

PROPOSED National Environmental Standards >> for Electricity Transmission

DISCUSSION DOCUMENT





Proposed National Environmental Standards for Electricity Transmission

Discussion Document

New Zealand Government

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Executive summary

Background

A reliable, secure and affordable supply of energy – particularly electricity – underpins our economy and is important for people's wellbeing. A resilient high-voltage electricity transmission network (national grid) is critical to ensuring security of supply and supporting renewable electricity generation. However, having a resilient grid that is responsive to our increasing demand for electricity (normally at large distances from where the electricity is generated) depends on adequate maintenance, upgrading the capacity of existing lines, and building new lines in areas where capacity is reached.

The national grid traverses 72 local and 12 regional councils and is operated by Transpower New Zealand Ltd (Transpower), a state-owned enterprise. A variety of approvals are required under the Resource Management Act 1991 (RMA) for the operation, maintenance and upgrade of the grid. A single line upgrade is likely to cross several districts, and the type of approval required depends on the requirements of each district plan, which can vary considerably between districts. This variation results in inconsistencies in the way the effects of transmission are managed, and there is scope for reducing the time spent determining the consent requirements for transmission work in each district.

The objective of the RMA is to promote the sustainable management of natural and physical resources. The definition of 'physical resource' includes structures such as the high-voltage electricity transmission infrastructure (the national grid). Sustainable management requires protecting this resource from the adverse effects of activities carried out in proximity to the grid. Electricity transmission also has adverse effects on the environment, and sustainable management in this context requires managing these effects.

Developing national environmental standards

National environmental standards (NES) can ensure that planning controls for electricity transmission are appropriate and nationally consistent, and can also manage activities that could endanger the integrity of the national grid if carried out near the lines.

The proposal to introduce NES is part of a wider government exercise to provide national guidance under the RMA on network infrastructure, including telecommunications and electricity generation. The first step was an investigation of the merits and potential scope of a range of options by the Reference Group on Electricity Transmission, comprising representatives from central and local government, landowners and industry. After evaluating the options, the Reference Group consulted with stakeholders and concluded that NES would be the best option for providing detailed national guidance on electricity transmission. On the basis of the Reference Group's report, the Government decided to consult on a proposed national policy statement (NPS) and proposals for NES for electricity transmission.

An NPS was released for consultation by an independent board of inquiry in May 2007 and submissions closed on 24 June (see Appendix 1). The board will report back to the Minister for the Environment in December 2007.

This discussion document follows on from the initial consultation on proposals for national guidance and direction under the RMA for electricity transmission. It builds on the work of the

Reference Group by setting out resource management issues faced in managing the operation, maintenance and upgrading of the electricity transmission network, and describes how standards under the RMA have the potential to resolve some of these issues. It then seeks your input on the preferred option for NES.

The proposed standards

This document proposes two NES. A *transmission activities NES* would set out a framework for managing the effects of electricity transmission operation, maintenance and upgrade activities, which would be consistently applied across all districts. The proposed NES would allow transmission activities that do not have significant adverse effects to be carried out without resource consent, subject to terms and conditions to limit the effects. Activities beyond the thresholds for permitted activities would require a resource consent. The level of assessment proposed for consents would be proportional to the likely environmental impacts. The proposed NES would not apply to the construction of new lines.

A resilient national grid also relies on protecting the grid from activities that could affect transmission lines or put the grid at risk; for example, by destabilising transmission support structures or interfering with the conductors (wires). Controls on third-party activities under the Electricity Act focus on electrical safe distances, but these distances may be much less than is appropriate for land-use planning. These controls also tend to be applied after the event and leave rectification to the grid operator. Two-thirds of plans do not provide any protection for transmission lines.

This document therefore also proposes a *transmission risks NES* to address the issue of risk to the national grid. The proposed NES would incorporate some of the provisions of the New Zealand Electrical Code of Practice for Electrical Safe Distances (NZECP 34) relating to excavations adjacent to towers, depositing material under lines, and boat ramps. The proposal includes two options for building near lines. One option imposes restrictions around the support structures and wires. The second option imposes a 20-metre zone each side of the transmission line, within which resource consent would be to construct buildings or structures. In addition, the proposal includes requiring resource consents for subdivision within this zone (aligned to current district council practice).

Costs and benefits

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Both proposed NES will benefit the electricity consumer through reducing the likelihood of future electricity supply interruptions and grid constraints, which could have economic impacts on businesses and communities, and could result in loss of life. These potentially significant benefits to consumers have not been quantified because the magnitude and likelihood of these effects are difficult to predict.

The quantifiable benefits of the proposals for a transmission activities NES are the cost savings to Transpower from having a nationally consistent framework for managing the adverse effects of transmission. Transpower will benefit from reduced costs in not needing to advocate for appropriate rules in plans, and from a reduction in costs of approvals for maintenance and upgrading projects.

A transmission activities NES may impose additional costs on councils and Transpower arising from additional resource consent requirements in some districts, but these will be offset by fewer resource consents being required in other districts. Local authorities will face general implementation costs and some non-recoverable costs in dealing with an increase in applications for certificates of compliance under the NES. Although there is no legal requirement to do so, some councils will choose to change their plans to incorporate the NES to avoid confusion. Overall, the benefits of the proposed transmission activities NES outweigh the costs.

The key benefit of the proposed transmission risks NES is a reduction in Transpower's costs to fix problems and repair lines damaged by third-party activities. Ultimately these costs are passed on to consumers, and although at an individual level the difference may not be noticeable, at a national level Transpower spend over \$5 million per year rectifying problems caused by third parties. An additional benefit, which could not be quantified, is reducing the risk of interruption to the electricity supply, which can have significant economic impacts. Line outages are inconvenient for consumers and can affect their health and wellbeing, and could result in loss of life.

However, the proposed transmission risks NES will impose additional consent requirements on landowners for activities carried out near the lines. In other words, it may impose restrictions on the activities that can be carried out on some land. This NES will also increase local authority enforcement costs and generate additional consent processing costs (not all of which may be recoverable from the applicant). The costs for those councils choosing to change their plans to incorporate the NES are the same as for the transmission activities NES (ie, regardless of whether the change is for one or two NES). Central government will face implementation costs for the standards, for producing guidance material and for monitoring implementation.

Both options for controlling buildings near transmission lines have been evaluated. The costs and benefits associated with a 20-metre consent-required zone option will be considerably higher than the option based on NZECP 34 electrical safe distances. In particular under the 20-metre zone option, Transpower would benefit by not needing to advocate for appropriate rules in district plans and a significant reduction in repair costs.

The costs for council plan changes and government implementation costs are the same regardless of whether one or two NES are introduced. Therefore the net benefit of introducing two NES together is greater than the sum of the net benefits of each proposed NES introduced alone.

Overall, the proposed transmission activities NES alone would have a net benefit of \$2.1 million over a 10-year period, and the ratio of the present value of benefits to costs is about 3.7 to 1. Implementing the transmission risks NES in conjunction with the transmission activities NES would have a net benefit over 10 years of \$3.8 million for the option based on electrical safe distances. The ratio of benefits to costs is about 2.9 to 1. If the option based on the 20-metre zone for buildings were implemented in conjunction with the proposed transmission activities NES, the net benefit over 10 years would be \$5.9 million and the ratio of benefits to costs would remain at about 2.9 to 1.

This economic evaluation does not include some benefits that were potentially significant but could not be quantified. For instance, the assessment doesn't include the potentially significant economic costs of line outages caused by grid constraints or third-party activities, or loss of life. (For example, the estimated economic cost of the 2006 Auckland power disruption was \$70 million.) The assessment also does not include the costs of consent-related delays to line upgrades.

Submissions are invited on the proposals in this discussion document. We invite you to read through the document, and then use chapter 7 for making a submission.

The document at a glance

What is the problem? (sections 2.5, 2.6)

Inconsistent provisions in plans that govern electricity transmission operation, maintenance and upgrade result in unnecessary RMA costs and delays. These costs fall on the operator of the national grid (Transpower) and local authorities.

Lack of protection for the national grid from inappropriate third-party activities puts the grid, and the person undertaking the activity, at risk, and results in expenditure by the grid operator of over \$5 million per year to rectify problems.

What would fix the problem? (sections 2.7, 3.3, 3.4)

A solution to the problem requires:

- nationally consistent management of the environmental effects of transmission
- providing an appropriate level of environmental protection while enabling maintenance and upgrade projects to proceed without consent-related delays and unnecessary costs
- nationally consistent management of the adverse effects of third-party activities that could put the national grid at risk.

What is being proposed? (chapter 4)

This discussion document proposes two national environmental standards (NES) for electricity transmission (the national grid). A proposed transmission activities NES would replace rules in district and some regional plans that manage the environmental effects of electricity transmission. A proposed transmission risks NES would supplement rules in plans to control the effects of third-party activities (eg, excavation or building) on the national grid.

Why was this option selected? (chapter 3)

National environmental standards:

- provide national consistency in managing the adverse effects of, and on, transmission lines through a framework of activity types that gives an appropriate level of control for each activity
- build on and extend existing local authority controls, and allow local decisionmaking on resource consent applications
- can be implemented in relatively short timeframes and at moderate cost.

Who will this affect? (chapter 5)

The proposed transmission activities NES will reduce RMA costs to the owner of the national grid, but may impose additional costs on local authorities. The proposed transmission risks NES will require that landowners obtain resource consent for certain new activities near transmission lines. It will significantly reduce the cost to the line owner of fixing damage from third-party activities, but may require additional local authority expenditure on enforcement. Both proposed NES will help improve the security of electricity supply, benefiting electricity consumers.

How to make a submission (chapter 7)

Submissions are invited on the proposed subject matter of the standards. Details on how to make a submission are given in chapter 7. Submissions close on 30 November 2007.

1 Introduction

1.1 Background

The 2004 review of the Resource Management Act 1991 (RMA) resulted in amendments that enhanced the Act's ability to provide national guidance through the use of existing RMA instruments such as national policy statements (NPS) and national environmental standards (NES). The review envisaged that more guidance would be provided on issues of national significance, in particular network infrastructure. Following the RMA review, the Minister for the Environment, and of Economic Development developed a programme to provide national guidance on network infrastructure under the RMA.

In January 2005 the Reference Group on Electricity Transmission was established to evaluate and advise on the merits and potential scope of national guidance on the management of electricity transmission under the RMA. The Reference Group was chaired by the Ministry of Economic Development and had representatives from relevant government departments, Business New Zealand, Local Government New Zealand, Transpower, Federated Farmers and the Electricity Commission.

In December 2005 the Reference Group consulted on a draft report that evaluated a range of options for national guidance. Twenty-nine submissions were received. The report of the Reference Group was finalised in April 2006 after considering the views of submitters (Reference Group on Electricity Transmission, 2006). The Reference Group's recommendations (summarised in section 3.1) were considered by Cabinet in July 2006, and the Minister for the Environment was invited to develop national environmental standards (NES) and a national policy statement for electricity transmission.

In November 2006 Cabinet invited the Minister for the Environment to prepare a discussion document and draft a cost–benefit analysis on two NES. The proposed standards would:

- provide a consistent national framework for managing the effects of transmission activities (operation, maintenance and upgrading of the national grid)
- protect transmission lines from inappropriate activities that could put the integrity of the national grid at risk.

A proposed NPS on Electricity Transmission is being developed as a separate process, in advance of proposals for NES. The NPS was publicly notified by a board of inquiry on 16 May 2007, and submissions closed on 25 June. The proposed NPS (see Appendix 1) provides a policy framework for electricity transmission. The board will report back to the Minister for the Environment in December 2007. The relationship between the NPS and an NES is spelt out in section 6.1.

1.2 Purpose of this document

This discussion document sets out the resource management issues that arise in managing the operation, maintenance and upgrade of the electricity transmission network, and describes how standards under the RMA could potentially resolve some of these issues.

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There are two key problems: inconsistency in the provisions in local plans that apply to electricity transmission operation, maintenance and upgrade activities; and lack of adequate provision for protecting electricity transmission infrastructure.

The preferred option for providing specific national guidance is to develop national environmental standards that:

- provide a consistent national framework for managing the environmental effects of the operation, maintenance and upgrade of the national grid by:(a) providing for transmission activities that do not have significant adverse effects to be permitted activities (ie, they can be undertaken without the need for resource consent), and (b) specifying the types of activities for which resource consent is needed
- protect transmission lines from activities that could put the integrity of the national grid at risk.

This discussion document provides information on the issues, the rationale for choosing the preferred option, and the costs and benefits of that option. It then seeks submissions on the proposals and the associated costs and benefits. This document includes the substantive regulatory impact analysis elements, including:

- statement of the problem (section 2.6)
- evaluation of options leading to the selection of the preferred option (chapter 3 and Appendix 2)
- details of the proposals (chapter 4)
- analysis of the costs and benefits of the proposals (chapter 5)
- implementation issues (chapter 6).

1.3 What this discussion document covers

This document focuses on options under the RMA. It only considers electricity transmission: the network of high-voltage conductors (wires) and support structures that make up the national grid. It discusses the inspection, operation, maintenance and upgrading of the transmission network, referred to as 'transmission activities'. It also discusses options for managing activities that may affect the grid.

1.4 What this document does not address

This document does not address the following issues:

- The construction of new transmission lines this will be subject to district and regional plan rules, unless the grid operator arranges for a designation in a district plan.
- **Local distribution lines** local distribution networks (the local delivery of electricity to homes and businesses) do not traverse multiple local authority boundaries in the way the national grid does. Unlike transmission, the adverse effects of electricity distribution are felt locally, as are the benefits, so local decision-making on distribution networks does not require balancing local and national interests.
- **Substations** the issues associated with substations (such as noise and reverse sensitivity) are different to those faced in managing the linear network of towers, poles and wires. Substations are normally provided for through designations in the district plan.

- **Electricity generation** a draft report assessing the need for national guidance has been published (Reference Group on Electricity Generation, 2006) and a national policy statement on renewable energy has been proposed. The Minister for the Environment will consult with iwi and other interested parties before preparing the proposed NES.
- The right for the transmission infrastructure to exist on private land, the right of Transpower to enter private land to access the transmission network, or compensation these issues are covered by the Electricity Act and are discussed in section 2.4.
- Electric and magnetic fields (EMF).
- The proposed National Policy Statement on Electricity Transmission (see Appendix 1).

2 Sustainable management of electricity transmission

2.1 What is electricity transmission?

The electricity transmission network refers to the pylons, wires and substations that make up the national grid.¹ Transpower New Zealand Ltd (Transpower), a state-owned enterprise, is the asset owner and system manager of the electricity transmission network.

Figure 1: What is electricity transmission?



¹ The technical definition of the national grid contained in the Electricity Governance Rules (Electricity Commission, 2007) is: "the system of transmission lines, substations and other works, including the High Voltage Direct Current link, used to connect grid injection points and grid exit points to convey electricity throughout the North and South Island of New Zealand."

2.2 Special characteristics of electricity transmission

National importance

New Zealand's current economic activity and future economic growth rely on a secure supply of energy, particularly electricity. The wellbeing of New Zealanders depends on a supply of affordable and sustainable energy to power their homes and businesses.

Demand for electricity has been growing at 2% per year, and is predicted to continue growing at 1.3% per year in the future (Ministry of Economic Development, 2006). This is likely to place increasing pressure on the transmission network. Investment to enhance the national grid infrastructure trebled in 2006 to over \$300 million compared with an average expenditure of \$100 million per annum over the last decade. Annual expenditure is expected to continue to increase. A proportionate level of increase in requirements for RMA approvals for maintenance and upgrade work can also be expected.

Now and in the foreseeable future new electricity generation is likely to be from medium- to large-scale generation remote from where most of the electricity is used (the demand centres). This will be especially so if the Government's objective that the majority of new electricity generation be from renewable sources, set out in the draft New Zealand Energy Strategy, is to be fulfilled. A robust grid to support renewable electricity supply is essential, because the intermittent nature of renewable electricity resources puts more pressure on the grid.

Security of electricity supply at affordable prices relies on having a resilient national grid, but grid constraints could result in planned and unplanned interruptions to supply, higher electricity prices, and renewable energy projects being unable to access the grid. Building and maintaining a robust national grid in a sustainable manner requires ongoing maintenance to prevent equipment failure disrupting supply, as well as upgrading the capacity of existing lines to cope with increased pressure on the grid. This in turn requires:

- appropriate controls on the environmental effects of electricity transmission
- a framework of consent requirements that enables the grid operator to operate without unnecessary constraints or delays
- appropriate controls on activities carried out adjacent to transmission lines that could put the national grid at risk.

A recent example of how a lack of maintenance can disrupt supply involved most of southern and central Auckland – including the central business district – losing power for between one and eight hours on Monday 12 June 2006. The blackout was caused by the failure of two corroded shackles during high wind. At an estimated cost of \$20,000 per kW hour of lost load, the estimated total cost of the blackout (based on Transpower's records of lost load) is \$70 million. Although the maintenance problem in this case was not the result of RMA constraints or delays, the example illustrates the potential economic cost of disruption to electricity supply through factors such as disruption to businesses, lost productivity and the cost of backup generation.

National and local benefits and costs

All electricity consumers benefit from a robust national grid, through a secure and reliable electricity supply at affordable prices. However, the negative aspects or costs, such as the effects of vegetation removal and visual impacts of the transmission network, are felt most acutely at a local level. Also, transmission lines cross private land, and landowners may be restricted in the activities they can carry out near the lines. As a result, in making decisions on electricity transmission activities local authorities need to balance the national and local benefits with these local costs.

