect of substantial benefits accruing due to the mandatory ESMS regime.

Thirdly, as discussed above, the "base case" against which the benefits must, conceptually, be measured is one in which safety performance could be expected to cease its recent improving trend and even to decline, as a result of large elements of the network reaching a critical age profile in terms of reliability and maintenance/replacement requirements.

Given these difficulties in demonstrating directly the effectiveness of the ESMS approach in improving and maintaining safety standards, the ESV view in this regard is based on the following general characteristics of safety case, or process based regulation:

- ESMS are inherently based on continuous improvement in the regulatory regime and are, to this extent, expected to yield better dynamic performance than a prescriptive regulatory regime;
- There are substantial practical limits to the ability of regulators to identify and specify prescriptively the detailed technical requirements that must be followed in order to effectively manage safety risks arising from complex technical assets; and
- By contrast, it is widely accepted as best practice to prescribe required safety outcomes and require those who are most competent (the operators) to continually keep up with best practice technical management of those risks.

Also of fundamental importance is the strong support for this approach to the regulatory management of complex and substantial safety risks constituting best practice arises from reviews of a number of previous major hazard facilities disasters and the identification of regulatory failures that have contributed to them. These include:

- The Cullen inquiry into the Piper Alpha disaster, which arguably led to the establishment of the whole safety case regime;
- Various European major hazard facility initiatives following dangerous goods disasters (eg: Seveso I & II); and
- The Longford Royal commission which effectively established a safety case regime for major hazard facilities in Victoria

In each of the above cases, major public inquiries found that departures from regulatory best practice had contributed substantially to the disasters in question. Moreover, in each case, the regulatory response has been to adopt process-based regulatory requirements in relation to risk management, involving the mandating of Safety Management Systems. Finally, while the spread of process based regulation is a relatively recent phenomenon, some evaluation data are available that attest to its practical performance. For example, a recent independent review[43] of the United Kingdom's *Railways (Safety Case) Regulations 1994* specifically sought to isolate the effect of the regulations from other environmental factors affecting British rail safety performance. It concluded that 15% of the safety gains achieved since the implementation of the regulations could be attributed to them and that, on this basis, benefits of £85 million substantially outweighed identified costs of £52 million. Moreover, the evaluation report concluded that the regulations had performed well across a range of six qualitatively specified "intermediate outputs".

The electricity industry is analogous to those considered above, from the regulatory perspective, in that it is characterised by large numbers of serious risks, a large-scale and complex operating environment and a potentially large number of risk control measures.

Thus, the fundamental concern is that, under current arrangements, a best practice regulatory approach is being applied on a purely voluntary basis and that, in this context, not all of the operators whose operations involve the most complex and significant risks have adopted this best practice approach.

The key context for these requirements is one in which the use of process based regulations to address environments in which there are multiple and substantial risks, as well as numerous different possible risk controls, is rapidly increasing. This type of regulatory approach is increasingly seen as constituting "best practice" in such contexts. Given the very significant risks that are necessarily associated with the generation,

[43] Evaluation of the Railways (Safety Case) Regulations. Prepared by BOMEL Ltd for the Health and Safety Executive. Research Report 192, 2004.
www.rail-reg.gov.uk/upload/pdf/rr192.pdf

transmission and distribution of electricity, such systematic, best practice regulatory approaches would clearly seem to be appropriate to this context.

The increasingly widespread adoption of process based regulation in regulatory contexts characterised by high levels of complexity, as well as substantial and numerous risks, reflects two main factors. Firstly, process based regulation requires that a global, management-based approach to managing this to be taken. This encourages regulated parties to take a broader view of their safety responsibilities, rather than limiting their actions to clients with a number of specific regulatory requirements. Thus, a process based regulatory regime clearly establishes that the primary responsibility for ensuring an appropriate overall level of safety in their operations lies with the operator, rather than the regulator.

Conceptually, a key benefit of adopting the process-based approach is that this form of regulation facilitates the efficient allocation of resources (hence, of compliance efforts) to achieving overall safety outcomes, rather than requiring them to be focused on achieving strict compliance with specific, prescriptive regulations. Moreover, the ESMS can be considered to be a "continuous improvement" model, as the requirement to reduce risk "as far as practicable" constitutes a moving target, with technological improvement and other factors progressively improving the ability to achieve better safety performance.

Given the fundamental impediments to developing and implementing an effective regime of prescriptive regulation in the specific industry context of electricity network operations, discussed in preceding sections, it is expected that the move toward a process based regime will lead to significant improvements in regulatory effectiveness. Moreover, the move will also achieve a substantial degree of consistency between the approaches taken to regulating electricity safety and gas safety, for both of which ESV is responsible. It should be noted, in this context, that a number of operators currently have businesses which span both the gas and electricity industries and that businesses that span these two industries sectors are likely to become more widespread in the future. Therefore there are clear potential benefits from the point of view of both regulated businesses and ESV as the regulator in adopting broadly consistent regulatory approaches in respect of the two energy industry sectors.

6.3. Reliability related benefits

While the main benefits sought by an introduction of the mandatory ESMS proposal are safety-related, it is also anticipated that important reliability benefits will flow, over time, due to their implementation. That is, the more systematic and effective management and maintenance of network assets which is expected to be achieved as a result of the implementation of the mandatory ESMS requirement can be expected to yield both safety and reliability benefits.

Clearly, where safety-related incidents occur, there will frequently also be interruptions to electricity supply. In addition, deficiencies in network asset maintenance can, in many

cases, lead to interruptions of electricity supply in circumstances in which there are no significant safety-related implications. Improved network asset maintenance can be expected to address of both of these issues.

The Essential Services Commission (ESC) publishes comparative performance reports for the electricity distribution businesses[44] which provide a range of data on the extent of interruptions to electricity supply. The most recent performance assessment, for 2007, shows that Victoria wide there were more than 120 minutes of unplanned electricity outages per customer, plus around 30 minutes of planned electricity outages.

This trend data show that there had been a gradual decline over several years in the average number of minutes of unplanned outages per customer, but that some increase in outages has been observed in the past few years. The data in the report also show that the majority of electricity distribution businesses are consistently failing to meet performance targets in relation to reliability measures as part of the price regulation process. As shown in Graph 5, above, considering the average reliability of the distribution sector as a whole, performance targets in respect of unplanned outages were only met in three of the seven years from 2001 to 2007[45].

The issue of reliability of supply embraces both quantity measures, as discussed above, and quality measures: consumers may suffer losses if the supplied electricity voltage is either too high or too low. In the former case, damage to equipment or a shortening of its life spent maybe likely to result. In the latter case, equipment may not function correctly. ESC also collected data in relation to quality of supply and has reported that the distributors appear to have issues to address in this regard[46]. However, trend and comparative data are not available at present due to the recent implementation of standardised reporting requirements. Clearly, however, improved network asset management can be expected to enhance performance in this respect as well as in relation to quantity of supply.

Precise estimation of the potential benefits of improved reliability of supply is not possible. However, data published by VENCorp and ESC allow some indicative estimates of the likely magnitude of these benefits to the proposed.

In its 2003 publication *Electricity Transmission Network Planning Criteria*, VENCorp estimated the average cost to consumers of electricity not supplied. The VENCorp estimate was that the value of the losses sustained by customers as a result of a non

[44] The most recent available report is the *Electricity Distribution Businesses: Comparative Performance Report 2007*. Essential Services Commission, October 2008. See: http://www.esc.vic.gov.au/public/Energy/Regulation+and+Compliance/Performance+Reports/Electricity+distribution+comparative+performance+report+2007-08/Electricity+distribution+comparative+performance+report+2007.htm

[45] ESC 2005, op. cit., p 64.

[46] Ibid, pp 66-70.

supply of electricity average $29,600 per MWh[47]. This estimate is expressed in 2002 dollars and is equal to $35,672 in 2009 dollars[48].