Linear nature of the network

Transmission is a linear, meshed network. A single transmission line (circuit) can traverse hundreds of kilometres and pass through several local authorities. Work done to maintain or upgrade a transmission line is only effective if it can be carried out on the whole length of the line. A partial upgrade is ineffective, because the capacity or reliability of the whole line would be limited by the section not maintained or upgraded.

2.3 Management of electricity transmission under the RMA

Unlike other network utilities, the majority of transmission lines are not covered by designations in district plans (see Appendix 3 for an explanation). Instead, Transpower relies on a complex system of rights and approvals under the RMA to operate, maintain and upgrade the national grid.



Figure 2: Planning instruments under the RMA

National, regional and district planning documents

The RMA sets the regulatory framework for resource management in New Zealand and provides for a range of policy instruments. The hierarchy of policy statements and plans under the RMA is set out in figure 2. National policy statements, including the New Zealand Coastal Policy Statement, set out objectives and policies for matters of national significance that are relevant to achieving the purposes of the RMA, but do not contain detailed rules. As noted above, a proposed NPS for electricity transmission was released for public consultation in May 2007 (see Appendix 1).

National environmental standards are regulations that are legally enforceable. They are used to manage the adverse effects of activities on the environment (eg, setting performance requirements for woodburners, requiring monitoring of water takes), or to set out minimum environmental quality standards (eg, standards for ambient air quality). NES are discussed in more detail in section 3.4.

Regional policy statements and plans contain objectives and policies (and regional plans also contain rules) that may relate to electricity transmission activities, for example land disturbance and activities in the coastal marine area. District plans may contain objectives, policies and rules that govern aspects of electricity transmission, or activities that may affect transmission lines, especially land-use activities, subdivision and noise.

Resource consents

A resource consent is an approval for an activity regulated under the RMA. Land-use consents and subdivision consents are granted by district councils. Coastal permits, water permits, discharge permits, and land-use consents for activities specified in a regional plan are obtained from the regional council.

Regional and district plan rules set out the requirements for resource consents. Transmission activities are permitted in some plans, whereas other plans require a range of resource consents for these activities. The proposals for NES would standardise this mixture. Some plans currently require consent for building and subdivision activities on the basis that they could affect transmission lines, but few plans control earthworks that may affect transmission infrastructure.

Designations

A designation in a district plan identifies an area of land for use for public works or projects, and may have conditions attached to it. Only 'requiring authorities' (network utility operators approved by the Minister for the Environment, local authorities and Ministers of the Crown) can arrange for a designation. A designation gives the requiring authority rights to undertake specified land-use activities in the designation corridor without obtaining resource consents. A designation also protects the designated land. A person who wishes to do anything on designated land that may prevent or hinder the designated work must get written consent from the requiring authority. Landowners affected by a designation can apply to the Environment Court for an order obliging the requiring authority to purchase or lease the land.

Transpower is required either to have a resource consent or to seek inclusion of a designation in a plan for any activity that is not a permitted activity or an existing use. Transpower has designations for substations, but does not have designations for the majority of the existing network.

Permitted activities and existing-use rights

Many district plans specify that the maintenance and upgrading of transmission lines is a permitted activity, and many plans permit new lines up to 110 kV in rural areas. Some plans recognise the national significance of the transmission network by permitting a wide range of transmission activities. Transpower often applies for 'certificates of compliance' for activities permitted by plans, in order to provide certainty about the status of the activity.

Section 10 of the RMA provides for land to be used in a manner that contravenes a rule in a district plan or proposed district plan if:

- the use was lawfully established before the rule became operative or the proposed plan was notified
- the effects of the use are the same or similar in character, intensity, and scale to those that existed before the rule became operative or the proposed plan was notified.

These 'existing-use rights' apply to the presence and operation of the existing transmission infrastructure, and any maintenance activities that do not change the character, intensity or scale of the transmission infrastructure.

2.4 Management of electricity transmission under the Electricity Act

Protection of transmission assets

The Electricity Act (1992) makes provision for regulations and codes of practice relating to electrical safety. The New Zealand Electricity Code of Practice (NZECP 34) is a mandatory code of practice under the Electricity Act (Ministry of Consumer Affairs, 2001). It sets out electrical safe distances for activities adjacent to transmission lines, such as excavation and structures, and safety requirements for working near lines. NZECP 34 applies to electricity transmission and distribution lines, and overhead telecommunications lines. It is enforced by the Energy Safety Service of the Ministry of Consumer Affairs, and violations can incur a fine of up to \$10,000.

NZECP 34 requires that written approval be obtained from the line owner before undertaking work within specified safe distances of overhead lines. The line owner is also required to comply with these safe distances when constructing or modifying lines. The operation of NZECP 34 is discussed further in section 2.5.

The Electricity (Hazards from Trees) Regulations 2003 (the 'Trees Regulations') are mandatory requirements under the Electricity Act for managing trees adjacent to power lines. The Trees Regulations set out the distances from electrical conductors within which trees must not interfere, and specify who has responsibility for cutting or trimming interfering trees. Tree owners are responsible for any trees they own that are growing close to conductors. The 'line maintenance contractor' is responsible for the service of any notices under the Trees Regulations, so that trees that threaten the safe operation of the transmission line can be removed or trimmed. Tree owners can opt out and get the line owner to manage the trees on their behalf.

Access to land

The RMA, including an NES, cannot address issues of access. Nothing in the RMA can give a transmission line owner the right to enter private property. Transpower's right of access to lines constructed (or started) before 1988 is provided by the Electricity Act. Section 23 of the Act allows Transpower, as the owner of existing transmission lines, the right to enter upon land for the purpose of gaining access to those works and may perform any act or operation necessary for the purpose of inspecting, maintaining or operating the works. In this section, 'maintenance' includes:

- (a) any repairs and any other activities for the purpose of maintaining, or that have the effect of maintaining, existing works; and
- (b) the carrying out of any replacement or upgrade of existing works as long as the land will not be injuriously affected as a result of the replacement or upgrade.

Before entering land to undertake maintenance, Transpower must give the landowner 10 working days' notice and must state when the land will be entered, the timing of the work, and what work will be undertaken. If the proposed work will injuriously affect the land, or the line was constructed after 1988, Transpower needs to arrange access and compensation with the landowner.

2.5 Why is national direction appropriate?

Opportunities to provide national guidance and direction

The RMA delegates decision-making to a local level, and the government has not provided any guidance on balancing the national benefits and local costs of electricity transmission. Each local authority has different policies, objectives and rules that apply to transmission. The proposed NPS contains an objective and policies at a national level (which will be incorporated into plans), but does not contain specific provisions such as rules. There is therefore further opportunity to provide detailed national direction on the management of transmission activities through the development of specific NES.

Question 1: Do you think national environmental standards are the most appropriate way of providing detailed national direction for managing the national grid?

Improving consistency in local plans and enhancing provision for transmission activities

We have already noted in general terms that local plans have a wide variety of approaches for managing electricity transmission. The same line upgrade could be permitted under one district plan, controlled in an adjacent district, and discretionary in the next district. A stocktake of district plans carried out in 2006 (Burtons, 2006) made the following specific findings:

• Plans are designed to be used by the general public rather than network utility companies, and each plan is structured in a way designed to be useful to users. A third of plans are straightforward for utility companies to interpret because they have a stand-alone utilities

chapter setting out clear rules for electricity transmission. Two-thirds do not have a standalone utilities chapter and require referring to rules interspersed throughout the plan to determine consent requirements for transmission activities.

- Only a quarter of district plans provide for transmission activities that do not have significant adverse effects to be permitted activities.
- Half of district plans do not make provision for upgrading transmission lines which meet the operational needs of the line owner. For example, many plans impose the same consent requirements usually full discretionary on upgrading existing lines (beyond minor upgrading) as for new lines, even though the effects of a new line are much more significant than upgrading an existing line, or they impose restrictive 100 MVA capacity limits.

The complexity and variability of district plans results in:

- variability in the way the adverse effects of transmission activities are managed
- more costly RMA approvals (and these costs may be passed on to electricity consumers through higher charges, or to ratepayers)
- delays in projects, which result in higher costs and also increase the risk of grid outages
- costs to Transpower to make submissions on plans, and to appeal plan changes, in an effort to get consistent provisions for transmission into plans; local authorities bear the costs of responding to submissions and appeals.

Case study: Adding a second circuit to the Islington Kikiwai B line, which runs from Christchurch to Nelson

The line passed through five districts and one regional council area, and the following resource consents were required for the activities required to achieve the upgrade:

Activity	Status under current plans		
Duplexing	Consent required (1) Permitted (4)		
Increasing voltage to 220 kV	Consent required (2) Permitted (3)		
Tower strengthening, etc.	Permitted (5)		
Earthworks (within 20 metres of watercourse)	Consent required (1)		
Foundation strengthening (depth 8 metres)	Consent required (1)		
Working in beds of rivers (regional council)	Consent required (1)		

By providing national guidance on electricity transmission under the RMA, there is an opportunity to both:

- give greater certainty to local communities that the environmental effects of transmission activities are being effectively managed, and
- enhance the robustness of the national grid through timely approvals and an appropriate level of control.

Enhancing protection of transmission infrastructure

Only a third of plans place controls on activities that may affect the integrity of the transmission network (eg, inappropriate subdivision, quarrying near pylons), so there is scope for improvement. At present, third-party activities that could affect the lines and put them at risk are controlled by a mandatory code of practice under the Electricity Act (see section 2.4). However, the electrical code of practice NZECP 34 has not provided the protection for transmission lines from activities of third parties that was anticipated, for the following reasons:

- Enforcement tends to be after the fact.
- The Electricity Act does not make provision for having structures in violation of the code removed or land reinstated.
- The code is primarily intended to prevent direct harm from electricity, so the distances in the code are considerably less than may be considered desirable for clarity and certainty. Also, the safe distances and requirements are difficult for the lay person to understand and require considerable interpretation (see section 3.2).
- The protection provided is a specified distance from the towers (at ground level) and a radial protection zone around the wires. If the wires are sufficiently distant from the ground, it is still possible to construct a building under the wires and conform with the code of practice. Under-building makes line access and maintenance difficult, and increases the chances of further encroachment into unsafe areas.
- There are frequent violations of the electrical code of practice: Transpower records show an estimated 5,000 breaches of the code per year.

2.6 Problem statement

As outlined above, there are two key problems:

- inconsistency of the provisions in local plans that apply to electricity transmission operation, maintenance and upgrade
- lack of adequate provision for protecting electricity transmission.

These problems apply mainly to existing transmission lines. For new transmission lines, Transpower will seek designations in district plans (or in some cases resource consents) and will have some control over activities undertaken by third parties through easement agreements with landowners.

2.7 Objective for the sustainable management of the national grid

The objective is to promote the sustainable management of electricity transmission (the national grid), ensuring there is national consistency and adequate protection of the grid.

The objective for national guidance on electricity transmission contributes to achieving the purpose of the RMA, which is "to promote the sustainable management of natural and physical resources" (including structures). Sustainable management means managing the use, development and protection of natural and physical resources in a way, or at a rate, that enables

people and communities to provide for their social, economic and cultural wellbeing and for their health and safety, while:

- sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations
- safeguarding the life-supporting capacity of air, water, soil and ecosystems
- avoiding, remedying or mitigating any adverse effects of activities on the environment.

Question 2: Do you agree with the objective? Do you think this objective meets the purpose of the RMA?

2.8 Conclusions

There is an opportunity for more effective management of the effects of electricity transmission activities on the environment, as well as the effects of activities adjacent to the transmission lines on electricity transmission infrastructure. Improving the consistency and certainty of consent requirements for transmission activities would help local authorities, and Transpower as operator of the national grid. The current management framework results in costs that could be avoided, and does not support the purpose of the RMA by promoting the sustainable management of the national grid. It does not support the government's energy policy objectives, particularly relating to increasing the renewable electricity supply.

The current system exposes the national grid to risk from inappropriate activities affecting the grid, or from delays to maintenance or upgrade projects while approvals are obtained. This increases the risks of electricity outages (supply interruptions), with attendant negative impacts on the economy and on people's wellbeing. It also imposes heavy costs on Transpower in terms of fixing problems caused by third-party activities.

3 What are the options?

3.1 Options considered by the Reference Group on Electricity Transmission

This is the second round of consultation on the potential for national guidance and direction for electricity transmission. In April 2006 the Reference Group on Electricity Transmission released a draft report for public consultation: *The Merits and Potential Scope of National Guidance of the Management of Electricity Transmission under the RMA* (Reference Group on Electricity Transmission, 2006). The report reviewed a number of options and concluded that a proposed NPS should be prepared for public consultation (see Appendix 1). The Reference Group also recommended that the Minister for the Environment be invited to prepare, for public consultation, two draft NES specifying:

- the activities associated with transmission that should, and should not, be permitted as of right (ie, those activities for which no resource consent is required)
- the resource consent categories (and associated requirements) to apply to the various activities that might adversely affect the transmission network (based on key mandatory restrictions already included in NZECP 34).

In arriving at this conclusion, the Reference Group examined and discarded a number of non-RMA options, including using the Building Act and the Electricity Act to resolve the issues. Only RMA and Electricity Act options are examined further in this discussion document. The report and preliminary analysis undertaken by the Reference Group forms the basis of the more detailed analysis of options in this document. An overview of the analysis is given in the following sections, and the full analysis is provided in Appendix 2.

3.2 Re-evaluation of the option of improving the enforcement of NZECP 34

Analysis of the option of improving the enforcement of NZECP 34 confirmed the Reference Group's conclusion that this would not deliver the protection required. It would also require duplicating an existing permit and enforcing system at the local level. The principal difficulties are as follows.

- The Electricity Act is about electrical safety and regulating the operation of the electricity industry. It does not contain a mandate for making regulations for planning or environmental matters. In particular, the Act as it stands could not address subdivisions, or building controls beyond matters of immediate electrical safety.
- Extending the mandate of the Electricity Act would not be appropriate when the RMA is specifically set up to provide for the management of natural and physical resources (including structures) it would result in unnecessary duplication and confusion.
- The distances specified for electrical safety are generally considerably less than would be good practice for land-use planning provisions (which take into account additional factors such as amenity and reverse sensitivity), and are difficult for a lay person to understand (see section 2.5).

- The activities of greatest concern excavation, building and subdivision are already managed by local authorities; these agencies have expertise in these matters and a local presence.
- Enhancing enforcement of the existing NZECP 34 for electricity transmission would require establishing a system of prior approvals for work adjacent to lines, and a local agency to enforce these approvals (particularly for excavation and buildings). This would add another approval layer for landowners, and potentially duplicate some of the existing work of local authorities. It would not resolve the issues relating to building and subdivision close to lines, and (as explained above) there is no mandate in the Electricity Act to extend the regulations beyond electrical safety.

3.3 Re-evaluation of RMA options

The following options under the RMA for addressing the issues identified in chapter 2 of this document have been re-evaluated:

- enact legislation to deem designations for existing transmission lines
- have Transpower obtain designations for existing transmission lines through the process set out in the RMA
- rely on a national policy statement alone to address the issue (by setting out policies and objectives, and local authorities creating rules to give effect to these if necessary)
- use national environmental standards which prevail over plan rules relating to electricity transmission.

The results of the re-evaluation of these options is summarised in the following sections, and presented in tables 1 and 2. Appendix 2 contains further details about the options and an evaluation against specific criteria.

Option 1: Deemed designations

Deemed designations would require amendments to the RMA to 'deem' designations to apply to existing transmission lines.

Deemed designations have the potential go some way towards resolving some of the issues with pre-1988 lines. They would provide nationally consistent authorisation for transmission activities (subject to conditions to control effects) and restrictions on what anyone other than Transpower could do on the designated land. However, there would be no local input to the process except via select committee hearings, and the cost would be considerable: Transpower estimates the cost of acquiring an interest in the land to be in the order of \$7 billion. Deemed designations were not recommended by the Reference Group.

Option 2: Transpower obtain designations

Under this option, Transpower would issue notices of requirement for the transmission network. The notices of requirement would be assessed by each local authority, and would be subject to submissions by the public and appeals to the Environment Court.

Acquiring an interest in the land would cost a similar amount to deemed designations, although this option would give more flexibility to roll out notices of requirements over time and come to arrangements with landowners that could be less costly than outright purchase. However, the cost of the actual designation process in each district would be considerable: for Transpower in preparing notices of requirement, for local authorities and for the public in assessing notices, and in appeals to the Environment Court. Each council would recommend on designations, so there would be no national consistency. This option is also not favoured because of the extremely high cost, and it is likely for implementing this option to take several years.

Option 3: National policy statement alone

In this option the NPS would be the only national guidance provided: there would be no NES developed. The NPS would provide policies and objectives, which local authorities would implement by developing appropriate rules. Although giving an opportunity for local involvement, it would not provide national consistency because implementation would depend on the rules developed locally. It could impose considerable costs on local authorities in plan changes to implement suitable rules. This option was rejected by the Reference Group and is not favoured because it does not resolve the issue of inconsistent provisions in plans.

What are national environmental standards?

National environmental standards are legally enforceable regulations made under sections 43 and 44 of the RMA. Standards can be numerical limits, narrative statements, or methodologies that are in a legally enforceable form. These may include standards relating to the use and subdivision of land, discharge of contaminants, or noise. Standards cannot contain guidance material, although an informative users' guide would be produced to assist users of the NES. A standard cannot indicate whether a resource consent should be notified, or who should be considered an affected party.

National environmental standards may:

- prohibit or allow an activity, or state that an activity is permitted
- specify that a resource consent is required, the type of activity (controlled, restricted, discretionary, discretionary or non-complying) and the matters over which control is reserved or discretion restricted
- restrict the making of a rule or the granting of a resource consent to matters specified in the standard
- require a person to obtain a certificate from a specified person, stating than an activity complies with a term or condition imposed by a national environmental standard.

Option 4: NES for transmission activities covering only permitted activities

Permitted activity standards would set out activities that Transpower could undertake to maintain and upgrade the network without needing a resource consent. NES terms and conditions would define the activities and set thresholds of effects. This option was recommended by the Reference Group, and a detailed investigation of the effectiveness, costs and benefits was undertaken.

It was found that the benefits only just exceed the costs. The present value of the net benefit (over a 10-year period) is only \$48,500, and the ratio of benefits to costs is 1.08. Although a permitted activities standard would provide a nationally consistent approach for minor activities, a serious disadvantage is that it would provide no guidance on how to treat activities that do not meet the effects thresholds set out, or that are not listed. The question is complex and

open to different interpretation by different local authorities. It appears that a permittedactivities-only NES may in fact make the situation more confusing for activities other than permitted. This confusion could result in an increase in costs and project delays, and in widespread plan changes to accommodate the NES.

Under this option Transpower would continue to advocate for changes to district plans to incorporate provisions for activities that are beyond permitted status, at significant cost to both Transpower and the local authority. This option is not favoured because it does not fix the problem.

3.4 Preferred option: NES for managing transmission effects and risks to the grid

NES to provide consistent provisions for managing the environmental effects of transmission activities

In this option, in addition to making provision for permitted activities, the standard would set out consent categories for activities that have effects greater than envisaged for permitted activities. For example, the standard would set out the consent categories that apply to specific activities that fail the permitted activity terms and conditions (eg, increases in tower height greater than a set limit), and for activities not listed as permitted.

This option addresses the problem of inconsistent plan requirements. It would provide a nationally consistent approach for the management of the adverse effects of electricity transmission, and provide certainty of the consent requirements. It allows for more consistent management of adverse effects than the current system, and at the same time enables Transpower to carry out transmission activities without procedural delays. It also provides for local input into decision-making on resource consents. A standard could be implemented with relatively low costs, and in a timely fashion. This is the preferred option for addressing inconsistent plan provisions for transmission activities.

NES for managing activities that could put the national grid at risk

A standard that builds on the controls on earthworks and buildings in the electricity code of practice would provide national consistency in the management of such activities that could put the national grid at risk. The key advantage of an NES over NZECP 34 is that an NES is enforced at a local level, requires approval in advance of the activity being undertaken, and local authorities have access to the full range of RMA enforcement, from infringement notices to prosecution.

This option provides national consistency in the management of activities that could adversely affect the transmission network. It provides protection for the network, while allowing for local decision making on resource consent applications. A standard could be implemented with relatively low costs, and in a timely fashion. This is the preferred option for providing protection for the transmission infrastructure.

Criteria		Preferred option				
	Status quo	Deemed designations	Transpower arrange designations	NPS alone	Permitted activities NES	Transmission activities NES
National consistency	×	\checkmark	×	×	~	~
Manage effects of transmission	~	~	×	×	~	~
Certainty	×	\checkmark	✓	×	×	\checkmark
Local input	\checkmark	×	\checkmark	\checkmark	✓	✓
Enables transmission activities	~	\checkmark	\checkmark	2	~	\checkmark
Protects national grid	n/a	n/a	n/a	n/a	n/a	n/a
Cost-effective	×	×	×	\checkmark	×	\checkmark
Timeliness	×	\checkmark	×	~	~	\checkmark

Table 1:Assessment summary of options for managing the environmental effects of
electricity transmission

Table 2:Assessment of options for managing the adverse effects of third-party
activities on the national grid

Criteria	Options that	failed to satisfy	Preferred options			
	Status quo	Deemed designations	Transpower arrange designations	NPS alone	Risks NES based on NZECP 34	Risks NES with enhanced building controls
National consistency	×	\checkmark	×	×	~	~
Manage effects of transmission	n/a	n/a	n/a	n/a	n/a	n/a
Certainty	×	\checkmark	\checkmark	×	\checkmark	\checkmark
Local input	\checkmark	×	\checkmark	\checkmark	\checkmark	\checkmark
Enables transmission activities	n/a	n/a	n/a	n/a	n/a	n/a
Protects national grid	×	~	\checkmark	~	~	~
Cost-effective	×	×	×	×	~	✓
Timeliness	×	\checkmark	×	~	\checkmark	\checkmark

Key to tables: \checkmark Meets the criterion

✗ Does not meet the criterion

➤ Partly meets the criterion

One of the key issues is the risks to the national grid from construction of buildings and structures adjacent to lines. Two variations on the preferred option are evaluated: building controls mirroring the provisions of NZECP 34, and a 20-metre zone within which resource consent is required for building.

Tables 1 and 2 compare the options discussed above, both for managing the environmental effects of electricity transmission (table 1) and for managing risks to the national grid (table 2). A more detailed analysis of the options is provided in Appendix 2. Two options for controlling building activity around transmission lines are proposed, and are discussed in more detail in chapter 4.

Question 3: Have we covered all the viable options for providing detailed national guidance under the RMA for the sustainable management of electricity transmission?

3.5 Conclusions

National environmental standards meet the objective of promoting the sustainable management of electricity transmission. They satisfy the key criteria, in particular they would be nationally applicable, provide a consistent framework for managing the effects of transmission activities on the environment, provide protection for the national grid, and provide consistency and certainty for the public, landowners, local authorities and the grid operator Transpower (see tables 1 and 2). The two proposed NES could be introduced in reasonable timeframes and with minimal implementation costs. The costs and benefits of the NES will be assessed in more detail in chapter 6.

In the following chapter we look more closely at the two proposed NES for electricity transmission and how they might work.

4 Proposed solution: national environmental standards (NES)

4.1 Introduction

This chapter summarises the proposals for national environmental standards for electricity transmission. Full details of the proposals, including the terms and conditions proposed for permitted activities, are given in Appendices 4 and 5. Note that the proposed standards are concerned with the environmental effects of the specified activities. They do not confer any rights of access on to private land. Access is governed by the Electricity Act and is discussed in section 2.4.

4.2 Scope

The proposed standards would apply to the high-voltage electricity transmission network (the national grid), including the line supports (towers and poles) and conductors (wires), but excluding substations.

The first proposed standard covers the operation, maintenance and upgrading of transmission lines (referred to as *transmission activities*), but does not cover the construction of new lines. It presents a framework for managing the adverse effects of transmission activities, and lists those activities that do not have significant adverse effects as permitted activities (no resource consent is required). The proposal then sets out consent categories for activities that require resource consent. For example, a major upgrade would be likely to be a discretionary activity. This proposed standard would apply only to the line owner, and contractors carrying out work on behalf of the line owner.

The second proposed standard provides controls on activities adjacent to transmission lines, such as construction and excavation, which could have adverse effects on the transmission infrastructure and could put the transmission network at risk. This is referred to as the *transmission risks* standard. This proposed standard would only apply to third parties, and would not apply to the line owner or contractors carrying out transmission activities on behalf of the line owner. The proposed standard does not affect the operation of the 'Trees Regulations' (see section 2.4).

A summary of the key provisions is given in sections 4.3 and 4.4 below. Full details of the proposals for the transmission activities NES are set out in Appendix 4, and details of the proposals for the transmission risks NES are contained in Appendix 5.

An explanation of activity types

Permitted: the activity does not require a resource consent provided the standards, terms or conditions specified are complied with.

Controlled: a resource consent is required. The consent authority must grant the consent, unless it has insufficient information, and can only impose conditions on the consent on matters over which it has reserved control.

Restricted discretionary: a resource consent is required. The consent authority may decline the consent, or grant it subject to conditions, but only on matters to which it has restricted its discretion.

Discretionary: a resource consent is required. The consent authority may decline the consent, or grant it with or without conditions.

Non-complying: a resource consent is required. The consent authority may decline the consent, or grant it with or without conditions. The consent authority may only grant a consent if it is satisfied that the adverse effects will be minor (other than effects on persons who have given their written consent) or the activity will not be contrary to the objectives and policies of any relevant plan or proposed plan.

Prohibited: no resource consent application may be made and a resource consent must not be granted for the activity.

4.3 Proposals for an NES for transmission activities

Structure of the standard

The proposed standard for transmission activities is based on recommendations made by a collaborative team of consultants with expertise in the identification and management of the environmental effects of high-voltage transmission lines, and the development and implementation of RMA controls. The proposed standard applies contains:

- a list of activities that are permitted (do not require a resource consent)
- terms and conditions to clearly define each activity and set thresholds of effects beyond which the activity would not be permitted
- consent categories to which activities default if they fail to meet the effects threshold
- consent requirements for activities that are not listed as permitted, or that fail a threshold test.

For activities listed as (or defaulting to) controlled, restricted discretionary or discretionary, a resource consent or designation would be required. For controlled and restricted discretionary activities the standard will list the matters over which the council will exercise control or discretion.

The proposed standard is generally more detailed than rules in district plans that manage the effects of electricity transmission, but it will provide for about the same level of management as in some plans. However, in some cases the NES will be more stringent (ie, provide a greater level of environmental protection) and in other cases the NES will be more permissive than rules in plans.

The proposed NES for transmission activities would override specific plan rules relating to transmission activities. Plan rules cannot be more restrictive nor more lenient than this NES. The only way in which plans can deviate from the proposed NES is to restate that an activity permitted by the NES is permitted, but with terms and conditions in the plan to control effects not covered in the NES. For example, a plan rule could say that painting transmission towers is permitted provided that the towers are painted a specific colour.

The proposed NES will be set out as a hierarchy compatible with the way many district plans currently deal with utilities. Figure 3 sets out the process for determining activity status and consent requirements under the proposed NES. If an activity is listed as permitted, it must meet the effects thresholds listed (terms and conditions). If an activity fails the effects thresholds, then the proposed standard will specify the status of the activity (generally as controlled or restricted discretionary). If an activity is not listed as permitted, then it may be listed as controlled or restricted discretionary (or in some cases discretionary). If an activity is not listed at all (but is still within the scope of the NES), it will be discretionary.

Figure 3: Determining resource consent requirements under the proposed transmission activities NES



Section 1: Proposals for *permitted* activities: operation, maintenance and minor upgrading of transmission lines

This section lists general categories of activity that are permitted, subject to specific terms and conditions (for full details see Appendix 4). Activities that are permitted must not have significant adverse effects. The proposals for permitted activities (and the terms and conditions that apply) have been assessed to ensure there are no significant adverse effects. This includes the cumulative effects of undertaking more than one of the listed activities together, as is likely to happen in a transmission line maintenance or upgrade project. All permitted activities must meet specified earthworks and noise terms and conditions.

Transmission activities to be permitted include:

- the operation and upgrading of transmission lines: operating at design voltage, thermal uprating and retensioning of lines, increasing line voltage
- towers, poles, foundations and structures:
 - tower washing, wet abrasive blasting and painting, subject to terms and conditions controlling discharges of contaminants and proximity to buildings and water bodies
 - strengthening, upgrading and replacing existing support structures and foundations, provided that any height increase does not exceed 15% and subject to limits on relocation distances
 - removal of existing lines
 - temporary structures
 - foundation dry abrasive blasting and painting, subject to terms and conditions controlling discharges of contaminants
- conductors and wires:
 - the addition of circuits where the line has been designed for an extra circuit (at present there are four lines like this)
 - alteration or replacement of wires, or the addition of wires up to duplex arrangement
 - the addition of up to two earth wires and communications cables
 - conductor maintenance
- hardware:
 - general maintenance
 - adding components (eg, hanger brackets, anti-climb guards, bird guards) and replacing components on support structures and conductors
 - signs (up to a specified size limit)
 - insulator cleaning and replacement
- earthworks associated with transmission activities, subject to controls on the volume excavated, sediment control, not disturbing historic heritage sites, and site restoration
- noise and vibration associated with transmission activities, subject to meeting construction noise and vibration standards
- vegetation trimming and removal, subject to conditions on landscape values.

Activities in the coastal marine area, in the beds of lakes and rivers, or that involve disturbance to known historic heritage sites such as wāhi tapu, cultural or archaeological sites will not be permitted activities. They are specifically listed as discretionary activities. Where an activity

falls outside the scope of the permitted activity description (eg, adding circuits to lines other than the four lines listed) or fails the terms and conditions (eg, tower height increase exceeds the specified limit), then the NES will specify the consent category (generally controlled or restricted discretionary).

Question 4: Are the proposals for permitted activities likely to generate additional resource consent requirements?

Question 5: Should more activities be permitted than are currently proposed? For example, earth peaks are permitted in many plans, and often increase the height of the tower by more than the 15% allowed for permitted activities in the proposed NES (see Appendix 3). Should earth peaks be permitted without a height allowance?

Section 2: Proposals for *controlled* activities: operation, maintenance and upgrading of transmission lines

The following activities are proposed as controlled activities (for full details see Appendix 4):

- replacement of towers or poles, with height increase as for permitted activities, but relocated outside the existing alignment by a set amount
- temporary line deviation and temporary line deviations which exceed the permitted activity terms and conditions
- trimming scheduled (ie, specifically identified in a district plan) vegetation
- new access tracks, or permanent deviations of existing tracks
- wet or dry abrasive blasting within 50 metres of (but not in) a water body or coastal marine area, or within 100 metres of a building or road
- earthworks associated with the maintenance and minor upgrading of transmission lines that do not comply with the terms and conditions listed in section 1
- noise which does not meet the permitted activity terms and conditions.

The matters the local authority may reserve control over could include:

- visual (for vegetation trimming)
- erosion control, discharge of sediment and revegetation
- heritage sites
- discharges and noise.

Section 3: Proposals for *restricted* discretionary activities: operation, maintenance and upgrading of transmission lines

Transmission activities that do not comply with the terms and conditions listed in section 1 for permitted activities or section 2 for controlled activities may be listed as restricted discretionary activities. Full details are set out in Appendix 4. Specific activities listed as restricted discretionary include:

- permanent deviation of a line
- replacing an existing overhead line with an underground line

- replacement of a tower or pole not satisfying the requirements for permitted or controlled activities
- the addition of conductors, earth wires, telecommunications facilities or signs, or the implosive jointing of conductors, which fail permitted requirements
- earthworks and tree trimming that fail permitted criteria.

Section 4: Proposals for *discretionary* activities: operation, maintenance and upgrading of existing transmission lines

Discretionary activities include:

- the undergrounding of transmission lines, or new access tracks, through scheduled cultural or historic sites, or through scheduled landscape or ecological protection areas
- work in the coastal marine area, or in the beds of lakes and rivers
- any transmission activities not listed elsewhere in the NES.

Question 6: Do you think the categories assigned to activities are appropriate? Are they too stringent, or too lenient? For example, putting existing overhead transmission lines underground is a restricted discretionary activity. Should this be a controlled or even permitted activity?

Question 7: Are the terms and conditions proposed to control the environmental effects of permitted activities appropriate? Are the matters over which the council can have control / discretion in assessing resource consents appropriate?

Question 8: Are there any other activities that should be listed in the transmission activities NES?

Question 9: Should the NES make any provision for activities to be 'non-complying' (for example, some activities in the coastal marine area)?

Question 10: Should the construction of new transmission lines be covered in the NES?

4.4 Proposals for an NES for activities that could put transmission lines at risk

Structure of the standard

The second proposed standard is based on key provisions of the mandatory code of practice for electrical safe distances (NZECP 34). It is based on an assessment of the key problems associated with third-party activities, the applicability of provisions in NZECP 34, and whether these can be effectively translated into an RMA framework. NZECP 34 controls activities that could endanger the transmission lines or be unsafe for the person carrying out the activity, which could be incorporated into a NES, including:

- excavation adjacent to transmission poles and towers
- erecting buildings and structures close to the lines
- stockpiling soil and debris under the lines
- facilities for launching boats (boat ramps).

The NES picks up the relevant aspects of the existing code of practice, and either prohibits them or proposes that a resource consent be required. Largely these are activities carried out by landowners on their own land. The assessment also examined whether risks to transmission lines could be reduced by incorporating additional provisions available under the RMA into the standard. The proposals for an NES therefore also include controls on subdivision (which generally requires resource consent in district plans). Damming and diverting water in a manner that could put transmission lines at risk is also being considered for inclusion in the standard.

The level of control proposed (see the explanation of activity types in section 4.3) is based on the level of risk, as follows:

- **prohibited:** activities that should never be contemplated at any place at any time because of the risk to the transmission line or public safety
- **non-complying:** activities where it is generally inadvisable to carry out the activity except in unusual circumstances
- **restricted discretionary:** activities that can generally be carried out provided controls are imposed to restrict the possible effects on the transmission line
- **controlled:** activities that can be carried out provided appropriate conditions are complied with.