Data from ABARE show that total electricity consumption in Victoria during 2003/04 was equal to 55,000 GWh. This is equal to approximately 150 GWh per day. The most recent average of 120 minutes of unplanned electricity supply interruptions per customer is equal to approximately 8.3% of one-day. Thus, it can be estimated that the average amount of electricity not delivered per annum is equal to:

150 GWh x 8.3% = 12.5 GWh.

12.5 GWh is equal to 12,500 MWh. Thus, the total value of the electricity not supplied due to unplanned electricity outages is equal to:

12,500 x $35,672 = $445.9 million.

Of course, unplanned supply outages occur for a number of reasons (e.g. adverse weather events), only some of which would be addressed in mandatory ESMS. Thus, the adoption of mandatory ESMS can be expected to have only a relatively limited impact in reducing the extent of these unplanned outages. However, given the size of the above estimate of the cost to consumers of these unplanned outages, it is clear that even a small reduction in their incidence will yield quite significant benefits. For example,were the introduction of mandatory ESMS to lead to a 1% reduction in the extent of unplanned outages, the annual value of the benefits to consumers would be approximately $4.5 million. This is equivalent to $37.0 million in present value terms over 10 years[49].

The incremental cost of the ESMS proposal, including the above estimate of additional substantive compliance costs, is equal to $158.1 million over ten years in present value terms[50]. The estimated cost of supply interruptions of $445.9 million per annum is equal to $3.7 billion in NPV terms over ten years. Thus, the costs of the mandatory ESMS proposal would be fully offset by reliability related benefits if there were an improvement of at least 4.2% in overall reliability as a result of better asset management arising from the mandatory ESMS. Considered alternatively, the direct costs of developing and assessing mandatory ESMS, estimated above at $17.3 million in present value terms over 10 years, would be fully offset by a reduction of even 0.47% in the current level of unplanned outages.

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[47] *Electricity Transmission Network Planning Criteria.* VENCorp, Melbourne, July 2003, p 2.

[48] CPI index value March 2009/March 2002 = 163.6/136.0 = 1.20. $29,600 x 1.20 = $35,672.

[49] Another, more limited, indicator of the potential benefits from improved supply reliability can be gained from the link between reliability performance against targets and the financial penalties to which distributors are liable. In 2005, the five distributors paid customers $1.112 million in GSL payments for low supply reliability and long supply restoration times, compared with $1.124 million paid in 2004[49]. Improved reliability clearly has the potential to save distribution businesses money in the direct sense.

[50] Estimated expenditure on substantive compliance of $140.8 over five years is equal to $28.2 million per annum. This is extrapolated over ten years (using a 3.5% real discount rate), giving an NPV of $234.2 million, to which is added the $8.0 million NPV in respect of developing and assessing the ESMS, cited above.

7. Identification and assessment of feasible alternatives

The use of a risk management based approach is widely considered a regulatory best practice in contexts in which there are numerous sources of risk, complex operating environments and numerous potentially feasible risk controls. It can be noted in particular that the The Gas Safety Act 1997, which ESV is also responsible for administering, is predicated on this approach to the regulation of safety standards. Specifically, section 37 of the Act requires all gas companies to submit a gas safety case to ESV, while the Act also sets out a number of specific requirements in relation to the safety case. This approach is also adopted in all Australian States and Territories in which reticulated gas is provided[51]. That said, jurisdictions do differ as to whether safety case requirements are applied to gas retailers.

Moreover, the Electricity Safety Act 1998, as it now exists following the 2007 amendments discussed above, requires major electricity companies to have an approved ESMS in place. Given these requirements of the primary legislation, all feasible alternatives to the proposed regulations must be developed in the context of the legislative requirement for ESMS to be adopted.

Within this context, two feasible alternatives have been identified. The first is that of adopting greater or lesser degrees of regulatory prescription as to the required contents of a safety case. On one view, this constitutes two separate alternatives – i.e. the adoption of greater prescription, or of lesser prescription. However, the arguments for and against such an approach are effectively mirror images of each other. Given this, the question of the appropriate degree of regulatory prescription in relation to safety cases is considered in generic terms below.

The second alternative considered is to broaden the scope of the ESMS requirement to include both the generation sector and the traction sector (i.e. train and tram operators). This latter alternative could not be implemented without legislative change. However, as it was given substantial consideration during the development of the 2007 amendments to the Electricity Safety Act 1998, this alternative is included here for the sake of transparency and completeness.

7.1. Adoption of greater degree of prescription in safety management system requirements

7.1.1. Benefits of a higher level of prescription

[51] However, not all jurisdictions require companies to submit their safety cases to the regulator for approval.

Three main advantages of adopting a higher level of regulatory prescription as to the required contents of safety management systems can be identified, as follows:

- it increases the legal certainty for affected operators as to what constitutes a complying safety management system,
- it reduces the reliance on the personal judgement of individual assessors of safety management systems, and
- it increases the transparency of the process.

All three of these identified advantages can be considered to be generic in nature, in that they can be cited in support of more prescriptive regulatory approaches in virtually any context. In order to determine the relative importance of each of these potential benefits in the specific context of the proposed ESMS requirements, it is necessary to consider the issue in the context of the specific characteristics of the electricity transmission and distribution industry.

Increased certainty for MECs

Difficulties in relation to certainty of compliance with non-prescriptive regulatory requirements are frequently highlighted as being of concern, in particular, to small businesses, which will frequently lack the dedicated technical resources that may be required in order to develop a specific regulatory compliance programme tailored to the operations of an individual business. More generally, where there is little experience with compliance with the regulatory regime in question, concerns over ensuring certainty of compliance with non prescriptive regulation may also be significant.

However, these circumstances clearly do not apply to MECs in Victoria in the current regulatory context. In the first instance, MECs that are required to comply with the proposed regulations are large and sophisticated organisations that are well-placed to develop complying ESMS with relatively limited guidance from the regulator. As noted elsewhere, five of the seven MECs have extensive practical experience in this area, in that they already have ESMS in place.

More generally, there is substantial industry experience in complying with the current regulations and their requirements in relation to voluntary ESMS, as these provisions have been in effect since 1999. Given that the proposed requirements in relation to mandatory ESMS are generally consistent with the current voluntary ESMS requirements, MECs will be well-placed to comply with their regulatory obligations without substantial additional prescription being implemented.

Thirdly, it has been noted elsewhere that the requirements of the proposed regulations are largely reflective of the internal business processes adopted in the majority of companies operating in the sector. This, again, suggests that there would be little, if any, benefit in increasing the degree of a prescription contained in the proposed regulations.

Reduced reliance on the personal judgement of individual ESMS assessors

The potential benefit of reduced reliance on the individual judgement of assessors essentially lies in the reduction of the potential that may exist for the regulations to be applied in an arbitrary and/or inconsistent fashion. However, consultation undertaken with MECs indicates that there has been little concern in this regard in terms of the implementation of the current ESMS requirements.

The existence of Australian Standards for the development of safety management systems is also particularly relevant, as it provides an authoritative background against which any issues of this kind could be assessed and resolved.

Increased transparency

Increased transparency can be of substantial importance particularly where there are public concerns regarding regulatory compliance and, consequently, the achievement of safety standards. In this context, improving transparency as to the processes of assessing compliance can increase confidence for the public and industry customers.

Transparency may also be important from the point of view of industry participants if there are strong concerns regarding the equity of treatment of different players by regulatory authorities.

However, neither of the above issues is believed to be substantial in the context of the electricity industry in Victoria at present. The general public perception is of strong safety performance in the industry, notwithstanding issues raised in recent times in relation to the possible role of electricity assets as causative factors in some of the Black Saturday bushfires.

7.1.2. Costs of a higher level of prescription

The following disadvantages of adopting a higher level of prescriptive detail regarding ESMS in the regulations can be identified:

- it reduces the flexibility of companies in the development of ESMS,
- it reduces the opportunity for harmonisation of requirements across jurisdictions,
- it can tend to stifle innovation in safety management systems,
- it can tend to foster a “cook book” or “cut and paste” approach to ESMS development,
- it can be perceived as running counter to the philosophy of an outcome based regime,
- it can tend to increase compliance costs and

- it can be difficult to design regulations that are universally appropriate given the substantial differences that exist in the scale, scope and nature of the operations of MECs.