The proposed standard sets limits on activities that can be carried out in the immediate vicinity of transmission lines. It is not intended that the provisions of this NES apply to the line owner carrying out the activities identified in the transmission activities NES.

For buildings and structures, two options are proposed. Both options provide for a prohibited activity zone around the wires, where any type of activity would put both the person undertaking the activity and the transmission line at risk.

- Option A follows the provisions of NZECP 34 closely, and would allow under-building.
- Option B provides for a zone within 20 metres each side of the transmission line in which a resource consent would be required for any building or structures.
Note that a definition of 'building' will be developed, which includes major structures and habitable buildings, but does not include minor structures such as culverts or sheds. In all cases it is intended that a district or regional plan can be more restrictive than the NES, and this will be explicitly stated. If an activity is beyond the scope of what is controlled by the NES (eg, an excavation at a greater distance than specified), then it would default to the provisions in the relevant district or regional plan.





Proposals for standards

Activities covered by this proposed standard are categorised as follows (see Appendix 5 for details).

- Excavation near support structures (as per safe distances in NZECP 34):
 - prohibited: excavating to a depth of more than 300 mm within 2.2 metres of a pole or 6 metres of a tower, or creating an unstable batter that could put the transmission line at risk
 - restricted discretionary: excavating to a depth of more than 750 mm up to 5 metres from a pole or to a depth exceeding 3 metres up to 12 metres from a tower.
- Erection of structures near support structures (as per safe distances in NZECP 34):
 - non-complying: ranging from 2 to 8 metres for poles and 6 to 12 metres from towers, depending on line voltage.

- Erection of structures within a specified distance of transmission lines (conductors / wires):
 - Prohibited: within specified electrical safe distances around wires as per NZECP 34. The safe distances depend on the accessibility of various parts of the structure and vary from 1.5 metres distance from 33 kV lines for inaccessible parts of a structure (eg, steep-pitched roof), to 7 metres from a 220 kV line for accessible parts of a structure (eg, roof garden)
 - Option A (based on electrical safe distances in NZECP 34): between the inner 'unsafe zone' and an outer boundary around wires: restricted discretionary (note this allows under-building); the distances range from 7 metres vertically and 8.5 metres to the side of a short-span 33 kV line, to 11 metres vertically and 22.5 metres to the side of a long-span 220 kV line, allowing for conductor movement (note that 220 kV towers range in height from 20 to 50 metres)
 - **Option B**: zone in which resource consent required: between the inner 'unsafe zone' and an on-the-ground buffer distance of 20 metres from the centre of the transmission line: restricted discretionary.

Note: an engineering survey is required in both options A and B to confirm the inner prohibited zone is not encroached upon.

- Deposition of material under transmission lines (as per safe distances in NZECP 34): prohibited.
- Subdivision within 20 metres of transmission line: controlled, with control reserved over the proximity of transmission lines to building platforms, and the ability to operate lines.
- Boat ramps within 9 metres of a line: non-complying (as per safe distances in NZECP 34).

Question 11: Do you have any comments on the activities proposed to be covered by the transmission risks NES? Is this the most appropriate way to manage these activities?

Question 12: Do you have any comments on the proposed activity types (prohibited, non-complying, controlled, restricted discretionary)?

Question 13: Which building option do you prefer and why? What should be the cut-off point for managing 'buildings' (eg, all buildings and structures, only inhabitable buildings)? What about bridges and other structures? How could this be defined?

Question 14: Are there any other activities that should be managed to prevent risks to transmission lines? For example, damming and diverting water could endanger transmission support structures. Is this adequately controlled in regional plans now, or are additional provisions required?

5 Evaluation of the proposed national environmental standards: costs and benefits

5.1 Preliminary assessment

A preliminary assessment of the costs and benefits of the proposed national environmental standards has been undertaken in order to provide as much information as possible on the proposals. The information on which the assessment is based, is summarised in table 3.

Most of the costs can be estimated with a reasonable degree of certainty, but many of the benefits cannot be quantified. For example, there is a potential for the NES to prevent loss of life arising from a grid outage or unsafe activities carried out by third parties. Grid outages can also have economic effects. However, it is not possible to estimate the future frequency and magnitude of grid outages nor the likelihood of loss of life.

Where there is a great deal of uncertainty around estimates of the benefits, they have not been included in the quantitative analysis. Appendix 2 contains an analysis of the sensitivity of the results to changes in key assumptions about the likely costs and benefits.

For the purpose of the analysis, it is assumed that investment in transmission maintenance and upgrading activities would increase over a 10-year period to three times the average level of expenditure over the previous decade. The costs and benefits of the proposals have been evaluated as estimated increases or decreases compared with the costs of the current regulatory regime, taking into account:

- predicted future increases in transmission activities
- the extent to which current plans already include provisions and requirements equivalent to those in the proposed NES.

A further analysis will be undertaken after consultation, when proposals for regulations (standards) are presented to the Minister for the Environment and ultimately to Cabinet for approval. Section 32 of the RMA requires that an analysis be undertaken of the appropriateness of the objectives in meeting the purposes of the RMA, and the costs and benefits of the proposals.

5.2 Effects on the public and the environment

Transmission activities NES

An improvement in the ability of the line operator to carry out regular maintenance and upgrading will provide the public with indirect benefits resulting from greater security of electricity supply due to fewer outages. Grid constraints or delays in upgrading could result in loss of supply, with corresponding economic costs to the public and businesses. For example, the estimated cost of a grid outage in Auckland in 2006 is \$70 million (see section 2.2).

The public will also benefit from avoiding future electricity price increases as a result from grid constraints. The NES is likely to reduce the overall costs of managing transmission; while this is a significant amount nationally, it is unlikely to result in any noticeable reduction in individual consumer electricity charges.

Environmental benefits arise from improving the management of the effects of electricity transmission and enhancing the ability to connect renewable electricity generation to the grid.

Local authority implementation costs arising from the NES (which will ultimately be passed on to the public as ratepayers), are discussed in section 5.3. Costs and benefits specific to landowners adjacent to transmission lines are discussed in section 5.4.

Transmission risks NES

The transmission risks NES will promote greater security of electricity supply (ie, fewer outages resulting from third-party activities, and greater protection of transmission lines from the associated risks). The public will receive benefits similar to those described above. Interruptions to electricity supply can affect people's wellbeing, health and ability to operate their businesses, and could result in loss of life. There is too much uncertainty in estimates of the frequency and magnitude of these effects to include them in the quantitative analysis.

5.3 Costs and benefits to local authorities and ratepayers

Transmission activities NES

The greater certainty of an NES means that councils will no longer face submissions and appeals from Transpower on plan changes arguing for rules relating to transmission activities. Information on the cost savings to councils in not needing to respond to plan submissions from Transpower was not available at the time this analysis was done. The certainty of consent types and matters to be considered should reduce costs to councils in determining the consent requirements for a transmission project, speed up the consent process and reduce delays. These costs vary widely between transmission projects, and it was not possible to derive a meaningful average cost saving.

Councils will need to become familiar with the NES and implement it. The estimated cost is \$60,000 total for all councils in the first three years.

Because of the current variability in plans, the proposed NES will result in some local authorities receiving more consent applications for transmission activities, and some local authorities receiving fewer applications. Overall, it is estimated that councils will receive fewer applications for existing-use certificates. Councils are likely to process more certificates of compliance, but these should be easier to assess against the standard than against plans. Direct costs of processing applications will be passed on to Transpower (and are discussed in section 5.5). However, there may be non-recoverable costs to councils (and ultimately ratepayers) through an increase in the number of applications for certificates of compliance. This non-recoverable cost is estimated at around \$14,600 per annum across all councils for the first year, and rising to \$33,750 in year 10.

Some local authorities may choose to initiate plan changes to ensure their plan rules are fully consistent with the NES to avoid confusion, although there is no legal requirement to do so. Other local authorities may update electronic versions of plans and web pages to note where the transmission NES applies. The analysis of costs and benefits assumes that 10 councils will choose to change their plans in the first two years, at a cost of \$50,000 each, and the remaining councils will make minor changes (totalling \$20,000 across all councils over two years).

Transmission risks NES

As for the transmission activities NES, local authorities will benefit by receiving fewer submissions on plan changes from Transpower but insufficient information is available to quantify this benefit. However, the proposed transmission risks NES will result in additional costs to local authorities, principally district councils and some regional councils, from implementation costs – estimated at \$60,000 across all councils in the first year.

The responsibility for enforcing provisions for buildings and earthworks will be transferred from NZECP 34, and costs that are not fully recoverable will be borne by councils (and ultimately by ratepayers). The analysis assumes that general enforcement and monitoring for either option A or option B will cost councils \$25,000 per year nationally, and six prosecutions will be required within the first three years at a cost to councils of \$50,000 each, and one prosecution per year in subsequent years.

Councils will need to process additional resource consent applications relating to third-party activities adjacent to transmission lines. The majority of these costs will be recovered from consent applicants, but councils will bear a small unrecoverable proportion of this cost, estimated at around \$8,400 per year for option A and around \$20,000 per year for option B across all councils.

As for the transmission activities NES, some councils will choose to change their plans to align them with the NES – the estimated cost of \$510,000 in the first two years applies whether the plan changes arise as a result of one NES or two.

5.4 Costs and benefits to landowners

Transmission activities NES

Landowners may benefit from certainty about the activities that Transpower can undertake without requiring resource consent, and the activities that require consent and for which the landowner may be regarded as an affected party. In some cases landowners will have more opportunity to comment on consent applications by Transpower, and in other areas the opportunities may reduce. The analysis assumes that overall there are no quantifiable costs or benefits to landowners.

Transmission risks NES

The proposed NES will provide certainty about which activities adjacent to transmission lines can and cannot be carried out, and which will need resource consent.

Some landowners will face an increase in costs from the requirement to obtain resource consent for some activities that may be permitted in plans at present. This may be the case for earthworks and buildings. Total consent costs arising from the NES are estimated to be around \$26,000 per year for earthworks permits, around \$58,000 per year for buildings under option A, and around \$180,000 per year for buildings under option B. Subdivisions already require consent, so additional costs are unlikely. If option B (a 20-metre consent trigger zone) is implemented for buildings, then in some cases land adjacent to and under transmission lines may no longer be suitable for the construction of new buildings.

5.5 Costs and benefits to Transpower

Transmission activities NES

The biggest cost saving of the transmission activities NES to Transpower will arise from the national consistency of requirements. Transpower currently monitors district plans, makes submissions to district plans on suitable provisions for transmission activities, and appeals plan changes. It is estimated this cost will reduce by \$163,000 per year because it should not be necessary for Transpower to make submissions on plan rules related to transmission, given that under the NES councils can legally only implement rules that are identical to the standards. The only exception is if a council chooses to restate that a permitted activity is permitted but subject to controls on effects not covered in the NES (eg, specifying the colour pylons must be painted).

Although the NES may result in Transpower needing more consents for some activities in some areas, it should result in Transpower requiring fewer consents in other areas. For the purposes of this analysis, it has been assumed that Transpower costs per consent will reduce, and the total cost of obtaining resource consents per year will reduce by \$37,500 in the first year, rising to over \$112,000 in year 10.

Transpower may not need to apply for as many certificates for verifying that activities are existing uses as under the current regime; for example, these activities may now be permitted. Transpower is likely to apply for more certificates of compliance, but at a lower cost since it should be easier to verify that an activity complies with the NES. For a line enhancement traversing several districts, it may not be necessary to apply for certificates of compliance in all of the districts involved. There will be one NES rather than several plans to assess, so the costs of preparing applications may be lower. Overall, the estimated cost saving in RMA approvals is around \$176,000 in the first year, rising to around \$529,000 after 10 years.

Another cost associated with the variability in district plans is the cost of becoming familiar with transmission proposals and assessing consent requirements. This is a cost to Transpower in terms of arranging site visits and providing additional information to councils. It can also be a protracted process and cause delays in projects (with associated increases in operational costs). These costs vary widely, so it has not been possible to quantify them.

Transmission risks NES

The largest benefit to Transpower is a reduction in the cost of rectifying breaches of NZECP 34, ranging from correcting earthworks violations to raising transmission lines in order to correct under-building violations. Transpower spends over \$5 million per year rectifying violations. Under the NES the number of violations, and hence the rectification costs, should reduce. Infringements will be subject to the full range of RMA enforcement provisions, from

infringement notices to prosecution. The RMA also provides for the ability to have breaches rectified.

Note that the NES cannot be used for correcting violations before it came into force, which must be resolved under the Electricity Act. Nor can an NES act retrospectively: if an existing activity was legal under NZECP 34, it will have existing-use rights under the RMA. The analysis only assesses likely future encroachments, and assumes the rectification costs, in the absence of a NES, would be the same as in previous years.

Under option A (based on electrical safe distances), rectification costs are predicted to reduce by \$442,500 per year. Under option B (a 20-metre-wide strip each side of the transmission lines in which consent will be required for building) there will be additional benefits in those local authorities that do not already have this provision in their plans for subdivision or building. The estimated cost saving is \$937,750 per year.

Both option A and option B reduce the likelihood of outages due to activities being too close to the transmission lines, such as construction activities (tall mobile equipment) and activities associated with buildings (TV aerials and extensions to buildings). Option B also removes the problem of under-building and activities too close to the transmission line. Better building siting also reduces operational difficulties, such as access for maintenance and emergency repair, thus reducing the risk of outage.

Transpower will not need to make submissions on plan rules on the matters covered by the NES because these cannot be more lenient than the NES. However, Transpower will still make submissions on third-party activities not covered by the NES. For option A the costs are predicted to reduce by 5% and under option B by 25%.

Under the transmission risks NES, Transpower may have more opportunity for involvement in consent application, and this will result in a small increase in costs, particularly for option B.

5.6 Costs and benefits to government

Transmission activities NES

The government will face implementation costs, which will include liaising with councils, producing guidance material on the standards, and monitoring the implementation and effectiveness of the standards. It is assumed that this will cost \$200,000, spread over three years.

The government benefits through an NES that supports its energy policies, as expressed in the draft New Zealand Energy Strategy, and that supports the purposes of the RMA.

Transmission risks NES

The government will face implementation costs as for the transmission activities NES. The cost of implementation will be the same for one NES as for two.

Question 15: Have we accurately reflected the range of costs and benefits arising from the proposals for national environmental standards and who might bear the costs or receive the benefits? Are there any costs and benefits we have overlooked?

Question 16: Are our estimates of costs and benefits accurate? Do you have information on costs and benefits that could assist the second stage of our assessment (of the impacts of the final proposals)? Do you have any information on costs and benefits that we have been unable at this stage to quantify?

Table 3: Estima	ated costs	and benefits of in	nplementing national environmental	l standards		
Activity	Cost or	Estimated costs / sa	tvings per annum			
	Denetit	To the public	To local authorities and ratepayers	To landowners	To Transpower	To government
Monitoring plans and making submissions on plans, appeals to the Environment Court	Benefits	None	Possible benefits from not responding to Transpower submissions on plans (not quantified)	Not quantified	\$163,000 for transmission activities NES;	None
					\$ 5,800 for transmission risks NES option A, \$29,000 option B	
Implementation	Costs	None	\$20,000 per year for first 3 years only for transmission activities NES;	None	Not quantified	\$200,000 cost over 2 years for
			\$60,000 in first year only for risks NES			one or both NES
Authorisations under transmission activities	Benefits	None	Not quantified	None	\$176,000 in year 1, rising to \$528,000 in year 10	Not quantified
NEO.	Costs	None	\$11,000 cost in year 1, rising to \$33,000 in year 10	Not quantified	Cost reduction – see benefits	None
Plan changes	Costs	Not quantified	\$510,000 over first 2 years	Not quantified	Not quantified	None
Transpower costs of rectifying NZECP 34 violations	Costs	None	None	Not quantified	\$443,000 benefit per year option A; \$938,000 benefit per year option B	None
Resource consents for third-party activities	Cost	None (analysis assumes consents obtained by landowners)	\$12,000 first 3 years, \$8,000 from year 4 for option A; \$27,000 in first 3 years and \$21,000 from year 4 for option B	\$109,000 cost option A for first 3 years, \$84,000 from year 4; \$269,000 cost for first 3 years option B, \$207,000 from year 4	\$9.000 benefit per year option A; \$22,000 cost per year option B	None
Enforcement of risks NES	Costs	None	\$300,000 over first 3 years; \$50,000 per year from year 4	Not quantified	None	None
Monitoring risks NES	Costs	None	\$25,000 per year for 3 years	None	None	None
Supply disruption, loss of life	Benefits	Potential benefits fror	n increases security of supply and preventing los	ss of life, but not possible to e	stimate frequency	

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5.7 Conclusions

Benefits derive from the certainty provided by having a consistent national framework for managing the effects of transmission activities, and for managing the effects of activities carried out adjacent to transmission lines. Fewer existing-use certificates will be required for transmission activities under the proposed NES, with a corresponding increase in applications for certificates of compliance. Applications for resource consents and certificates of compliances should cost less to prepare, providing significant benefits to Transpower. Councils will face some implementation costs through needing to become familiar with the new requirements, and some will choose to change their plans to accommodate any NES.

The proposed NES for transmission risks will result in a significant reduction in Transpower's expenditure rectifying problems caused by third-party activities that damage the lines or put them at risk. As a result of the implementation of the proposed NES, some of the costs of managing third-party activities will increase, due to increased numbers of resource consent applications and increased enforcement costs. Additional costs could fall on local authorities through increased consent processing, monitoring and enforcement (including prosecutions). Some of these costs would be passed on to landowners as consent fees, and the remainder borne by ratepayers. Landowners may face additional costs in preparing resource consent applications.

There are benefits from both proposed standards arising from the national consistency of requirements, meaning that Transpower will no longer need to make submissions on district plans on the matters covered by the NES. The government will incur implementation costs from providing guidance material and monitoring the implementation of the standards.

This analysis of the costs and benefits of the proposals shows that an NES for transmission activities in combination with an NES to control risks to transmission, based on electrical safe distances, has a net benefit (over a 10-year period) of \$3.8 million and a benefit-to-cost ratio of 2.9 to 1. The costs and the benefits of option B are correspondingly higher than option A, and overall option B has a higher net benefit but similar ratio of benefits to costs. A transmission activities NES in combination with a transmission risks NES which provides a 20-metre 'consent required zone' for buildings each side of the transmission lines has a net benefit of \$5.9 million and a ratio of benefits to costs of 2.9 to 1. This is summarised in table 4.

Table 4:Preliminary summary of benefits of the proposed national environmental
standards

	At 10% dis	scount rate	At 5% dis	count rate
Proposal	Net present value (\$ million)	Benefit : cost ratio	Net present value (\$ million)	Benefit : cost ratio
Transmission activities NES	2.2	3.9	2.9	4.3
Transmission activities NES + Risk NES: NZECP 34	3.8	2.9	5.0	3.2
Transmission activities NES + Risk NES: 20 m trigger zone	5.9	2.9	7.7	3.1
Risk NES NZECP 34	1.0	1.6	1.4	1.7
Risk NES 20 m consent required zone	3.1	2.1	4.1	2.2

6 Implementing the national environmental standards

6.1 How does an NES relate to the proposed national policy statement?

The proposed national policy statement sets out objectives and policies for transmission. Once the NPS is in place, these objectives and policies will be given effect to by district and regional councils.

NES stand alone, so it is not necessary to have an NPS to support an NES. However, in the case of electricity transmission, the NPS and the NES will work together to provide a consistent framework for managing electricity transmission. The NES will set out a framework of permitted activities and consent requirements, and matters to be considered in assessing consent applications. The NPS will provide a framework of objectives and policies, which will be used by local authorities in making decisions on consent applications under the NES, and for decisions on approvals for constructing new lines and other matters not covered by the NES.

6.2 How does an NES relate to rules in plans?

In general, an NES overrides a rule in a plan. A rule in a plan:

- cannot be more lenient than an NES
- can specify that an activity (which is permitted by the standard) is permitted, subject to terms and conditions to regulate effects not covered by the standard
- can be more stringent if the NES specifically allows a rule in a plan to be more stringent.

There is no requirement for councils to change their plans to accommodate NES. Rules in plans that differ from the proposed transmission activities standards, or are more lenient than the transmission risks standards, will simply no longer apply.

For the proposed transmission activities NES, rules in plans that cover the same activities cannot be more lenient and will not be able to be more stringent than an NES. The permitted activities listed in the NES will be subject to terms and conditions. However, plans can deal with terms and conditions not covered in the NES. For example, if a standard permits painting of towers, then a plan could specify the colour for towers to be painted.

For the proposed transmission risks NES, rules in plans will be able to be more stringent than the NES, because the NES will stipulate this. They cannot be more lenient. This allows for specific local issues to be taken into account. For example, the NES may control excavation of more than 750 mm in depth within 5 metres of a transmission pole, to avoid destabilising the pole. A regional plan that deals with land disturbance may contain more stringent rules about excavations in erosion-prone areas to deal with this specific local issue.

6.3 How does an NES relate to resource consents and designations?

In general, an NES does not affect authorisations in place at the time the NES commences. The following relationships apply.

- An existing resource consent prevails over an NES.
- An NES prevails over resource consents or designations granted or made after the NES.
- An existing designation prevails over an NES unless the designation lapses or is altered.²
- Work undertaken before an NES was made and then covered by a designation after the NES was made does not have to comply with the NES.
- An NES prevails over an existing designation which requires an outline plan if:
 - the designation was in existence when the standard was made, and
 - no outline plan for the designation has completed the process in section 176A of the RMA.
- A requiring authority can issue a Notice of Requirement seeking a designation for a matter covered by an NES.
- A bylaw only prevails over an NES if it is more stringent than the NES and the standard says that a bylaw may be more stringent. Bylaws cannot be more lenient than an NES.

6.4 What about existing-use rights?

The rights to continue existing uses of land in section 10 of the RMA (see section 2.3) also apply to an NES. However, if an activity was not lawfully established (eg, if it was established in violation of NZECP 34) then it cannot claim existing-use rights. Activities carried out in violation of NZECP 34 would need to be rectified through action under the Electricity Act. Standards under the RMA cannot be applied retrospectively to correct violations under another Act.

Existing-use rights only apply if there is no change in the nature, scale and intensity of the land use. Existing-use rights do not apply to subdivision consents, but may apply to buildings.

² However, a use that was lawfully established by way of a designation before the standard was made but has lapsed is not required to comply with the NES if the effects of the use, in character, intensity and scale, are the same as or similar to those that existed before the NES was made, provided the use itself did not lapse.

7 Next steps in developing a national environmental standard

7.1 NES development process

An outline of the standard development process, including opportunities to make submissions, is shown in figure 5. Preliminary consultation on national guidance for electricity transmission has already been undertaken by the Reference Group.

Figure 5: The NES development process



7.2 Making a submission

You are invited to make a submission on the proposed subject standards. Anyone can make a submission, and we would welcome your feedback.

Please include the following information with your submission:

- your name and postal address, phone number, fax number and email address (if applicable)
- the title of the proposed standards you are making the submission about
- whether you support or oppose the standards
- your submission, with reasons for your views
- any changes you would like made to the standards
- the decision you wish the Minister for the Environment to make.

You can post your submission to:

Electricity Transmission NES Ministry for the Environment PO Box 10-362 Wellington

or email to:

electricity@mfe.govt.nz

Your submission must be forwarded in time to be received no later than 5.00 pm on Friday 30 November 2007.

Note: your submission is public information and is subject to release under the Official Information Act. Please clearly indicate if any of your comments are commercially sensitive or if, for some other reason, you consider they should not be disclosed.

7.3 Discussion questions

Your submission can address any issue relating to the standards. However, the Ministry for the Environment would greatly appreciate specific comment on the following questions.

Submission questions

Question 1: Do you think national environmental standards are the most appropriate way of providing detailed national direction for management of the national grid?

Question 2: Do you agree with the objective? Do you think this objective meets the purpose of the RMA?

Question 3: Have we covered all the viable options for providing detailed national guidance under the RMA for the sustainable management of electricity transmission?

Question 4: Are the proposals for permitted activities likely to generate additional resource consent requirements?

Question 5: Should more activities be permitted than currently proposed? For example, earth peaks are permitted in many plans, and often increase the height of the tower by more than the 15% allowed in the proposed NES. Should earth peaks be permitted without a height allowance?

Question 6: Do you think the categories assigned to activities are appropriate? Are they too stringent, or too lenient? For example, putting existing overhead transmission lines underground is a restricted discretionary activity. Should this be a controlled or even permitted activity?

Question 7: Are the terms and conditions proposed to control the environmental effects of permitted activities appropriate? Are the matters over which the council can have control / discretion in assessing resource consents appropriate?

Question 8: Are there any other activities that should be listed in the transmission activities NES?

Question 9: Should the NES make any provision for activities to be 'non-complying (for example, some activities in the coastal marine area)?

Question 10: Should the construction of new transmission lines be covered in the NES?

Question 11: Do you have any comments on the activities proposed to be covered by the transmission risks NES? Is this the most appropriate way to manage these activities?

Question 12: Do you have any comments on the proposed activity types (prohibited, controlled, non-complying, restricted discretionary)?

Question 13: Which building option do you prefer and why? What should be the cut-off point for managing 'buildings' (eg, all buildings and structures, only inhabitable buildings)? What about bridges and other structures? How could this be defined?

Question 14: Are there any other activities that should be managed to prevent risks to transmission lines? For example, damming and diverting water could endanger transmission support structures. Is this adequately controlled in regional plans now, or are additional provisions required?

Question 15: Have we accurately reflected the range of costs and benefits arising from the proposals for national environmental standards and who might bear the costs or receive the benefits? Are there any costs and benefits we have overlooked?

Question 16: Are our estimates of costs and benefits accurate? Do you have information on costs and benefits that could assist the second stage of our assessment (of the impacts of the final proposals)? Do you have any information on costs and benefits that we have been unable at this stage to quantify?

Appendix 1:

Proposed National Policy Statement on Electricity Transmission³

Preamble

This proposed National Policy Statement sets out the objective and policies for managing the electricity transmission network under the Resource Management Act 1991.

The efficient transmission of electricity on the national grid plays a vital role in the well-being of New Zealand, its people and the environment. Electricity transmission has special characteristics that create challenges for its management under the Resource Management Act. These include:

- transporting electricity efficiently over long distances requires pylons, conductors (wires) and cables that create significant environmental effects
- the transmission network is extensive and linear, making it important that where possible there are consistent policy and regulatory approaches by local authorities
- the linear character of the transmission network can limit the extent that it is feasible to avoid adverse environmental effects
- the environmental effects of the transmission network are often local while the benefits extend beyond the local to the regional and national making it important that those exercising powers and functions under the Resource Management Act balance local, regional and national environmental effects
- extensive investment in the transmission network and significant upgrades are expected to be required to supply demand for electricity and to meet the government's objectives for a renewable energy future.

Objective

To recognise the national significance of the electricity transmission network.

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³ 'Electricity transmission network' and 'electricity transmission' mean, the national grid of transmission lines and cables (aerial, underground and undersea, including the high-voltage direct-current link), stations and substations and other works used to connect grid injection points and grid exit points to convey electricity throughout the North and South Island of New Zealand. ('National grid' means: the assets used or owned by Transpower NZ Ltd.)

Policy 1

The benefits of sustainable, secure and efficient electricity transmission relevant to any particular project or development of the electricity transmission network may include:

- i) improved security of supply of electricity
- ii) improved efficiencies in the supply of electricity
- iii) the facilitation of new and existing renewable electricity generation
- iv) lower overall environmental costs from the generation of electricity.

Policy 2

The electricity transmission network should be operated, maintained and upgraded efficiently.

Policy 3

Corridors and sites should be located and other activities associated with the electricity transmission network should be undertaken in a way that avoids, remedies or mitigates any adverse effects on matters of national importance.⁴

Policy 4

Any new development⁵ that is sensitive to the effects of the electricity transmission network should be managed in a way that does not compromise efficient operation of the electricity transmission network.

Policy 5

Where maps are included in a plan, these should identify the existing electricity transmission network, whether or not it is designated.

- (e) The relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:
- (f) The protection of historic heritage from inappropriate subdivision, use, and development:
- (g) The protection of recognised customary activities.
- ⁵ Not related to the electricity transmission network.

⁴ The Resource Management Act (section 6) states that 'Matters of national importance' are:

⁽a) The preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:

⁽b) The protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:

⁽c) The protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:

⁽d) The maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:

Policy 6

Provisions dealing with electric and magnetic fields (EMF) associated with the electricity transmission network should be based on the ICNIRP⁶ guidelines.

Explanatory note

The proposed National Policy Statement will not detract from, or override, the responsibilities of local authorities to ensure that all relevant environmental effects are appropriately considered in carrying out their functions under the Resource Management Act 1991.

The proposed National Policy Statement will not override the Resource Management Act or any other legislation. The proposed National Policy Statement should be read together with other relevant planning documents, including the New Zealand Coastal Policy Statement.

The National Policy Statement will apply to all persons exercising functions and powers under the Resource Management Act. The provisions of the National Policy Statement will be included in documents pursuant to section 55(2A)(b) of the Resource Management Act.

⁶ International Commission on Non-Ionizing Radiation Protection (ICNIRP). Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz). *Health Physics* 1998, 74(4): 494–522.

Appendix 2:

Evaluation of options

Objective

The objective is to promote the sustainable management of electricity transmission (the national grid), and to ensure there is national consistency and adequate protection of the grid.

Assessment criteria

Key criteria were developed to assess the effectiveness of several possible options in meeting the purpose of the RMA and the objective for the provision of detailed national guidance:

- provide national consistency
- manage the environmental effects of transmission
- provide certainty
- allow for local input into decision-making
- enable activities required to operate and enhance the grid
- provide protection from inappropriate activities
- be cost-effective
- be able to be implemented in reasonable timeframes.

Evaluation of alternative options

The status quo and the following options were evaluated against the evaluation criteria.

- Enact legislation to deem designations for existing transmission lines.
- Have Transpower obtain designations through the process set out in the RMA.
- Rely on a national policy statement alone to address the issue by setting out policies and objectives and having local authorities create rules to give effect to these if necessary.
- Devise national environmental standards that prevail over plan rules relating to electricity transmission.

This evaluation only considers RMA options. The option of enhancing the enforcement of the electricity code of practice is covered, for completeness, in the discussion document (See sections 3.2). The results of the analysis are presented in tables A1 and A2.

The status quo

The status quo has been assessed against the criteria, as follows.

- **National consistency**: there is no national consistency in treatment of the operation, maintenance and upgrade of existing infrastructure. Rules vary widely between districts.
- Manage the effects of transmission: the variability of plan rules means that in some cases controls may be insufficient, and in other cases minor activities without significant adverse effects may be subjected to an inappropriate level of control.
- **Certainty**: around half of local plans provide a reasonable degree of certainty to local authorities on the matters to be taken into account when considering whether an activity (Transpower or third party) is to be permitted, or the type of resource consent required.
- **Local input**: the current framework provides the opportunity for local input to decisions.
- **Enabling**: half of district plans do not provide for upgrade activities that do not have significant environmental effects as permitted activities. Many plans apply the same rules to new lines and upgrading existing lines.
- **Protective**: around a third of district plans provide adequate protection for the transmission network from inappropriate activities that could put the network at risk, through implementation of a 20-metre rule (consent required for building and / or subdivision within 20 metres of the transmission line). Over half of district plans do not provide protection for transmission lines.
- **Cost-effective**: the status quo results in Transpower expenditure on advocacy for appropriate rules in local plans. Transpower has lodged appeals against around two-thirds of district plans, resulting in costs for both local authorities and Transpower in resolving the issues. There are also significant costs for both local authorities and Transpower in interpreting complex plan rules, determining whether activities have existing-use rights, and obtaining resource consents for activities with no significant adverse effects.
- **Timeliness**: Transpower has the opportunity to have input into plans when they are reviewed on a 10-yearly cycle, which is a slow process. Although Transpower could request private plan changes, this would be an expensive and potentially adversarial process.

Deemed designations

A designation is an authorisation included in a district plan that allows a requiring authority (in this case, Transpower) to undertake works without a land-use resource consent on a site or route. A designation also places restrictions on what anyone other than the requiring authority can do on the designated land that would prevent or hinder the designated activity, without the requiring authority's permission. Deemed designation would require special legislation to 'deem' designations that would apply nationally to all transmission lines.

- **National consistency**: deemed designations could be applied at any location in New Zealand, and could provide national consistency in the treatment of the existing network, including upgrades to existing infrastructure.
- **Manage effects**: deemed designations could manage the effects of transmission, but there would be extreme practical difficulties in coming up with a designation framework applicable at every location in New Zealand.
- **Certainty**: deemed designations would provide certainty to local authorities and Transpower about the status of transmission lines and activities.

- **Local input**: there would be no local input to decision-making. Deeming designations would not provide landowners with the opportunity to participate in the process of applying for a designation and any appeals. The only input would be via the select committee process at a national level. It is unlikely that deemed designations would be accepted readily by the majority of local communities.
- **Enabling**: deemed designations would give Transpower the right to do anything consistent with the designation without requiring resource consents under the district plan. Deemed designations could not authorise activities for which a consent is required under regional plans.
- **Protective**: deemed designations could restrict activities that could be carried out within the area of the designation and that could put the network at risk. However, they could not restrict activities carried out beyond designated boundaries, or address issues of reverse sensitivity. The potential cost of acquiring an interest in the land covered by the designation restricts the option of having a sufficiently wide designated strip to cover all off-site effects and third-party activities, which could put the integrity of the network at risk.
- **Cost-effective**: the costs to district councils could be reduced by transitional arrangements that do not require local authorities to revise plans immediately to include the designations. However, the main cost would be obtaining an interest in the land. Deemed designations would provide landowners with the opportunity to require Transpower to acquire or lease the land covered by the designation (section 185 of the RMA, Public Works Act 1981). The Reference Group report estimates that this would be extremely costly. Transpower have provided an unconfirmed estimate that the cost of acquiring interest in the land could be \$7 billion.
- **Timeliness**: this option would require special legislation to deem Transpower to have designations over the existing transmission network. Legislation could be enacted within two years.

Deemed designations could potentially go some way towards resolving some of the issues with pre-1988 lines. They would provide nationally consistent authorisation for transmission activities (subject to conditions to control effects) and restrictions on what anyone other than Transpower could do on the designated land. However, there would be no local input to the process except via select committee hearings. The cost would be considerable: Transpower estimate the cost could be in the order of \$7 billion. Deemed designations were not recommended by the Reference Group.