Reduced flexibility/increased compliance costs

Reduced flexibility in the development of ESMS, as a result of the need to meet more detailed, prescriptive regulatory requirements, has the potential to substantially increase the cost of regulatory compliance. This will occur to the extent that the specific prescriptive requirements of the regulations are unable to be reconciled with the business operations and the particular requirements of the individual business involved.

Consultation with MECs has indicated that there is some, albeit relatively small, incidence of this dynamic of additional costs being incurred at present due to the specific requirements of the current regulations. This suggests that any substantial increase in the degree of prescription of the regulations would have the potential to substantially increase compliance costs in this way.

Reduced opportunity for harmonisation across jurisdictions

Some MECs[52] already operate electricity assets across more than one Australian jurisdiction, while it is feasible that the incidence of such cross-jurisdictional operations will increase with further reform and restructuring within the electricity industry. Given that SMS based regulation is becoming increasingly widespread, there are important potential cost savings arising from the possibility of adopting consistent approaches to the development and implementation of ESMS in different states.

Clearly, the greater is the degree of prescription in the regulatory requirements in relation to SMS the smaller is the possibility that these cost savings will be realised in practice.

Stifling innovation

In general terms, a key benefit of performance and process based regulatory systems is that they allow greater flexibility to regulated parties in achieving compliance. This enhanced flexibility is particularly important in the dynamic context, as it helps to ensure that innovation in achieving compliance with the underlying regulatory objectives is not impeded by the need to comply with the specific prescriptive requirements.

Therefore, increased prescription in SMS regulation has the potential to inhibit the realisation of possible reductions in regulatory compliance costs and to inhibit the achievement of improvements in regulatory effectiveness through better compliance strategies.

[52] For example, Basslink is required to comply with both Victorian and Tasmanian legislation and regulations.

Fostering a "cut and paste" approach to ESMS development

The underlying rationale for process based regulation, such as that requiring the development of an ESMS, is that regulated parties adopt a management based approach and take substantial responsibility for determining the specific actions that they will undertake in order to achieve regulatory compliance. This is considered to be fundamental to the development of a "safety culture" and, therefore, to the achievement of better safety outcomes.

In this context, there is a substantial risk that significantly increasing the degree of prescriptive detail as to the matters to be included in ESMS will act to undermine this fundamental logic of the regulatory approach being adopted.

In this context, it should be noted that Australian standards already exist which provide substantial guidance for MECs in the development of their ESMS.

Counter to the philosophy of an outcome based regime

This objection to adopting a more prescriptive approach is, in effect, a slight variant of the above objection. That is, the philosophy of an outcome based regulatory regime is, in large part, rooted in the notion that the regulated parties should take a high degree of responsibility for determining the appropriate regulatory compliance response for their circumstances. The use of detailed prescriptive requirements clearly acts contrary to this philosophical approach.

An alternative perspective on this objection is that, under an outcome based regulatory regime, the regulated party is expected to have significant freedom of action, so that compliance can be achieved at minimum cost.

Difficulty of designing universally appropriate regulations

As discussed elsewhere, there are substantial differences in the scale, scope and nature of the operations of Victorian MECs. Clearly, the greater is the degree of prescription contained in the regulations, the greater will be the degree of difficulty in designing a set of regulatory requirements that are equally applicable, or even reasonably applicable, to the operations of all of the regulated parties.

7.1.3. Stakeholder views of the alternative

Consultation undertaken with MECs indicates that they are generally comfortable with the structure of the current and proposed regulations in respect of ESMS requirements,

while no views were put forward in favour of a substantive increase in the degree of prescription implicit in the proposed regulations.

Some MECs have expressed the view that some reduction in the degree of prescription in the proposed regulations could potentially reduce their costs of compliance, since this would tend to reduce the number of circumstances in which, in order to achieve compliance with specific regulatory requirements, they were required to adopt approaches that differed from their normal, or preferred, business practices. However, these comments must be seen within the broader context of several MECs having stated explicitly that they believed that the process of working toward compliance with the existing regulations had yielded significant benefits to their business in many cases.

In general, therefore, it is concluded that MECs required to comply with the proposed regulations do not believe that additional benefits, or reductions in costs, could be attained through significant changes to the currently proposed level of prescription contained in the regulations.

It can also be noted that a comparison of the proposed regulations with the major hazard facilities sections of the Occupational Health and Safety Regulations 2007[53] suggests that the two regulations are broadly similar in terms of their approach to specifying SMS related matters. In some areas, additional prescription appears to exist in the OHS Regulations. These, relatively minor, additional degrees of prescription are, presumably, considered to be justified by the specific focus of these regulations on those facilities that entail the most major hazards and, as a consequence, require the most painstaking process of verification by the regulator of the adequacy of safety case based activities.

7.2. Expand the scope of the regulations to include the generation sector & tram and train operators

Upon commencement of the new Part 10 of the Electricity Safety Act 1998 on 1 January 2010, section 3 of that Act will define MECs as being licensed electricity transmission and distribution companies, other than those which have been declared not to be an MEC. The new provisions require all MEC to have an approved ESMS in place. During the course of the 2007 amendments to the Act which introduced these provisions, extensive consideration was given to the alternative of expanding the scope of the compulsory ESMS requirement to include the coal-fired generation sector and traction companies (i.e.tram and train operators), as well as the transmission and distribution sectors.

Given that the act was ultimately framed in terms noted above, it is not a legally feasible alternative for the proposed regulations to include the electricity generation sector

[53] See Chapter 5, Division 4. This division references some other parts of the regulations in establishing the requirements.

within the scope of the mandatory ESMS requirement. That is, legislative change would be needed for such an alternative to become legally possible. However, given the historical development of the mandatory ESMS requirement, the conceptual merits of expanding this requirement to include the coal-fired generation sector are considered below as an alternative to the proposed regulations.

The move to mandatory ESMS adopted via the 2007 amendments to the Electricity Safety Act was justified on the basis that process based regulation constitutes best practice in this area and that, particularly in light of experience to date with voluntary ESMS, mandating this approach to risk identification, assessment and control can be expected to improve overall electrical safety performance. Given this rationale, it is clearly arguable that the scope of the mandatory ESMS requirement should be broadened. It is currently proposed to apply the mandatory ESMS requirement to only seven operators in the transmission and distribution sector, five of whom already have approved ESMS in place. Extension of the requirement to the generation and traction sector would bring a total of six coal-fired electricity generators and the two traction companies (i.e. the metropolitan train and tram operators) into the ambit of the mandatory ESMS requirements.

7.2.1. Expected benefits of the alternative

Adoption of a broader requirement for the preparation and approval of ESMS could be expected to improve the electricity safety performance of a larger proportion of the electricity industry than will be the case under the current proposals. Given the generic nature of the ESMS approach to ensuring electricity safety, it is arguable that this approach is applicable to a much wider group of participants within the electricity industry than the seven operators affected by the proposed regulations.

However, while the ESMS approach clearly has potential benefits for a wide group of electricity industry operators, these benefits are likely to be relatively smaller in respect of both the generation sector and the traction sector.

In relation to the generation sector, while the six major coal fired generation facilities constitute large scale operations, it is arguable that they lack the degree of complexity, in terms of the range of risks involved in their operations, of the transmission and distribution sectors. In particular, the general public is not exposed to the operations of the generation sector in any significant way, in contrast to the situation with regard to transmission and distribution, in which the network assets are widely distributed in the public domain and pose potential risks to non-electrical workers and to the general public. As an example, a significant proportion of recent electrical fatalities have derived from accidents involving agricultural workers coming into contact with overhead wires. By contrast, there is no known instance of workers from other industries or the general public suffering fatalities as a result of coming into contact with generation assets.

In relation to the traction sector, the key issue is that operators are already required to have Safety Management Systems in place as a result of the operation of the Rail Safety Act 2006. These SMS requirements cover the whole of the operations involved and are largely equivalent in the nature of their requirements for risk identification, assessment and control to those included in the proposed regulations. Thus, it is not likely that applying an explicit requirement to adopt an ESMS would have significant additional benefits in terms of improvement to the safety performance of this sector. It can also be noted that this sector is not one in respect of which non-compliance with the network asset regulations is known to be widespread.