Transpower obtain designations

Under this option, Transpower would issue notices of requirement for the transmission network. The notices of requirement would be assessed by each local authority, and would be subject to submissions by the public, and appeals to the Environment Court.

- **National consistency**: this option would not provide consistency or certainty, because notices of requirement over a single line would be served on various local authorities, who could deal with them independently and propose different conditions. Transpower would be responsible for negotiating with local authorities to achieve consistent conditions across regions.
- Managing effects: designations would contain conditions to manage adverse effects.
- **Certainty**: once in place, designations would provide certainty to all parties.

- **Local input**: the designation process provides for local input: notices of requirement are publicly notified, the public can make submissions, the council holds a hearing if required, and can make recommendations to the requiring authority. Submitters and the local authority can appeal to the Environment Court.
- **Enabling:** as for deemed designations.
- **Protective**: as for deemed designations.
- **Cost-effective:** in addition to the costs of acquiring an interest in the land described above, the costs of Transpower obtaining designations would be much higher because of the cost of local involvement and possible Environment Court hearings. The cost could be spread over several years.
- **Timeliness**: obtaining designation for all transmission lines could be expected to take as long as 10 years.

This option would cost a similar amount to Transpower acquiring an interest in affected land using deemed designations, although it would give more flexibility to roll out notices of requirements over time and come to arrangements with landowners that could be less costly than outright purchase. However, the cost of the actual designation process in each district would be considerable, both for Transpower in preparing notices of requirement, for local authorities and the public in assessing notices, and in appeals to the Environment Court. Each council would recommend on designations, so there would be no national consistency. This option is also not favoured because of the extremely high cost, and it is likely that implementing it would take several years, or even decades.

National policy statement alone

In this option, the national policy statement would be the only national guidance provided. There would be no national environmental standards developed.

- **National consistency**: relying on an NPS would not give national consistency. An NPS can set overall policies, but would require local authorities to change their plans to give effect to policies by introducing specific rules. There could be considerable local variability in the rules.
- Manage effects: this would depend on the content of the local rules.
- **Certainty**: the ability to provide certainty would depend on how local rules are crafted.
- **Local input:** there would be the opportunity for local input into the development of local rules.
- **Enabling:** whether or not this option could provide for activities required to maintain and upgrade the transmission network would depend on the content of local rules.
- **Protective:** whether or not this option could protect the transmission network from inappropriate activities that could put the network at risk would depend on the content of local rules.
- **Cost-effectiveness and timeliness**: the cost would depend on whether local authorities waited until the next plan change to introduce rules to give effect to the national policy statement. Requiring that plans be changed within short timeframes would result in considerable cost to local authorities and to Transpower in submitting on plan changes.

The NPS would provide policies and objectives that local authorities would implement by developing appropriate rules. While this would give an opportunity for local involvement, it would not provide national consistency because implementation would be dependent on the

rules developed locally. It could impose considerable costs on local authorities in plan changes to implement suitable rules.

Permitted activity national environmental standards alone

Permitted activity standards would set out activities that Transpower could undertake to maintain and upgrade the network, which do not have significant environmental effects. Terms and conditions would define the activities and set thresholds of effects.

This option was recommended by the Reference Group, and a detailed investigation of the effectiveness, costs and benefits was undertaken. It was found that the benefits only just exceeded the costs. The present value of the net benefit (over a 10-year period) was only \$48,500, and the ratio of benefits to costs was 1.08.

Although a permitted activities standard would provide a nationally consistent approach for minor activities, a serious disadvantage is that it would provide no guidance on how to treat activities that do not meet the effects thresholds set out, or that are not listed. The question is complex and open to different interpretation by different local authorities. In fact a permitted activities only NES may make the situation more confusing for activities beyond permitted activities. This confusion could result in an increase in costs and project delays, and may result in plan changes to accommodate the NES.

- **National consistency:** standards for permitted activities would provide national consistency for maintenance of the existing network, including minor upgrades to existing infrastructure. However, there may be inconsistencies in the way plans deal with activities that are more than minor.
- Managing effects: only for minor activities.
- **Local input:** there would be the opportunity for local input into decision making on consent applications for activities falling outside the permitted activities NES.
- **Certainty:** while providing certainty for activities falling within the scope of the NES, a permitted activities standard could increase the confusion surrounding the status of other transmission activities.
- **Enabling:** permitted activities would enable Transpower to undertake activities that do not have significant adverse effects without requiring resource consent, but there is a risk that any activity falling outside the permitted activities thresholds could be regarded as discretionary, when a controlled status could be more appropriate.
- **Protect** the transmission network from inappropriate activities that could put the network at risk: not applicable.
- **Cost-effective**: the benefits only just exceed the costs, by less than the margin of uncertainty in estimating costs and benefits.
- **Timeliness:** a permitted activities NES could be implemented within 18 months.

Under this option, Transpower would continue to advocate for changes to district plans to incorporate provisions for activities that are beyond permitted status, at significant cost to both Transpower and the local authority. This option is not favoured because it does not fix the problem.

Preferred option: National environmental standards to manage transmission activities and transmission risks

The preferred option is the development of national environmental standards to:

- provide for transmission activities that do not have significant adverse effects to be permitted activities (ie, they can be undertaken without the need for resource consents)
- specify resource consent categories for other transmission activities
- protect transmission lines from inappropriate third-party activities.

This is preferred because the NES:

- can provide a consistent set of standards that apply across all districts, and provide certainty to local authorities and Transpower about the status of transmission activities and third-party activities that could affect transmission
- can facilitate transmission activities that do not have significant adverse effects, and make appropriate provisions for other transmission activities
- can provide an enforceable framework for controlling activities that could affect the transmission network
- shows significant benefits over costs (see table of costs and cost savings, table A3).

An assessment of the preferred option in terms of the selection criteria is given below.

Two standards are proposed (see chapter 4 of the discussion document for a description of the proposals). The first standard sets out a framework for managing the environmental effects of electricity transmission. It specifies activities that could be permitted (subject to terms and conditions to ensure there are no adverse effects) and the types of activities for which resource consents are required. The second standard sets out a framework for managing the potential adverse effects of activities undertaken adjacent to the transmission lines. It proposes controls on earthworks, deposition, buildings, subdivisions and boat ramps. Two options are presented for buildings: one closely aligned to electrical safe distances, the other a 20-metre zone each side of transmission lines where consent is required.

Assessment of standards providing for a range of maintenance and upgrading activities

- **National consistency**: this option provides for a nationally consistent framework of permitted activities and resource consent requirements. Under this option there would be no requirement for the expense of Transpower submitting on plan changes, or for the local authority responding to Transpower appeals.
- **Manage effects:** the proposed NES provides a consistent framework for managing the effects of transmission activities.
- **Certainty:** this option would provide certainty to local authorities and Transpower regarding the matters to be taken into account when considering whether an activity (Transpower or third party) is to be permitted or, if a resource consent is required, what type of consent will be required.
- **Local input:** there would be the opportunity for local input into decision making on activities for which resource consent is required, and through submissions on the NES proposals.

- **Enabling:** it is unlikely this option would be more enabling than a permitted activities NES for minor activities. However, it may facilitate the processing of resource consents for activities that are not permitted by the NES, focusing on the key issues and involving an appropriate amount of notification.
- **Cost-effective**: the cost of developing and evaluating this NES would be higher than for a permitted activities NES, but the benefits are much greater. The cost of implementation would be about the same as a permitted activities standard. Councils would not need to amend plans, because the NES would prevail over relevant plan rules.
- **Timeliness:** a transmission activities NES could be implemented within 18 months.

Assessment of standards to control activities that could put the national grid at risk

- **Consistency**: this option would provide a consistent set of controls on activities adjacent to transmission lines that could put the network at risk.
- Nationally applicable: the controls would be applicable nationally.
- **Certainty**: this option would provide certainty to local authorities, Transpower and landowners about consent requirements for activities adjacent to transmission lines.
- Local input: local input would be through submissions on the NES proposals.
- **Protection:** an NES could provide a reasonable degree of protection from activities that could put the transmission line at risk.
- **Cost-effective:** the cost of developing an NES, based on existing controls under NZECP 34 and district plans, is reasonable. Councils would not need to change their plans, because the NES prevails over applicable rules in plans. The benefits to arise from significant cost reduction in rectifying problems with the national grid caused by inappropriate third-party activities.
- **Timeliness:** An NES could be in place within 18 months.

Criteria	Options that failed to	satisfy the selection	criteria			Preferred option
	Status quo	Deemed designations	Transpower arrange designations	NPS alone	Permitted activities NES	Transmission activities NES
National consistency	Inconsistent local rules	Yes	No – variation between councils probable	No – reliant on local rules	Yes – but only for minor activities	Yes
Manage effects of transmission	Variable	Yes	No – variation between councils probable	No – reliant on local rules	Yes – but only for minor activities	Yes
Certainty	No certainty	Yes	Yes	No – reliant on local rules	No – may create confusion	Yes
Local input	Yes	No	Yes	Yes	Yes – submissions on NES & local decisions on consents	Yes – submissions on NES & local decisions on consents
Enabling	Variable	Yes	Yes	Variable	Yes – but only for minor activities	Yes
Protective	n/a	n/a	n/a	n/a	n/a	n/a
Cost-effective	No	Extremely high costs	Even higher costs than deemed designations	Moderate to high costs	Costs similar to benefits	Yes
Timeliness	10-year cycle	3-5 years	5-15 years	2-5 years	1-2 years	1-2 years

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Assessment of options for managing the adverse effects of third-party activities on the national grid Table A2:

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Criteria	Options which failed	to satisfy the selectio	n criteria		Preferred options	
	Status quo	Deemed designations	Transpower arrange designations	NPS alone	Risks NES based on NZECP 34	Risks NES with enhanced building controls
National consistency	Inconsistent – local rules	Yes	No – variation between councils probable	No – reliant on local rules	Yes – but only adjacent to lines	Yes
Manage effects of transmission	n/a	n/a	n/a	n/a	n/a	n/a
Certainty	No certainty	Yes	Yes	No – reliant on local rules	Yes	Yes
Local input	Yes	No	Yes	Yes	Yes – submissions on NES	Yes – submissions on NES
Enabling	n/a	n/a	n/a	n/a	n/a	n/a
Protective	No	Partly	Yes	Variable	Yes – but not for all risky activities	Yes
Cost-effective	No	Extremely high costs	Even higher costs than deemed designations	Moderate to high costs	Moderate costs (consent applications, enforcement)	Costs higher than for NZECP 34- based option
Timeliness	10-year cycle	3-5 years	5-15 years	2-5 years	1-2 years	1-2 years

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Summary of costs and benefits of the preferred option

A full description of the costs and benefits of the preferred option is set out in chapter 5 of this discussion document.

The key benefit of the proposed NES for transmission activities is that it could result in a considerable reduction in expenditure for both Transpower and local authorities in dealing with submissions on plan changes (where Transpower advocates for rules relating to transmission) and appeals. It should provide certainty in the type of consent required for each activity, and reduce consent processing timeframes and costs. The standard may result in local authority expenditure through plan changes to align with the standard (although this is not legally required) and government implementation costs.

The key benefit of the proposed NES addressing transmission risks is an estimated reduction in Transpower's expenditure on rectifying problems. The benefit is significantly greater for the 20-metre zone option, and this option would also result in a significant reduction in plan advocacy costs for Transpower and councils. Some councils already have this rule in their plans. The costs of this proposal fall on local authorities in terms of monitoring and enforcing the standards, and on landowners in terms of additional requirements for resource consents.

Table A3 summarises the costs and benefits of the proposed transmission activities NES alone, and in combination with each option for a transmission risks NES. The greatest net benefit would be achieved by implementing the transmission activities NES in combination with the '20 metre consent required' zone for the transmission risks NES.

	At 10% dis	scount rate	At 5% dis	count rate
Proposal	Net present value (\$ million)	Benefit : cost ratio	Net present value (\$ million)	Benefit : cost ratio
Transmission activities NES	2.2	3.9	2.9	4.3
Transmission activities NES + Risk NES: NZECP 34	3.9	3.0	5.0	3.2
Transmission activities NES + Risk NES: 20 m trigger zone	5.9	3.0	7.7	3.1
Risk NES NZECP 34	1.0	1.6	1.4	1.7
Risk NES 20 m consent required zone	3.1	2.1	4.1	2.2

Table A3:Preliminary summary of benefits of the proposed national environmental
standards

Sensitivity analysis

The sensitivity of the results to changes in assumptions about the costs and benefits of the proposals was assessed by varying these assumptions. The analysis looked at the changes in the overall costs and benefits if specific costs and benefits were increased or decreased by 25%. In the case of landowner costs, the sensitivity analysis looked at the effects of increasing the costs or benefits by 50%, as these costs were less certain.

The results presented here apply to the costs and benefits at a 10% discount rate.

For the transmission activities NES:

- If the expenditure by Transpower on maintenance and upgrading occurs earlier or later than predicted, there is very little change in the net present value or the benefit : cost ratio.
- If the benefits were 25% less than estimated, the net present value would drop to \$1.4 million, and the benefit : cost ratio would drop to 2.8 to 1. The analysis is sensitive to changes in assumptions about benefits.
- If the implementation costs were 25% more than estimated, then the net present value would drop to \$2.1 million and the benefit : cost ratio would drop to 3.4 to 1. The analysis is relatively insensitive to changes in assumptions about council costs.
- It is possible that the benefits of the NES could be less and the costs more than estimated at the same time. For example, if the NES resulted in a requirement for more consent applications, the benefits (of lower consent costs) would be less than anticipated and council costs higher. In the worst case scenario (benefits 25% lower and costs 25% higher than predicted) the net present value would drop to \$1.4 million and the benefit cost ratio would drop to 2.6 to 1, which is still worthwhile.

For the transmission risks NES (20-metre consent-required zone, option B):

- If the benefits (operational cost savings) were 25% lower than estimated, then the net present value would decrease to \$1.6 million and the benefit : cost ratio decrease to 1.6 to 1. The analysis is relatively sensitive to changes in assumptions about the operational cost savings.
- If the landowner costs were 50% higher than estimated, the net present value would drop to \$2.3 million and the benefit : cost ratio to 1.6 to 1. The analysis is moderately sensitive to changes in assumptions about landowner costs.
- If council costs were 25% higher than anticipated, the net present value would drop to \$2.9 million and the benefit : cost ratio to 2 to 1. The analysis is relatively insensitive to changes in assumptions about council costs.
- The relationship between costs and benefits is complex. It is unlikely that the landowner costs and the council costs would increase simultaneously. If landowner costs were higher than predicted, then it is likely that although consent processing costs would be correspondingly higher, enforcement costs would be lower. If the benefits were lower than anticipated, it may mean a high degree of non-compliance, with lower landowner costs (fewer consents sought) but higher enforcement costs.

In the worst-case scenario, if costs were greater than predicted and benefits less, as described above, then the net present value would decrease to \$0.6 million, and the benefit : cost ratio to 1.2 to 1. The equivalent worst-case scenario for the option based on NZECP 34 requirements would be a net present value of \$5,000 and a benefit : cost ratio just over 1.

Appendix 3:

A history of electricity transmission controls in New Zealand

The majority of transmission lines were built by the government (the New Zealand Electricity Department) in the 1950s and 1960s, with development of the national grid tapering off during the 1970s. In 1988 ownership of the transmission network transferred to the Electricity Corporation of New Zealand (ECNZ, a state-owned enterprise) and then to Transpower New Zealand Ltd (also a state-owned enterprise).

Under the Town and Country Planning Act 1977 (the legislation that preceded the RMA) there were designations in district schemes for most infrastructure (eg, roads and rail). Pre-1988 transmission lines were built by the New Zealand Electricity Department. The Crown did not need to arrange designations, and lines of 110 kV or less were permitted. Designations were obtained for substations only.

When the RMA came into force in 1991, other requiring authorities were able to take advantage of the 'rolling over' of designations into the new framework, but Transpower (by that stage a state-owned enterprise in its own right) could not, because it had never needed designations. The Electricity Act 1992 was amended to make it clear that pre-1988 lines were legally established and therefore had 'existing-use rights' under the RMA. However, Transpower requires easements for post-1988 lines (which include restrictions on landowner activities, but not the general public). Designations or resource consents are obtained as appropriate for new lines.

The vast majority of existing transmission lines do not have designations or registered easements. Transpower is a requiring authority under the RMA, and has the ability to arrange for designations. This has not been done, however, because the costs of acquiring an interest in the land affected (through purchase, lease or easement) is likely to be prohibitive.

For pre-1988 transmission lines, Transpower relies on:

- transitional RMA provisions (section 375) for public utilities, including that transformers and lines for conveying electricity up to voltage 110 kV (capacity 100 MVA) be permitted in transitional district plans
- section 10 of the RMA, which provides for existing uses of land to be able to continue provided they were already lawfully established and the effects are the same or similar to those that existed before the rule became operative or the proposed plan was notified
- the Electricity Act 1992 (Part 3), which confirms that existing works (completed or partially completed prior to 1 January 1988) were 'lawfully established' and establishes rights of access for Transpower for maintenance and upgrading (provided the land is not injuriously affected)
- Electricity Act mechanisms, such as the 'Trees Regulations', and NZ Electrical Code of Practice 34, which set out electrical safe distances for activities near transmission lines
- resource consents, where they are required for activities that do not have existing-use rights and are not permitted in plans.

Appendix 4:

Proposed NES for transmission activities

Objective

The objective of these proposals is to provide a consistent framework for managing the adverse effects of transmission activities throughout New Zealand by:

- providing for transmission activities that do not have significant adverse effects to be classified as permitted activities (as long as they comply with specific terms and conditions to define the threshold of effects)
- defining resource consent requirements for activities which are not permitted.

Note: if a transmission activity is not listed in the standard as permitted (table A4), controlled (table A5) or restricted discretionary (table A6), it should be regarded as a discretionary activity. In addition, table A7 lists activities specifically identified as discretionary.

Scope

The proposals for national environmental standards apply to transmission activities. In other words, the NES proposals apply to the operation, maintenance and upgrading or enhancement of transmission lines, including work undertaken adjacent to the lines that is required to achieve a specified activity (eg, moving a transmission tower requires associated earthworks). The proposals do not apply to activities undertaken at substations. The proposals only apply to the line owner or authorised agent.

How the proposals would work

Plans cannot be more lenient nor more stringent than the proposed NES. Refer to figure 3 (page 21) for a flowchart of the steps involved in determining consent requirements under the proposed NES for transmission activities, and to section 4.3 for an explanation of activity types. The steps are given below, and the detailed requirements for each activity type are set out in the following tables.

1. Is the activity listed as a permitted activity (Table A4)?

- a. If so, does it meet the terms and conditions listed (and the additional terms and conditions for noise and earthworks)? Then it is a permitted activity.
- b. If the activity is listed in the permitted activities list, but fails to meet the terms and conditions, then it will default to controlled, restricted discretionary or discretionary. The permitted activities table will specify where the activity defaults to.

2. Is the activity listed as a controlled activity (Table A5)?

- a. If so, does it fall within the detailed definition? Then it is a controlled activity.
- b. If the activity falls outside the definition, the table will specify where the activity defaults to (generally restricted discretionary).

3. Is the activity listed as a restricted discretionary activity (Table A6)?

- a. If so, does it fall within the detailed definition? Then it is a restricted discretionary activity.
- b. If the activity falls outside the definition, the activity will default to discretionary.
- 4. Is the activity listed as discretionary (Table A7), or is it not listed in Tables A4 to A6?
 - a. If so, it is a discretionary activity.
 - b. If the activity falls outside the restricted discretionary descriptions, or is listed as defaulting to discretionary, then it is a discretionary activity.

Examples of determining consent requirements

1. Reconductoring a line with a conductor of the same size (for maintenance reasons) at the same configuration, and the replacement of some insulators.

Status: The reconductoring would be **permitted** under Table A4 (1). Changing the insulators would be **permitted** under Table A4 (15).

2. Increasing carrying capacity of an existing line with tower increases of 18% to comply with the NZECP 34 ground-to-conductor clearances.

Status: The carrying capacity increase would be permitted under Table A4 (17).

Increasing the height of the towers is over 15% and exceeds the allowable height increase for a permitted [Table A4 (3)] or controlled activity [Table A5 (21)]. Therefore consent will be required as a **restricted discretionary activity** [Table A5(32)]. Note that since the increase in tower height results from line enhancement work by the line owner, the additional height increase allowed in Table A4 (3) point 4 for rectifying breaches by third parties does not apply.

3. Upgrading of an existing transmission line from 220 kV to 330 kV with insulator changes and increases to towers over 23% to comply with the NZECP 34 ground-to-conductor clearances.

Status: The increase in voltage would be **permitted** under Table A4 (17). Changing insulators would be **permitted** under Table A4 (15). As for example 2, increasing the height of the towers is over 15% and therefore consents will be required as a **restricted discretionary activity** [Table A6 (32)].

4. Construction of a new 220 kV line

Status: The construction of a new line is outside the scope of the proposed NES. The provisions of district plan rules will apply, unless the line owner arranges a designation in a district plan. Relevant provisions of regional plans will also apply.

Table A4: Proposed transmission activities NES: permitted activities

- All permitted activities are subject to the terms and conditions for earthworks and noise listed in (18), (19) and (20).
- The terms used to describe transmission activities are explained in the Glossary.

Ac	tivity	Terms and conditions	Default if fail to meet terms and conditions ⁷
1.	Repair, addition or replacement of conductors	 The work results in: no more than duplex configuration conductors not exceeding 50 mm diameter where the existing conductor already exceeds 50 mm, any new or replacement conductor not exceeding the diameter of the existing conductor. 	Restricted discretionary (39)
2.	Addition or replacement of earth wires and aerial communications cables (including earth wires containing an optic fibre ground wire)	 The work results in: no more than 2 earth wires per pole / tower, or 1 earth wire and 1 communication cable per pole / tower wires or cables not exceeding 25 mm diameter. 	Restricted discretionary (39)
3.	Alterations to or replacement / strengthening of towers and foundations (note: the definition of towers includes cross-arms) Alterations to or replacement / strengthening of poles (note: the definition of poles includes cross-arms or opuly includes cross-arms	 The tower height increase must not be more than 15% (including foundations and earth peaks) and the additional height must comply with any airport surface limitation or scheduled view shaft in a plan. The tower foundation footprint must not increase by more than 15% of the existing tower base footprint, calculated on an area basis. The tower foundation footprint must not be relocated by more than the <i>tower relocation envelope for</i> <i>permitted activities</i> (ie, no more than 60% of the width of the base, see figure 6, page 75). If the height increase is to correct an NZECP 34 violation created by parties other than the line owner, it may increase by up to 25%. The pole height must not increase by more than 15% (including foundations and earth peaks) provided the additional height complies with any existing airport surface limitation or scheduled view shaft in a plan. 	Controlled (21) or restricted discretionary (32)
	and guy wires)	 The pole must not be relocated by more than 2 m, measured as a horizontal distance, from the pole it replaces. If the height increase is to correct an NZECP 34 violation created by parties other than the line owner, it may increase by up to 25%. 	
5.	Replacement of a tower with a pole	The replacement pole must not exceed the height of the tower it replaces by more than 15%.	Restricted discretionary (32)
6.	Removal of existing lines		Controlled (27)
7.	Addition of circuits to lines designed to carry an additional circuit: Inangahua – Kikiwa B Inangahua – Westport B Haywards – Melling A Hairini – Mt Maungapui B	The conductors must not exceed 50 mm in diameter.	Restricted discretionary (39)

⁷ The number in brackets indicates the activity number in the following tables. For example, for adding conductors beyond duplex, the activity will default to restricted discretionary activity number 39 in Table A6.

Activity	Terms and conditions	Default if fail to meet terms and conditions ⁷
8. Trimming or removal of trees or vegetation for the purposes of transmission line maintenance	 Trees or vegetation are: not explicitly scheduled in a district plan not within a scheduled landscape / ecological protection area or land administered by the Department of Conservation under the Conservation Act 1987 or any other Act specified in Schedule 1 to that Act not planted for authorised river control purposes. Trimming or vegetation clearance: is supervised by an arboricultural professional; and does not contribute to or create slope or land surface instability, including subsidence, or erosion of the bed or bank of any river, stream or lake. 	Controlled (25) or restricted discretionary (36)
 Signs attached to transmission infrastructure 	 The total face area per pole / tower does not exceed 1 m². For signs required for safety or navigation purposes, the total face area per pole / tower does not exceed 5 m². 	Restricted discretionary (37)
10. Temporary structures required for transmission maintenance or upgrade	Structures are erected not more than 20 working days before commencement of line works and removed no later than 20 working days after work finishes.	Controlled (24)
11. Painting of transmission support structures, components and foundations		n/a
12. Non-abrasive washing of transmission support structures and components	 Washing is not to be undertaken within 50 m of a water body or public road, or within 100 m of an occupied building. The wash water is not to contain chemical additives. All readily collectible waste and debris arising from abrasive blasting is to be removed from the site. There is to be no discharge of contaminants to water, and no discharge to land of contaminants that could enter water 	Controlled (28)
13. Wet abrasive blasting of transmission support structures and components	 Wet abrasive blasting is not to be undertaken within 50 m of a water body or public road, or within 100 m of an occupied building. Abrasive material is to contain no more than 5% free silica. No paint stripper (except solvent rag used for degreasing), fungicides, acids, alkalis, sodium hypochlorite or other oxidising agents is to be used for surface preparation. There is to be no discharge of contaminants to water, and no discharge to land of contaminants that could enter water. There is to be no discharge of contaminants to air that are noxious, dangerous, offensive or objectionable at the notional boundary of any occupied building. Prior to wet abrasive blasting work on towers coated with lead-based paint, a geotextile material of a filter quality shall be positioned on and around towers to capture spent abrasive material. All readily collectible waste and debris arising from abrasive blasting is to be removed from the site. 	Controlled (28)

		Default if fail to meet terms and
Activity	Terms and conditions	conditions ⁷
14. Dry abrasive blasting of tower foundations	 Dry abrasive blasting is not to be undertaken: within 50 m of a water body or public road, or 	Controlled (28)
	within 100 m of an occupied building, ormore than 1 m above ground level.	
	 Abrasive material is to contain no greater than 5% free silica. 	
	 Prior to dry abrasive blasting work on towers coated with lead-based paint, a geotextile material of a filter quality shall be positioned on and around towers to capture spent abrasive material. 	
	 All readily collectible waste and debris arising from abrasive blasting is to be removed from the site. 	
	 There is to be no discharge of contaminants to water, and no discharge to land of contaminants that could enter water. 	
	 There is to be no discharge of contaminants to air that are noxious, dangerous, offensive or objectionable at the notional boundary of any occupied building. 	
15. Maintenance, replacement, alteration or addition of components or electrical fittings on support structures or conductors; for example (but not restricted to) hanger brackets, insulators, marker balls	There is to be no increase in the height of the structure unless permitted by items (3) or (4) of this table.	Controlled (21 or 22)
 Enhancement of existing circuits – retensioning, re- sagging, nip-tuck 		n/a
17. Operating at design voltage and increasing the voltage and / or carrying capacity of a line (this does not include any physical works required to upgrade the line)	Note: major increases in voltage or carrying capacity would require other physical work to be done (eg, increasing tower height), which would be likely to be restricted discretionary or discretionary.	n/a
 Any earthworks (including tracking) associated with the above permitted activities 	 The volume of any earthworks (including tracking) associated with a permitted activity shall not exceed any relevant permitted activity threshold specified in a regional plan. 	Controlled (27)
	 Earthworks in any scheduled landscape or ecological protection area identified in a district plan shall not exceed 50 m³ per tower or pole in a calendar year, or 100 m³ per track. 	
	 All areas of bare ground shall be protected from soil erosion for the duration of the works. 	
	 All areas of ground disturbance for foundation works shall be appropriately remediated at the completion of activities. 	

Activity	Terms and conditions	Default if fail to meet terms and conditions ⁷
19. Any earthworks (including tracking) associated with the above permitted activities	 Earthworks shall not contribute to nor create slope or land surface instability, including subsidence, or the erosion of the bed or bank of any river, stream or lake. 	Restricted discretionary (38)
	 Excavated material or debris shall not be placed where it can enter any water body or the coastal marine area. 	
	3. No earthworks to be undertaken in the coastal marine area or the beds of lakes and rivers.	
	 Any earthworks undertaken on land identified in a contaminated land register held by a district or regional council shall comply with any relevant requirements of a district or regional plan. 	
	 Construction or earthworks shall not be undertaken within an archaeological site, wāhi tapu area or any other cultural heritage area or sites explicitly scheduled in a district plan (unless the specific provisions of the district plan are complied with). 	
	 If any archaeological site, as defined by the Historic Places Act 1993, or site of cultural significance is exposed or identified before or during earthworks activities, the following procedures shall be applied: 	
	all site works are to cease immediately	
	 the area is to be secured to prevent further disturbance. 	
	Note: if any archaeological site that isn't listed in a plan is uncovered as a result of earthworks, then it will be necessary for the person carrying out the work to notify relevant tangata whenua, NZ Historic Places Trust, the relevant district council, and, in the case of human remains, the Police. A resource consent may be required.	
20. Noise and vibration associated with permitted activities	 Noise from all construction and maintenance work (including implosive jointing of conductors) is to comply with NZ Standard NZS 6803:1999 Acoustics – Construction Noise. 	Controlled (29 or 30)
	 Vibration from all construction and maintenance work is to meet the peak particle velocity limits in table 1 of German Standard DIN 4150-3:1999 Structural Vibration – Effects of Vibration on Structures. 	
	Note: Noise from the normal operation of transmission lines would be managed via the district plan, probably requiring compliance with NZS 6802:1991 Assessment of Environmental Sound or NZS 6802:1999 Acoustics: Assessment of Environmental Sound.	

Activity	Matters over which control is reserved	Default if outside controlled
 21. Replacement of towers, or placement of fittings on towers, where the height increase is up to 15% (as for permitted), but relocated outside the existing tower base footprint by more than 60% of the width, but no more than 1.5 times the width of the existing tower base footprint (figures 6 and 7, page 75) 	 visual, landscape, archaeological (including wāhi tapu), ecological effects construction works and timing. 	Restricted discretionary (32)
22. Replacement of poles, or placement of fittings on poles where the height increase is up to 15% and located more than 2 m but less than 5 m in a horizontal distance from the existing pole base	 visual, landscape, archaeological(including wāhi tapu), ecological effects construction works and timing. 	Restricted discretionary (32)
 Temporary line deviation where one or more of the support structures located outside the replacement envelope (1.5 times the base width for towers, 5 m horizontally for poles (figure 7, page 75) 	 visual, landscape, archaeological (including wāhi tapu), ecological effects duration of works construction works and timing. 	n/a
24. Temporary structures that exceed the time constraints for a permitted activity	 visual, landscape, archaeological (including wāhi tapu), ecological effects construction effects and timing of the work. 	n/a
25. Trimming of scheduled areas of vegetation to reduce the risk to the transmission line Note: this does not include individual scheduled trees	 effects on the form, integrity and longevity of the vegetation replacement species and location. 	Restricted discretionary (36)
 26. New access tracks to transmission lines, including permanent deviations of existing tracks: for the purpose of accessing transmission lines that are not within a scheduled landscape or ecological area or area of cultural significance 	 visual, landscape, archaeological (including wāhi tapu), earthworks and ecological effects earthworks matters (see (27) below). 	Restricted discretionary (38)
 27. Earthworks that do not meet specified permitted activity conditions, but excluding earthworks undertaken within a scheduled landscape or ecological or heritage area or area of cultural significance 	 volume and extent wlope stability wediment control visual, landscape, ecological and archaeological (including wāhi tapu) remediation construction effects and timing of the work. 	Restricted discretionary (38)
28. Wet or dry abrasive blasting within 50 m of a water body or coastal marine area but work is not undertaken in the water body or coastal marine area or public road or within 100 m of a public building	 containment methods for discharges to land, air or water measures proposed for spill contingency management extent and nature of effects on ecologically sensitive receiving environments. 	Discretionary
29. Noise associated with maintenance and upgrading of transmission lines that fails to meet permitted activity requirements	 timing of works and minimising effects on noise sensitive land uses giving notice of work to potentially affected parties. 	n/a
30. Implosive jointing of conductors that fails to meet noise limits for permitted activities	 timing of works and minimising effects on noise sensitive land uses giving notice of work to potentially affected parties. 	n/a

 Table A5:
 Proposed transmission activities NES: controlled activities
Table A6: Proposed transmission activities NES: restricted discretionary activities

Note: there are no defaults specified for these activities, because if an activity is outside the description it will default to a discretionary activity.

Activity		Matters over which discretion applies			
31.	Permanent deviation of transmission line outside the <i>tower relocation envelope for</i> <i>controlled activities</i> (figure 7, page 75) or the specified timeframes for permitted activities	 deviation route and siting of support structures in relation to visual, landscape, archaeological and ecological effects and areas of cultural sensitivity height of support structure siting of towers in relation to visual landscape and ecological effects earthworks and vegetation clearance construction effects effects on any scheduled heritage item electric and magnetic fields. 			
32.	Replacement or alteration of a pole or tower that is not otherwise specified as permitted or controlled	 height and siting of the tower or pole in relation to visual, landscape, archaeological and ecological effects and areas of cultural sensitivity construction effects. 			
33.	Underground transmission lines, including termination towers	 siting of termination towers in relation to visual, landscape and archaeological effects and areas of cultural sensitivity route of the underground cable in relation to visual, landscape, archaeological and ecological effects and areas of cultural sensitivity extent and nature of earthworks and sediment control construction effects effects on services and infrastructure electric and magnetic fields. 			
34.	Telecommunication facilities on existing towers or poles required for transmission line management and monitoring, and not specified as permitted activities	 antenna or dish or cable size, height and number visual and landscape effects. 			
35.	Permanent alterations to a scheduled transmission heritage item	 degree of change to be made and effects on its heritage value alternative methods. 			
36.	Trimming of individual scheduled trees or removal of scheduled areas of vegetation for the purpose of reducing risk to the transmission lines	 extent and nature of trimming and the effects on the health integrity and longevity of the tree ecological effects. 			
37.	Signs above the size limit specified for a permitted activity	orientationvisual effects.			
38.	 Earthworks that are associated with works on or access to a line are: undertaken within a scheduled heritage site, area or precinct; or undertaken within scheduled landscape or ecological protection area; or on land identified in a contaminated land register Addition or replacement of circuits, conductors or earth wires in excess of the number or size of conductors specified for	 extent and nature of disturbance and effects on the heritage values of the site area or precinct and areas of cultural sensitivity reinstatement earthworks management and methods extent and nature of disturbance in relation to visual, landscape and ecological effects extent and nature of disturbance in relation to health effects. visual effects timing of works and minimising effects on sensitive land uses 			

 Table A7:
 Proposed transmission activities NES: discretionary activities

Acti	Activity				
40.	Creating new access tracks through scheduled cultural or historic sites, or scheduled landscape / ecological protection areas				
41.	Work in the coastal marine area or in the beds of lakes and rivers				
42.	Any transmission activity not defined as permitted, controlled or restricted discretionary.				