Given the above, it is considered that the additional benefits consequent on extending the mandatory ESMS requirement to the generation and traction sectors may be relatively small.

7.2.2. Expected costs of the alternative

The costs associated with adopting the mandatory ESMS requirements in relation to the six coal-fired electricity generators and the two traction companies cannot be estimated precisely, since questionnaires seeking information on the expected cost of compliance with the proposed regulations were not sent to these operators. However, in the absence of specific cost estimates, the following indicative estimates have been generated.

Direct cost to operators of complying with ESMS regulations

Traction companies

As noted, an additional eight operators would be required to develop and implement approved ESMS under this alternative. Among these, the two traction companies already have SMS in place pursuant to the requirements of the Rail Safety Act 2006. It is anticipated that these SMS would be judged to be largely compliant with the ESMS requirement and that these companies would therefore face minimum additional compliance costs. The main costs involved would be those of providing copies of their existing SMS related documentation to ESV, answering queries and generating any additional materials required.

No quantitative estimates of these costs have been derived as there is necessarily uncertainty as to the extent of any additional requirements that would be imposed in practice as well as the scope for regulatory harmonisation arrangements to be adopted between the rail safety regulator and ESV in order to reduce any regulatory overlap and/or inconsistency and thus limit any additional cost. In general, as noted above, additional costs for these operators are expected to be small.

Generation sector

As noted above, no direct estimates on compliance costs for the coal-fired generation sector have been generated. In the absence of such data, an indicative estimate of the cost to this sector can be obtained by adopting the assumption that the per-operator cost of developing, implementing and maintaining ESMS would be similar to that incurred by the transmission sector. This assumption reflects the fact that:

- Unlike the distribution sector, the cost estimates made in relation to the transmission sector are based on the need for operators to undertake initial development of an ESMS, as they do not currently have a compliant ESMS in place. This assumption would reflect the reality faced by the generation sector.
- The lower estimated cost per business for the transmission sector (cf distribution) is likely to better reflect the position faced by generators, given that their assets are geographically limited in extent and are not accessible to the general public.

On the basis of this assumption, this alternative would imply additional costs of:

6 x $1,646,766 = $9,880,596 in present value terms over 10 years.

These costs would be additional to the total costs of $16,780,969 estimated above in relation to the development, implementation and review of ESMS within the transmission and distribution sector. Thus the estimated total costs of ESMS development, implementation and review under this alternative are equal to:

($16,780,969 + $9,880,596) = $26,661,565.

Regulatory administration costs

The above analysis of the ESMS related costs of regulatory administration and enforcement that would be borne by ESV under the proposed regulations concluded that these costs would total $563,908 in present value terms over 10 years. As noted, the number of operators that would be regulated under the proposed regulations is seven. By contrast, under this alternative, a total of 15 operators would be required to have approved ESMS in place, albeit that two of these 15 would be expected to rely on existing SMS prepared under the Rail Safety Act 2006.

This comparison suggests that the size of the regulatory administration and enforcement function that ESV would be required to undertake were this alternative to be adopted is approximately double that which would be required under the proposed regulations. Thus, likely regulatory administration and enforcement costs to ESV are estimated to be of the order of $1.1 million in present value terms over 10 years under this alternative.

8. Conclusion

Given the fact that a full quantification of all benefits and costs associated with the proposed regulations and three alternatives identified has not proven possible, the relative merits of these different alternatives have been assessed using a multi criteria analysis (MCA), as recommended in the Victorian Guide to Regulation.

The base case against which each of the alternatives has been measured is one in which the Electricity Safety (Network Assets) Regulations 1999 would continue in existence. As noted elsewhere these regulations, which are due to sunset in December 2009, are not expected to be replaced, provided that the proposed regulations are brought into effect. However, were the proposed regulations not to be made, it would be necessary to re-make the network assets regulations. This reflects the fact that there would be significant difficulties and uncertainties associated with the practical implementation of the compulsory ESMS requirements of the Act in the absence of the detailed specification of what matters are to be included in ESMS via the proposed regulations.

The proposed regulations and the identified alternatives have been assessed using three criteria. These are expected costs, expected regulatory effectiveness (i.e. benefit) and certainty of compliance. These three criteria have, implicitly, being given equal weighting. The following explains the assessment of each option made under each criterion and provides the basis for the allocated scores, as set out in the following table.

Regulatory costs

Quantitative estimates of the costs likely to be imposed have been derived in the case of two of the four alternatives under consideration: the proposed regulations and the alternative of broadening the scope of the ESMS requirements to include the generation and traction sectors. The estimated cost of adopting the proposed regulations total $17.3 million over 10 years in present value terms, comprising $16.8 million in ESMS development, maintenance and implementation costs, to be borne by MECs and $0.6 million in a regulatory administration and enforcement costs to be borne by ESV[54].

By contrast, the estimated cost of adopting the alternative of applying the mandatory ESMS requirement more broadly has been estimated at $27.8 million over 10 years in present value terms, comprising $26.7 million in ESMS development, maintenance and administration costs and $1.1 million in a regulatory administration and enforcement costs.

[54] A rounding issue accounts for the fact that these two cost estimates differ slightly from the total cost figure given. It should also be noted that the costs to ESV are expected to be recovered through the industry levy arrangements that are already in place.

It should be noted that these costs exclude the substantive costs associated with compliance with the requirements of the ESMS itself (as distinct from the costs of complying with the requirement to develop and adopt an ESMS). The size of these costs is necessarily much more difficult to estimate accurately. However, these costs are clearly substantially larger than the direct – essentially "administrative" costs of developing and adopting ESMS.

An indicative estimate of $468.2 million has been developed in respect of the proposed regulations, this estimate being based on actual expenditures reported to ESC as part of the price-setting process. There is little substantive basis upon which to develop an equivalent estimate of the substantive compliance costs of the alternative of a broader application of the ESMS requirement. Train and tram operators would be likely to incur few, if any, additional substantive compliance costs, since they already operate under SMS arrangements under the Rail Safety Act. Additional substantive costs may well be incurred within the generation sector. However, the size of these costs is impossible to estimate: none of the operators in this sector is currently operating under voluntary ESMS, so that there is no direct basis for estimation.

Quantitative estimates of the remaining two alternatives – i.e. those of adopting either increasing or decreasing degrees of prescription in the regulations specifying the specific ESMS requirements - have not been able to be derived. This reflects the fact that numerous different variants of these two alternatives could be specified, and there is no obvious bases for settling on one particular specification.

However, a qualitative assessment suggests that ESMS related costs would be increased under a more prescriptive regime, while they could be expected to be reduced to some extent under a less prescriptive option. However, the extent of the costs associated with feasible degrees of increased prescription in the regulated ESMS requirements will necessarily be substantially less than those associated with the option of extending the ESMS requirements to the generation and traction sectors.

Consequently, the alternative of adopting less prescriptive regulatory requirements governing ESMS constitutes the lowest cost option and scored five points. The proposed regulations constitute the next lowest cost option, scoring four points. The option of adopting an increased degree of prescription scores three points, while the option of broadening the scope of the ESMS requirements, being the highest cost option, scores two points. While the adoption of a broader ESMS requirement is the highest cost option among the four considered, the anticipated costs under this alternative still remain substantially lower than those that would be expected to be incurred in the base case. As discussed above, this reflects the fact that substantial moves toward achieving "literal compliance" with even a revised and remade version of the network assets regulations is expected to prove much more costly than the adoption of a risk management-based approach. Consequently, all the alternatives considered receive positive scores against this criterion.

Regulatory effectiveness (benefit)

Expected regulatory benefits have not been able to be quantified in respect of any of the four alternatives under consideration. This reflects a range of factors, including the impossibility of observing actual performance in an unregulated environment and the wide range of factors that contribute to the actual observed performance of the electricity operators. However, indicative quantitative analyses have been presented in order to demonstrate in general terms the size of the benefits associated with even relatively modest improvements in safety and reliability performance.

It has also been noted that the implementation of voluntary ESMS over the past several years has coincided with a trend toward generally improving safety and reliability performance. ESV expects that the adoption of mandatory ESMS throughout the distribution and transmission sectors will lead to further performance improvements. The detailed discussion contained in section six set out the underlying bases for the belief that regulatory effectiveness in the context of the process-based ESMS requirements will be substantially higher than under the base case of complete reliance on a prescriptive regime, as represented by the network assets regulations.

Consequently, all four of the alternatives considered also receive a positive score against the criterion of regulatory effectiveness. Alternative two, involving the broader application of the mandatory ESMS requirements receives the highest score against this criterion. While the substantial majority of the benefits of adopting ESMS are believed to be likely to accrue to the transmission and distribution sectors, it can nonetheless be expected that some additional benefits would be obtained through the extension of these requirements to the generation sector. As noted above, the traction sector already adopts substantively similar requirements and so would not be expected to be a significant source of additional benefits under this alternative.

The proposed regulations score next highest, with four points. By comparison, both the options of increased and reduced degrees of prescription in the ESMS requirement score slightly lower, at three points. The option of adopting a more prescriptive approach provides a higher level of control by ESV officials over the form and extent of ESMS. However, this will only lead to improved regulatory performance if sufficient expertise exists within the regulatory agency to both ensure that the additional prescriptive requirements set out in the regulations are the most appropriate to be applied to the specific circumstances of the regulated entities, and if the regulations are able consistently to be reviewed and revised in a timely manner in response to ongoing changes in those businesses and their regulatory environment. It is considered that any substantial increase from the current level of prescription would not allow these conditions to be fully met. Hence, this option scores marginally lower against this criterion than the proposed regulations.

Conversely, a reduction in the level of prescription of the ESMS requirements is believed to be associated with a significant risk that not all MECs would adopt sufficiently robust and far reaching ESMS. Without sufficient degree of regulatory prescription, ESV would be relatively poorly placed to insist on expansions and improvements in proposed ESMS

in this context. Thus, this option scores slightly lower than the proposed regulations, with three points.

Certainty of compliance

Again, all the alternatives assessed achieve positive scores on this criterion. This reflects the fact that there continues to be significant long-term non-compliance with aspects of the prescriptive requirements of the network assets regulations (as documented by ESC, among others) which form the base case against which the alternatives are assessed.

The option of adopting a more prescriptive ESMS requirements scores most highly against this criterion. This reflects the view that a greater degree of prescription should allow ESV to exercise a greater degree of control over the form and content of ESMS of our approved in practice. This, in turn, would be expected to facilitate regulatory administration and enforcement activities. Consequently, this alternative scores five points.

Both the proposed regulations and the alternative of broadening the scope of the ESMS requirement score four points against this criterion. This reflects the fact that the latter alternative is seen as containing a similar degree of regulatory prescription to the proposed regulations. Finally, the alternative of adopting a reduced degree of prescription in the regulated ESMS requirements scores lowest, at three points. This reflects the fact that the use of a reduced degree of prescription would be expected to yield significant uncertainties as to whether approved ESMS adequately addressed all relevant risk concerns.

Table 9: Multi-Criteria Analysis Results Summary

	Cost	**Benefit (regulatory effectiveness)**	**Certainty of compliance**	**Total**
Proposed regulation	+4	+4	+4	**12**
Increased ESMS prescription	+3	+3	+5	**11**
Reduced ESMS prescription	+5	+3	+2	**10**
Broadened scope of ESMS	+2	+5	+4	**11**

Table 9 shows that the proposed regulations receive the highest total score, with 12 points. Both the alternative of broadening the scope of the ESMS requirement and that of adopting a more prescriptive set of ESMS regulations score 11 points. The option of adopting a less prescriptive ESMS requirements scores lowest, at 10 points. Given the

above, the proposed regulations are preferred to any of the alternatives identified. It is therefore intended to proceed with the making of the proposed regulations.

9. Administrative burden statement

As a result of the Victorian Government's *Reducing the Regulatory Burden* initiative, where new legislation or regulation would be likely to impose significant new administrative burdens on business, these must be assessed according to a Standard Cost Model (SCM) methodology and an SCM report prepared which identifies the extent of the increase in administrative burdens.

Administrative burdens are defined as costs incurred by business to demonstrate compliance with regulation or to allow government to administer regulation[55]. Given this definition, the administrative burdens identified in respect of the proposed regulations are those relating to the establishment and maintenance of incident recording and reporting systems. Specifically, these are:

- The cost of establishing and maintaining record keeping systems (regulation 22(1));
- the cost of completing and sending quarterly reports to ESV (regulation 23(1)); and
- the cost of maintaining the required records (regulation 22(2)).

Data obtained via the questionnaire process indicate that the estimated time for completion of these requirements was a one-off input of 40 person hours for the initial establishment of record-keeping systems and an annual input of 1390 person hours for completion of the other tasks enumerated above. Given the reported average hourly labour cost of $73.62, this implies that the average cost of complying with the administrative burdens contained within the proposed regulations is equal to:

- A one-off cost of (40 hours x $73.62/hr) = $2944.80; and
- an annual cost of (1390 hours x $73.62/hr) = $102,331.80.

In present value terms, this is equal to $853,898.41 over ten years. This constitutes the total administrative burden for each electrical operator affected by the regulations. To determine the net change in administrative burdens, it is necessary to compare the identified burdens with those imposed by the current regulations. As noted elsewhere, five of the seven electrical operators that will be required to comply with the proposed regulations already have an approved ESMS in place under the current regulations. Consequently, the incremental change in administrative burdens is equal to the total cost of the administrative burdens imposed upon the two operators who do not currently have ESMS, plus the incremental cost of moving from current record keeping and reporting requirements to those imposed under the proposed regulations.

[55] *Measurement of Changes in Administrative Burdens: Interim Guidelines Issued by the Treasurer*. Effective from 2 October 2006.

Questionnaire responses and discussions with operators who currently have ESMS in place indicated that they did not believe that the reporting and record-keeping requirements contained in the proposed regulations would lead to any increases in the costs that they currently incur in these areas. Consequently, the increase in administrative burdens that is expected to occur as a result of the adoption of the proposed regulations is simply the total administrative burden cost that will be borne by the two operators that do not currently have ESMS in place and will be required to adopt ESMS.

As noted above, the average cost per operator is estimated at $853,898.41 in present value terms over 10 years. Thus, the expected increase in administrative burdens as a result of the adoption of the proposed regulations is approximately $1.7 million in present value terms over 10 years.

Given the small size of these estimated increases in administrative burdens, a formal SCM assessment will not be undertaken in respect of these regulations. However, it should be noted that the basis for the above estimates shares much with the SCM methodology and is considered to provide a relatively reliable estimate.

10. National competition policy assessment

The National Competition Policy Agreements ("NCPA") set out specific requirements with regard to all new legislation adopted by jurisdictions that are party to the agreements. Clause 5(1) of the Competition Principles Agreement sets out the basic principle that must be applied to both existing legislation, under the legislative review process, and to proposed legislation:

> *The guiding principle is that legislation (including Acts, enactments, Ordinances or Regulations) should not restrict competition unless it can be demonstrated that:*
>
> *(a) The benefits of the restriction to the community as a whole outweigh the costs; and*
> *The objectives of the regulation can only be achieved by restricting competition.*

Clause 5(5) provides a specific obligation on parties to the agreement with regard to newly proposed legislation:

> *Each party will require proposals for new legislation that restricts competition to be accompanied by evidence that the restriction is consistent with the principle set out in sub-clause (1).*[56]

Accordingly, every regulatory impact statement must include a section providing evidence that the proposed regulatory instrument is consistent with these NCP obligations. The recently released OECD Competition Assessment Toolkit[57] provides a checklist for identifying potentially significant negative impact on competition in the RIA context. This is based on the following three questions:

- Does the proposed regulation limit the number or range of suppliers?
- Does the proposed regulation limit the ability of suppliers to compete?
- Does the proposed regulation limit the incentives for suppliers to compete vigorously?

According to the OECD, if all three of these questions can be answered in the negative, it is unlikely that the proposed regulations will have any significant negative impact on competition.

The proposed regulations do not contain any of the restrictions highlighted in the above three-part questionnaire proposed by the OECD (and reproduced in the Victorian Guide

[56] Clause 5, Competition Principles Agreement, 11 April 1995 accessed at www.ncc.gov.au/pdf/PIAg-001.pdf

[57] See *Integrating Competition Assessment into Regulatory Impact Analysis.* OECD, Paris, 2007. (DAF/COMP(2007)8).

to Regulation). It can also be noted that the regulations apply equally to transmission and distribution sector operators, while the majority of the affected parties are already meeting ESMS requirements that are broadly similar to those that will be imposed via the proposed regulations. Consequently, it is not considered that compliance with these regulations will constitute a significant compliance burden and hence barrier to continued operation within the industry for any of the affected parties.

Therefore it is concluded that the proposed regulations will have no material adverse impact on competition.

11. Consultation

As discussed above, the majority of the MECs that will be required to comply with the proposed regulations already operate under voluntary ESMS. ESV maintains an ongoing dialogue with all the affected operators including, but not limited to, the continuing monitoring of existing ESMS.

Specific consultation in relation to the substance of the proposed regulations commenced with a number of workshops that were held with electricity operators during the development of the 2008 amendments to the Act. Subsequently, an e-mailed request for comment was sent to affected operators in March 2007. This e-mail pointed out that a key ESV objective in developing the proposed regulations was to maximise the degree of consistency between the proposed ESMS requirements and the equivalent requirements of the Gas (Safety Case) Regulations. One response was received to this e-mail.

A subsequent e-mail request for comment was sent to the Electrical Trades Union and to affected operators in March 2008, and contained a draft of the proposed regulations. A further three responses from MECs were received to this e-mail.

All parties indicated general support for the adoption of compulsory ESMS requirements. None raised any major concerns with the key elements of the proposed regulations. Rather, the responses received focused on the achievement of improved clarity in some areas and consistency with the Act and other instruments. The ETU also noted the importance of ensuring an adequate degree of rigour in auditing activity in relation to ESMS. ESV has discussed ETU's concerns with them and will continue to liaise with the ETU regarding the content of the regulations and how they will be administered by ESV.

Under the proposed Electricity Safety (Management) Regulations, there is a requirement for a prospective scheme operator to specify the published technical standards to be applied to the subject matter of the scheme. ESV also intends to ensure there is an appropriate audit regime for ESMSs and has the power under the Electricity Safety Act to require scheme operators to obtain independent validation of their schemes.

As the next stage in the public consultation process, this RIS will be released for a public consultation period of 28 days, as required under the Subordinate Legislation Act 1994. While Victorian Government policy favours the adoption of a 60 day consultation period for RIS where practicable, the imminent sunsetting of the current regulations, combined with the need to ensure that the proposed regulations are in place prior to the 2007 amendments to the Act coming into effect on 1 January 2010, mean that this longer consultation period is not feasible in the current circumstances.

Appendix 1: Proposed Electricity Safety (Management) Regulations

Electricity Safety (Management) Regulations

Exposure Draft

TABLE OF PROPOSALS

Victoria

Electricity Safety (Management) Regulations

Exposure Draft

PART 1—PRELIMINARY

1 Objective

The objective of these Regulations is to provide for the requirements, procedures and other matters relating to the acceptance of electricity safety management schemes.

2 Authorising provisions

These Regulations are made under sections 150 and 157 of the **Electricity Safety Act 1998**.

3 Commencement

These Regulations come into operation on 13 December 2009.

4 Revocation

The following Regulations are **revoked**—

(a) the Electricity Safety (Management) Regulations 1999[1];

(b) the Electricity Safety (Management) (Amendment) Regulations 2001[2];

(c) the Electricity Safety (Management) (Amendment) Regulations 2003[3].

5 Definitions

In these Regulations—

access authority system has the meaning given by regulation 6;

applicable asset means—

(a) a supply network owned or operated by an MEC; or

(b) a complex electrical installation;

emergency service means—

(a) the Chief Commissioner of Police;

(b) an ambulance service;

(c) the Country Fire Authority;

(d) the Metropolitan Fire and Emergency Services Board;

(e) the State Emergency Service;

(f) the Department of Sustainability and Environment;

employer operator means—

(a) an employer of electrical workers who is entitled to make an application under section 114 of the Act;

(b) an occupier of specified premises who is entitled to make an application under section 115 of the Act;

MEC means a major electricity company;

published technical standard means a document giving technical information, guidance or advice published by—

(a) Standards Australia; or

(b) Standards New Zealand; or

(c) the British Standards Institute; or

(d) the International Organisation for Standardisation; or

(e) the International Electrotechnical Commission; or

(f) any similar standards organisation within or outside Australia approved by Energy Safe Victoria; or

(g) Energy Safe Victoria;

relevant asset operator means—

(a) an MEC; or

(b) an owner of a complex electrical installation who is entitled to make an application under section 116 of the Act;

scheme operator means an employer operator or relevant asset operator;

the Act means the **Electricity Safety Act 1998**.

6 Meaning of *access authority system*

(1) For the purpose of these Regulations, an ***access authority system*** is, for a safety management system for an applicable asset, a system—

(a) under which access to, or the carrying out of work on or near, the applicable asset or part of the applicable asset to which the electricity safety management scheme relates is controlled; and

(b) under which an access authority may be issued for the purpose of allowing access to, or the carrying out of work on or near, the applicable asset or part of the applicable asset to which the electricity safety management scheme relates; and

(c) that specifies the positions of the persons who are authorised by the relevant asset operator to issue an access authority and to supervise that access or the carrying out of that work; and

(d) that ensures that persons authorised to issue an access authority, and persons carrying out that work under an access authority—

(i) are competent to do so; and

(ii) are provided with appropriate training, procedures, tools, equipment and emergency support.

(2) For the purpose of these Regulations, an ***access authority system*** is, for a safety management system for electrical work carried out by electrical workers employed by an employer operator, a system—

(a) under which the following is controlled—

(i) access to an electrical installation or electrical equipment while electrical work to which the electricity safety management scheme relates is being carried out on the installation or equipment;

(ii) the carrying out of work near an electrical installation or electrical equipment while electrical work to which the electricity safety management scheme relates is being carried out on the installation or equipment; and

(b) under which an access authority may be issued for the purpose of allowing access to, or the carrying out of work near, an electrical installation or electrical equipment while electrical work to which the electricity safety management scheme relates is being carried out on the installation or equipment; and

(c) that specifies the positions of the persons who are authorised by the employer operator to issue an access authority and to supervise that access or the carrying out of that work; and

(d) that ensures that persons authorised to issue an access authority, and persons carrying out that work under an access authority—

(i) are competent to do so; and

(ii) are provided with appropriate training, procedures, tools, equipment and emergency support.

PART 2—SAFETY MANAGEMENT SCHEMES

Division 1—Content of electricity safety management scheme

7 Person responsible for supply network or installation, or carrying out of electrical work

An electricity safety management scheme must specify—

(a) in the case of a relevant asset operator, the title of the position and the business address of the person who has ultimate responsibility for the management, control and safe operation of the applicable asset; and

(b) in the case of an employer operator, the title of the position and the business address of the person who has ultimate responsibility for the management, control and safe carrying out of electrical work to which the scheme relates.

8 Person responsible for electricity safety management scheme

An electricity safety management scheme must specify the title of the position of the person who is responsible for preparation and submission of the scheme.

9 Scheme description—employer operators

(1) An electricity safety management scheme submitted by an employer operator must contain a description of—

(a) the electrical work to which the scheme relates; and

(b) the electrical installation or electrical equipment in relation to which that work is carried out.

(2) The description must provide sufficient information to enable Energy Safe Victoria to—

(a) identify the location, extent and scope of the electrical installation or electrical equipment requiring the electrical work; and

(b) assess the risks associated with the safety of the electrical installation or electrical equipment.

10 Scheme description—relevant asset operators

(1) An electricity safety management scheme submitted by a relevant asset operator must contain a description of the design, construction, operation and maintenance of the applicable asset to which the scheme relates.

(2) The description must provide sufficient information to enable Energy Safe Victoria to identify the location, extent and scope of the applicable asset and to assess the risks associated with the safety of the applicable asset.

11 Formal safety assessment

(1) An electricity safety management scheme must contain a formal safety assessment relating to, as the case requires—

(a) the carrying out of electrical work for the employer operator; or

(b) the relevant asset operator's applicable asset.

(2) The formal safety assessment must be consistent with the applicable scheme description and must provide—

(a) a description of the methodology used and investigations undertaken for the formal safety assessment; and

(b) an identification of hazards having the potential to cause a serious electrical incident; and

(c) a systematic assessment of the risks associated with, as the case requires—

(i) the electrical work that is carried out in relation to an electrical installation or electrical equipment; or

(ii) the applicable asset—

including the likelihood and consequences of a serious electrical incident; and

(d) a description of technical and other measures undertaken or to be undertaken to reduce those risks as far as practicable.

(3) In this regulation, ***applicable scheme description*** means—

(a) for electrical work to be carried out, the scheme description required by regulation 8;

(b) for an applicable asset, the scheme description required by regulation 9.

12 Exemptions to be specified

For the purpose of section 117 of the Act, an electricity safety management scheme submitted under Division 3 of Part 10 of the Act must specify—

(a) all provisions of the regulations relating to—

(i) the installation and operation of electrical installations; or

(ii) supply networks—

from which the scheme operator seeks to be exempted; and

(b) in the case of a scheme under which a person authorised under the scheme to carry out a class or type of electrical work is to be exempt from compliance with—

(i) any of the regulations relating to the carrying out of that class or type of work; or

(ii) the provisions referred to in section 117(1) of the Act—

all provisions of the regulations relating to the carrying out of that class or type of work and the provisions referred to in that section from which the person seeks to be exempted; and

(c) in the case of a scheme under which a person carrying out a specified class or type of electrical work on the specified premises to which the scheme applies is to be exempt from compliance with—

(i) any of the regulations relating to the carrying out of that class or type of work; or

(ii) the provisions referred to in section 117(2) of the Act—

all provisions of the regulations relating to the carrying out of that class or type of work and the provisions referred to in that section from which the person seeks to be exempted.

Division 2—Content of safety management system

13 Safety management system

(1) An electricity safety management scheme must specify a safety management system that complies with this Division to be followed in relation to the safety of, as the case requires—

(a) the design, construction, operation, maintenance and decommissioning of the applicable asset owned or operated by the relevant asset operator; or

(b) the electrical work carried out or to be carried out by the persons authorised by the employer operator.

14 Safety policy

A safety management system must specify—

(a) the safety policy; and

(b) the titles of the positions and the duties of the persons responsible for the implementation of the safety policy.

15 Published technical standards

A safety management system must specify the published technical standards to be applied, as the case requires—

(a) in the design, construction, commissioning, installation, operation, maintenance and decommissioning of an applicable asset owned or operated by the relevant asset operator; or

(b) in connection with electrical work to be carried out by the persons authorised by an employer operator.

16 Applicable assets—asset management plan requirements

A safety management system must specify the asset management plan for an applicable asset by which a relevant asset operator will ensure that the design, construction, commissioning, installation, operation, maintenance and decommissioning of the applicable asset and any modification of the applicable asset—

(a) are adequate to ensure the safety and safe operation of the applicable asset; and

(b) take into account the results of the formal safety assessment for the applicable asset; and

(c) meet any published technical standards specified in the safety management system; and

(d) provide adequate means of automatically isolating the applicable asset or any part of the applicable asset in the event of an emergency; and

(e) provide adequate means of preventing unauthorised access by the public to the applicable asset.

17 Requirements in relation to electrical work

A safety management system for the carrying out of electrical work must specify the means by which an employer operator will ensure that the electrical work—

(a) is adequate for the safe operation of the electrical installation or electrical equipment in relation to which electrical work is carried out; and

(b) takes into account the results of the formal safety assessment for the scheme; and

(c) meets any published technical standards specified in the safety management system; and

(d) is carried out by the persons authorised to carry out the work.

18 Access authority system

(1) The safety management system for an electricity safety management scheme submitted by a relevant asset operator must specify—

(a) the applicable asset or part of the applicable asset for which an access authority system needs to be established; and

(b) the access authority system that is to apply in respect of—

(i) the operation or maintenance of the applicable asset or the part of the applicable asset; or

(ii) work that is to be carried out on or near the applicable asset or part of the applicable asset.

(2) The safety management system for an electricity safety management scheme submitted under section 115 of the Act must specify—

(a) the electrical work carried out or to be carried out on or near an electrical installation or electrical equipment at the premises to which the scheme applies for which an access authority system needs to be established; and

(b) the access authority system that is to apply to that work.

19 Emergency preparedness

(1) A safety management system must specify a response plan designed to address all reasonably foreseeable emergencies which have been identified through the formal safety assessment.

(2) The response plan must—

(a) ensure the safety of the public; and

(b) specify a system for communications between the scheme operator and any other person who may be affected by an emergency referred to in subregulation (1); and

(c) in the case of a relevant asset operator, specify the means by which the asset operator will ensure the continued safety of the relevant applicable asset and its operation; or

(d) in the case of an employer operator, the means by which the operator will ensure the continued safety of electrical work being carried out on electrical installations and electrical equipment.

20 Internal monitoring, auditing and reviewing

(1) A safety management system must specify the means by which the scheme operator will—

(a) monitor and audit the implementation of the safety policies and procedures specified in the safety management system; and

(b) review the adequacy of those policies and procedures.

(2) A safety management system must specify the means to be used to ensure—

(a) regular and systematic identification of deficiencies in those policies and procedures and in their implementation; and

(b) systematic improvement in those policies and procedures and in their implementation.

21 Key performance indicators

A safety management system must specify—

(a) the key performance indicators to be used to determine the scheme operator's level of compliance with the electricity safety management scheme, the relevant provisions of the Act and the regulations made under the Act; and

(b) the process to be adopted to analyse the key performance indicators and to ensure that appropriate action is taken to improve compliance if required.

22 Incident recording, investigation and reviewing

A safety management system must specify—

(a) the means to be used for recording and investigating serious electrical incidents involving, as the case requires—

(i) a relevant asset operator's applicable asset; or

(ii) electrical work carried out by an electrical worker employed or engaged by an employer operator; and

(b) the management systems to be used for reviewing and taking action on the information so recorded or arising from those investigations.

23 Competence and training

(1) The safety management system for an electricity safety management scheme submitted by a relevant asset operator must specify the work and staffing systems required for the safe design, construction, operation, maintenance and decommissioning of the asset operator's applicable asset to ensure that—

(a) the minimum level of qualifications, skill and competence that is required to perform those activities is established; and

(b) only persons with the appropriate qualifications, skills and competence are assigned to perform those activities; and

(c) any training necessary for persons assigned to perform those activities is provided.

(2) The safety management system for an electricity safety management scheme submitted by an employer operator must specify the work and staffing systems used in carrying out the electrical work to which the scheme relates to ensure that—

(a) the minimum level of qualifications, skill and competence that is required for the carrying out of the electrical work is established; and

(b) only persons with the qualifications, skills and competence appropriate to the work are assigned to carry out that work; and

(c) any training necessary for persons assigned to carry out the work is provided.

PART 3—RECORDS AND REPORTING

24 Records

(1) An accepted ESMS operator must, in accordance with this regulation, establish and maintain a system for keeping records relating to its accepted ESMS.

Penalty: 20 penalty units.

(2) The records required to be kept under subregulation (1) are—

(a) the accepted ESMS; and

(b) any revisions of the accepted ESMS; and

(c) any written audit reports of the accepted ESMS;

(d) any reports of investigations of incidents involving—

(i) in the case of an employer operator, the carrying out of electrical work;

(ii) in the case of an MEC, the MEC's supply network;

(e) a copy of each report given by the accepted ESMS operator to Energy Safe Victoria; and

(f) in the case of an employer operator, a register of the names and qualifications of persons nominated to carry out electrical work under the accepted ESMS.

(3) The records must be kept—

(a) at the address nominated by the accepted ESMS operator in the accepted ESMS; and

(b) in a manner that makes their retrieval reasonably practicable; and

(c) in a secure manner; and

(d) for the period of 7 years after the creation of the record.

25 Relevant asset operator requirements for reporting of serious electrical incidents

(1) For the purposes of section 142(1) and (2) of the Act, an electricity supplier that is a relevant asset operator must report a serious electrical incident in the form of a statistical summary on a quarterly basis.

(2) Despite subregulation (1), for the purposes of section 142(1) and (2) of the Act, an electricity supplier that is a relevant asset operator must report a serious electrical incident as soon as practicable after it occurs if the incident—

(a) involves a transmission line; or

(b) causes the death of or injury to a person; or

(c) causes significant property damage; or

(d) causes significant disruption to the community; or

(e) involves an imminent risk of electrocution.

(3) The report of a serious electrical incident to which subregulation (2) applies must specify, to the extent that the information is available to the relevant asset operator—

(a) the nature of the incident; and

(b) where and when the incident occurred; and

(c) the cause of the incident; and

(d) particulars of any person involved in the incident; and

(e) whether any emergency service attended the incident; and

(f) what remedial actions (if any) were taken by the asset operator; and

(g) what actions are proposed to prevent a repetition of the incident.

(4) In subregulation (2)—

transmission line means an electric line that is—

(a) owned or operated by an MEC that is a transmission company; or

(b) a complex electrical installation.

PART 4—GENERAL

26 Exemptions from regulation requirements

(1) Energy Safe Victoria may, on the application of the scheme operator, exempt an electricity safety management scheme from any of the requirements of these Regulations.

(2) An exemption under subregulation (1) may be subject to conditions (if any) specified by Energy Safe Victoria.

(3) An application must be in writing and state—

(a) the name, address and telephone number of the applicant; and

(b) the exemption requested; and

(c) the reasons for applying for the exemption.

ENDNOTES

[1] Reg. 4(a): S.R. No. 140/1999.

[2] Reg. 4(b): S.R. No. 8/2001.

[3] Reg. 4(c): S.R. No. 149/2003.

Appendix 2: Compliance costs questionnaire

Questionnaire

Electricity Safety (Management) Regulations 2009

Introduction

We are interviewing you in order to obtain estimates of the expected costs of complying with the proposed *Electricity Safety (Management) Regulations 2009*. We request that you attempt to complete the following questionnaire prior to the interview being conducted. The interview will provide an opportunity to discuss and clarify any questions or issues in completing the questionnaire. You will be invited to submit a final questionnaire response after the interview has been completed.

We are seeking to understand the full costs of complying with the regulations for an operator who does not currently have an electricity safety management scheme (ESMS) in place, as well as the costs incurred in undertaking the required five-yearly review and revision of an ESMS. The proposed regulations are substantially similar to the existing *Electricity Safety (Management) Regulations 1999*. Consequently, if you currently have an ESMS in place, the historical costs you have incurred in complying with the existing regulations are likely to provide significant guidance as to the expected costs of compliance for a new entrant (or other operator who would be developing an ESMS for the first time). However, we request that you highlight any areas in which the proposed regulations are likely to have significantly different compliance costs to those of the existing regulations when preparing your responses.

The approach taken in the following questionnaire is to seek to identify each individual requirement that you must fulfil in order to comply with the regulations. However, where you are unable to provide time or cost estimates in relation to individual tasks, you are requested as an alternative approach to provide aggregated estimates of the costs of a particular set of tasks, where possible.

Where compliance activities are undertaken internally, you are asked to estimate the amount of staff time required to complete the task. The total time taken to complete all tasks is then multiplied by average costs for wages and overheads (i.e. average weekly earnings plus percentage for overheads) to obtain an estimate of the total costs involved. If you believe that the average wage cost of staff involved in completing these regulatory compliance tasks significantly exceeds average weekly earnings, this should be indicates in your response.

Where tasks are completed by external service providers, you are requested to provide the total cost of having the task completed by these external providers.

This method has been specified by the Government as a standardised approach required to be used by all regulatory agencies.

Problems/queries

For assistance with any problems or queries in completing the questionnaire, please contact Mr Rex Deighton-Smith, Director, Jaguar Consulting Pty Ltd. [ph: 9500 0212, mob: 0402 129 121, em: jaguar@bigpond.net.au]

1. Content of Electricity Safety Management Scheme

Task	Time to complete[58]	Frequency[59]	Comments
Scheme description (reg 8 or reg 9)			
Formal safety assessment (reg 10)			
Exemptions (reg 11) (for employer operator schemes only)			
Safety Management System (see next question)	XXXXXX	XXXXXXXXX	XXXXXXX

Comments on this section:

[58] Insert cost of task if completed by an external service provider.

[59] i.e. the frequency with which the task must be completed.

2. Safety Management system[60]

Task	Time to complete[61]	Frequency	Comments
Development/documentation of safety policy (reg 13(a))			
Identification of staff responsible for safety policy (reg 13(b))			
Identification of relevant technical standards (reg 14)			
Identification of requirements for safe electrical work – employer operators (reg 15(1))			
Specification of asset management plan – major electricity companies (reg 15(2)			
Specification of access authority system (reg 16)			
Development of and documentation of emergency response plan (reg 17)			
Development of monitoring, auditing & reviewing processes (reg 18)			
Specification of Key Performance Indicators (reg			

[60] Note that the cost of documenting completion of each of these tasks should be included in your estimates.

[61] Insert cost if task if completed by an external service provider.

19)			
Development of incident recording, investigation & review processes & management systems (reg 20)			
Specification of work and staffing systems & establishment of minimum competencies and training (reg 21)			
Establishing record-keeping system (reg 22)			

Comments on this section:

3. Reporting & record-keeping requirements

Task	Time to complete[62]	Frequency	Comments
Establishment of record-keeping system (Reg 22)			
Completion of quarterly report (reg 23(1)			
Incident reporting (reg 23(2) & (3)			
Maintenance of required records			

[62] Insert cost if task is completed by an external service provider.

(SMS, revisions to or audits of SMS, investigation reports, reports to ESV)			

Comments on this section:

Appendix 3: List of Incidents Involving Fallen Transmission Towers or Conductors

6 January 1999, 0000 – South Morang – Dederang 330 kV line
Both lines initially tripped but the No 1 line successfully reclosed. Three towers on the No 2 line fell down.

12 November 2001, 0428 – West Melbourne – Keilor No 1 220 kV line
Conductor fallen in Kensington area due to broken shackle on insulator string

6 February 2002, 0848 – Ballarat – Bendigo 220 kV line
Conductor fallen near Ballarat Terminal Station due to helicopter cutting bottom conductor

9 October 2003, 0002 – Geelong – Keilor No 1 220 kV line
Insulator string of top conductor failed three towers out from Geelong Terminal Station.

8 July 2004, 0523 – Hazelwood Terminal – Rowville No 4 500 kV line
Earth wire between rack and first tower fell on conductor within terminal station

7 September 2005, 0144 – Hazelwood Power – Rowville No 1 220 kV line
Suspension insulator string on middle phase failed. Conductor found on ground near Trafalgar

30 January 2007, 0619 – Rowville – Springvale No 2 220 kV line
Middle phase fell near residential development at Waverly Park. Insulator string had flashed over and failed. High humidity and dust from nearby earthworks may have contributed.

20 February 2007, 0441 – Brooklyn – Keilor 220 kV line
Insulator string failed on top phase, and conductor fell to the ground, damaging other two conductors on the way. Incident occurred between Glengala Road and Boundary Road, Sunshine.

26 May 2008, 0438 – Hazelwood Power – Rowville No 1 220 kV line
Insulator string failed on middle phase of a tower east of Trafalgar. Affected tower was one tower down from similar incident on 7 September 2005.

18 June 2008, 2048 – Alcoa Portland – Heywood No 2 500 kV line
Conductor had broken due to corrosion, and fell through other phases.

6 October 2008, 0311 – Eildon – Mount Beauty No 2 220 kV line
Broken conductor fell to ground due to shotgun damage.

7 February 2009, 1727 – Dederang – South Morang No 1 330 kV line
Tower near Strathewen fell during bush fire and strong winds.