Note: line upgrades which result in a significant increase in line voltage, in the number of circuits or in the number of conductors would require additional work, such as increasing tower height or significant earthworks. Such projects would be unlikely to meet the terms and conditions specified for permitted, controlled or restricted discretionary activities and would be likely to default to discretionary activities.

Appendix 5:

Proposed NES: activities that could put transmission lines at risk

Objective

The objective of the transmission risks NES is to establish consistent and reasonable controls on activities that could adversely affect the transmission lines, or pose a risk to the person undertaking the activity.

Scope

The proposed standard would set controls on activities carried out in the immediate vicinity of transmission lines that could adversely affect the lines or affect public safety. The proposed standard would apply to anybody other than the line owner undertaking activities adjacent to transmission lines that are not related to transmission operation, maintenance and upgrade. Earthworks and structures adjacent to transmission lines required as part of line maintenance and enhancement and undertaken by the line owner are controlled by the proposed transmission activities NES.

How the proposals would work

Plans cannot be more lenient than the NES. However, the NES will state that plans can be more stringent. A rule in a plan which covers the same activity as the NES (eg, subdivisions) will be able to be more stringent than the NES, and the matters for consideration listed in the plan rule will apply. For example, a plan could specify that subdivision is a restricted discretionary activity, whereas the proposed NES specifies that subdivision near transmission lines is a controlled activity. Where an activity is not addressed in the NES, the district plan rules would continue to apply.

Table A8 shows the detailed proposals and their relationship between the proposals and existing NZECP 34 provisions or district plan rules. A key difference between RMA controls and NZECP 34 is that NZECP 34 gives the line owner the discretion to allow activities, whereas under the proposed NES the local authority would have the discretion to grant or decline resource consents.

The proposed controls are based on existing controls in the mandatory code of practice for electrical safe distances (NZECP 34) and existing provisions in district plans under the RMA. Controls on excavating and depositing materials and building boat ramps near transmission lines, and on buildings and structures near transmission support structures, are based on the electrical safe distances and matters set out in NZECP 34. In addition, controls are proposed for subdivision within 20 metres of transmission lines, based on section 11 of the RMA. These controls are based on the existing requirements in district plans.

Two options are presented for buildings and structures near conductors:

- one based on NZECP 34
- the other extending the radial electrical safe distances to a 20-metre ground-level zone within which resource consents would be required.

Option A (based on NZECP 34 safe distances)

- 1. Buildings within the distances specified in schedule 3 pose electrical safety risks and are prohibited.
- 2. Buildings outside the distances specified in Schedule 3 (as certified by a qualified electrical engineer) but within the distances specified in Schedule 2 require a resource consent.

Anyone wanting to build within the distances from the conductors specified in Schedule 2 (see below) must demonstrate that the safe distances in Schedule 3 would not be exceeded. The Schedule 3 distances take account of the feasibility of lines coming into contact with buildings, and take particular account of accessibility to people and exposure to hazards.

3. Buildings outside the safe distances specified in Schedule 2 are not regulated by the proposed NES. The distances set out in Schedule 2 (from NZECP 34) are vertical distances under conductors, and distances to the side of conductors. They contain a conservative margin of error to allow for possible line sag and swing, and vary according to span length (and a small amount of variation based on voltage). These are simple distances, so expert advice is not required.

Option B (based on 20-metre 'consent required' zone)

- 1. Buildings within the distances specified in Schedule 3 pose electrical safety risks and are prohibited.
- 2. Buildings within 20 metres of the centre of the transmission line but outside the distances specified in Schedule 3 (as certified by a qualified electrical engineer) require a resource consent.
- **3.** Buildings more than 20 metres from the transmission line are not regulated by the proposed NES. The 20-metre distance is measured from the centre of the transmission line.

Table A8: Proposed NES for transmission risks

- plans can be more stringent than the NES
- activities not covered by this proposed NES will continue to be subject to plan rules
- this proposed NES will not apply to the owner of the transmission line.

Acti	vity	Activity type	Matters discretion applies to (for restricted discretionary activities)	Comparison with status quo			
Exc	Excavation near support structures						
1.	Excavation of the land adjacent to any pole or stay wire of an overhead conductor:						
	a. to a depth greater than 300 mm within 2.2 m, or which creates an unstable batter that is likely to endanger the structural stability of the transmission line support	Prohibited	n/a	The distances and requirements are consistent with existing requirements under NZECP 34.			
Ext	 b. to a depth greater than 750 mm, located at a distance between 2.2 m and 5 m. clusion: This does not apply to vertage 	Restricted discretionary	 the effect on the stability of transmission line supports the ability of the asset owner to excavate transmission line supports for maintenance and strengthening the extent that buried conductive pipes pose a safety risk to the transmission line or the public any other matters set out in a plan or proposed plan for excavations. 	istance of 1.5 m or greater			
froi 2.	m a pole or stay wire. Excavation of the land adjacent to any pylon						
	 a. at a depth exceeding 300 mm within 6 m of the outer edge of the visible foundation of the tower, or which creates an unstable batter that is likely to endanger the structural stability of the transmission line support 	Prohibited	n/a	The distances and requirements are consistent with existing requirements under NZECP 34.			
	 b. at a depth exceeding 3 m, located between 6 m and 12 m of the outer edge of the visible foundation of the tower. 	Restricted discretionary	 stability of transmission line supports no effect on ability to excavate transmission line supports for maintenance and strengthening any safety risk to the transmission line or the public from buried conductive pipes any other matters set out in plans for excavations. 	The distances and requirements are consistent with existing requirements under NZECP 34.			
Excl activ	Exclusion: 1 and 2 do not apply to excavations undertaken as part of any transmission line maintenance or upgrading activities.						

Activity	Activity type	Matters discretion applies to (for restricted discretionary activities)	Comparison with status quo
Deposition of material			
3. The deposition of material under or adjacent to a transmission line in a way that would reduce the height to the ground to less than the safe distances in Schedule 4 (Table 4 of NZECP 34)	Prohibited	n/a	This is a straight prohibition in both NZECP 34 and the NES, and the distances are the same.
Building near support structures			
4. The erection or placement of a building or structure closer to a transmission line support structure than the distances specified in Schedule 1 (Table 1 of NZECP 34) The distances are to be measured from the closest visible edge of the overhead conductor support foundation to the nearest part of the outermost part of the building or structure (See Glossary for definition of 'building or structure'.)	Restricted discretionary	 risk to the structural integrity of the transmission line effects on the ability of the transmission line owner to operate, maintain and upgrade the high-voltage transmission network proximity of buildings and structures to electrical hazards risk of electrical hazards affecting public safety, and risk of electrical faults causing disruption to electricity supply extent of earthworks required, and use of mobile machinery near transmission line which may put the line at risk risk of electrical hazards due to the mature height of any associated vegetation siting of building in relation to transmission lines to minimise visual effects from transmission line any other matters set out in plans for buildings. 	The distances in Schedule 1 are the same as the requirements of NZECP 34.
Building near conductors			
Prohibited zone around conductors			
5 Building closer to an overhead conductor than the distances specified in Schedule 3 (Table 3 of NZECP 34, electrical safe distances based on voltage and accessibility of building)	Prohibited	n/a	The distances are the same as NZECP 34 requirements. Buildings within the distances in Schedule 3 are prohibited in both the NES and NZECP 34.

Activity	Activity type	Matters discretion applies to (for restricted discretionary activities)	Comparison with status quo	
Option A: NZECP 34-based controls a	round conduct	ors		
6A Buildings or structures closer to the conductors than the distances specified in Schedule 2 and further from the conductors than the distances specified in	Restricted discretionary	Restricted discretionary	 risk to the structural integrity of the transmission line effects on the ability of the transmission line owner to operate, maintain and upgrade the high-voltage 	The distances are the same as NZECP 34 requirements.
An engineering study undertaken by a suitably qualified electrical engineer is required to determine that the structure is located outside the distances specified in Schedule 3.		 transmission network proximity of structures to electrical hazards risk of electrical hazards affecting public safety, and risk of property damage risk of electrical faults causing disruption to electricity supply extent of earthworks required, and use of mobile machinery near the transmission line that may put the line at risk risk of electrical hazards due to the mature height of any associated vegetation siting of building in relation to transmission line any other matters set out in plans for structures. 		
Option B: Controls on activities at gr	ound level			
 6B Buildings or structures within 20 m of the centreline of the transmission line, but further from the conductors than the distances specified in Schedule 3 An engineering study undertaken by a suitably qualified electrical engineer is required to determine that the structure is located outside the distances specified in Schedule 3. 	Restricted discretionary	 risk to the structural integrity of the transmission line effects on the ability of the transmission line owner to operate, maintain and upgrade the high-voltage transmission network proximity of structures to electrical hazards risk of electrical hazards affecting public safety, and risk of electrical faults causing disruption to electricity supply extent of earthworks required, and use of mobile machinery near the transmission line that may put the line at risk risk of electrical hazard due to the mature height of any associated vegetation the siting of building in relation to transmission lines to minimise visual effects from the transmission line any other matters set out in plans for this type of activity 	This is very different from NZECP 34. In addition to the differences listed above, the distances are extended from the distances in the schedule to 20 m, and instead of being horizontal / vertical distances they extend to ground level. 15 district plans include a requirement that resource consent be obtained for buildings and structures within 20 m of a transmission line.	

Activity	Activity type	Matters discretion applies to (for restricted discretionary activities)	Comparison with status quo
Subdivisions			
 Subdivision within 20 metres of the centreline of a transmission line An engineering study undertaken by a suitably qualified electrical engineer may be required to determine that no buildings are likely to be located within the distances specified in Schedule 3 	Controlled	 consideration of transmission lines in the subdivision design including the ability of the line owner to operate, maintain and upgrade access lines (for routine and emergency works), and mitigating the effect of the lines through siting of buildings, roading and reserves location of building platforms in proximity to the transmission lines risk to the structural integrity of the transmission line proximity of buildings and structures to electrical hazards risk of electrical hazards affecting public safety, and risk of property damage risk of electrical faults causing disruption to the electricity supply extent of earthworks required, and use of mobile machinery near the transmission line which may put the line at risk the mature height of any associated vegetation the risk of electrical hazard due to siting buildings in relation to transmission lines to minimise visual effects from the transmission line any other matters in a plan or 	All district plans address subdivision, and this is treated variously as a controlled, restricted discretionary or discretionary activity. With one or two exceptions, resource consent is always required for subdivisions. 28 district plans specifically require resource consent to be obtained for subdivision within 20 m of a transmission line, and this is treated as a controlled, restricted discretionary, or discretionary activity.
Boat ramps			
8. Construction of a boat ramp within 9 m in any direction of a transmission line	Non- complying	n/a	This is a requirement of NZECP 34 with 'prior written consent required'. Boat ramps are likely to be controlled in some way in regional plans as a coastal activity (not related to transmission).
Additional proposal: damming and d	liverting water		
Damming or diverting any surface water within 20 m of a transmission line, or in a way that could put the structural integrity of the transmission line at risk Note: Comments are invited on whether damming and diverting water should be included in the NES, or whether it is already covered adequately by other requirements.	Restricted discretionary	 effect on structural stability of transmission line any other matters set out in plans for damming and diverting water. 	This is not specifically covered in NZECP 34, but may be controlled in some regional plans. Further investigation will be needed to establish the degree of control in each regional plan, and whether this is covered under legislation related to dam safety

Schedule 1: Minimum safe distances between buildings and overhead electric line supports

Circuit voltage	Pole	Tower (pylon)
11 kV to 33 kV	2 m	6 m
Greater than 33 kV and less than 66 kV	6 m	9 m
Greater than 66 kV	8 m	12 m

Schedule 2: Safe distances for buildings and structures from conductors without engineering advice (from NZECP 34)

	Maximum span length	Minimum distance beneath conductors under normal conditions	Minimum distance to the side of conductors under normal conditions	
Circuit voltage	(m)	(m)	(m)	
Not exceeding 33 kV AC	125	7	8.5	
Exceeding 33 kV but not exceeding 110 kV AC	125	7.5	9.5	
Exceeding 110 kV but not exceeding 220 kV AC	125	8.5	11	
275 kV DC and 350 kV DC	125	8.5	7.5	
Not exceeding 33 kV AC	250	8	12	
Exceeding 33 kV but not exceeding 110 kV AC	250	8.5	12.5	
Exceeding 110 kV but not exceeding 220 kV AC	250	10	14	
275 kV DC and 350 kV DC	250	10	11	
Not exceeding 33 kV AC	375	9.5	20.5	
Exceeding 33 kV but not exceeding 110 kV AC	375	10	21	
Exceeding 110 kV but not exceeding 220 kV AC	375	11	22.5	
275 kV DC and 350 kV DC	375	10.5	18	
All other spans	Engineering advice required			

Notes:

Observance of potential conductor motion is required to ensure safe distances during construction.

Where supporting structures are not located on equal elevations, a specific engineering study may be required to ensure that distances are in accordance with Schedule 3.

Schedule 3: Minimum safe distances of conductors from buildings and other structures where specific calculation of conductor movement has been carried out (from NZECP 34)

		Not exceeding 33 kV AC (bare or covered)	Exceeding 33 kV but not exceeding 110 kV AC (bare)	Exceeding 110 kV but not exceeding 220 kV AC (bare)	Exceeding 220 kV AC or DC
Sa	fe distance conditions	(m)	(m)	(m)	(m)
A:	Vertically above those parts of any structure normally accessible to persons	4.5	5	6.5	7
B:	Vertically above those parts of any structure not normally accessible to persons but on which a person can stand	3.7	4.5	6	6.5
C:	In any direction (other than vertically above) from those parts of any structure normally accessible to persons, or from any part not normally accessible to persons but on which a person can stand	2.1	3	4.5	5
D:	In any direction from those parts of any structure not normally accessible to persons	1.5	2.5	3.5	4
E:	In any direction from the ground	Refer to Schedule 4			

Schedule 4: Minimum safe distances of conductors from the ground

	Vertica	Radial distance (m)		
Circuit voltage	Across or along roads or driveways	Any other land traversable by vehicles	Any land not traversable by vehicles due to inaccessibility	In any direction other than vertical on all land
Not exceeding 33 kV AC	6.5	5.5	4.5	2
Exceeding 33 kV but not exceeding 110 kV AC	6.5	6.5	5.5	3
Exceeding 110 kV but not exceeding 220 kV	7.5	7.5	6.0	4.5
Exceeding 220 kV AC or DC	8.0	8.0	6.5	5

Note: 'Vehicles' includes mobile plant.

Glossary and definitions

Arboricultural professional: a person with an appropriate qualification and experience in the trimming, removal and management of trees and vegetation.

Base footprint: the ground area on which an existing tower stands, the dimensions of which are defined by the outer points of the structure at ground level (not including concrete foundations).

Building or structure: a building or structure large enough to pose a risk to transmission. A firm definition needs to be developed for inclusion in NES regulations.

Circuit: a set of conductors (normally three) plus associated hardware and insulation on a transmission line, which together form a single electrical connection between two or more stations.

Conductor: the wire that carries electricity along a transmission line, and is made of copper or steel-reinforced aluminium. **Simplex, duplex, triplex, quadplex** refer to conductors of the same phase in a single, double, triple or quadruple configuration, respectively.

Dry abrasive blasting: the use of an abrasive material which is entrained in air and blasted at pressure onto a structure to abrade / remove surface layers of paint, zinc galvanising and rust.

Earthworks: the disturbance of the land surfaces by methods including blading, contouring, ripping, moving, removing, placing, replacing, excavating, cutting and filling.

Enhancement or upgrading: all activities and effects relating to an increase in the carrying capacity, efficiency or security of transmission lines; for example:

- (a) the addition of earth wires (which may contain telecommunication lines), earth peaks and lightning rods
- (b) alteration of, and extensions to, towers and poles, including works required in order to achieve compliance with the *New Zealand Electrical Code of Practice for Electrical Safe Distances* (NZECP 34: 2001) (eg, re-tensioning and re-sagging of conductors)
- (c) addition of circuits to lines
- (d) alterations to insulators and other hardware
- (e) erection of temporary structures and lighting
- (f) addition of conductors and / or replacement of conductors with larger conductors
- (g) earthworks, and trimming of trees and vegetation, associated with enhancement activities
- (h) construction noise and vibration associated with enhancement activities
- (i) use of machinery and vehicles associated with enhancement activities
- (j) increasing the voltage or current-carrying capacity of a line, or both.

Earthworks: the disturbance of the land surface by blading, boring, contouring, drilling, ripping, moving, removing, placing or replacing soil or earth; or by excavation, or by cutting or filling operations.

Height: the height of a transmission line structure (including conductors and earth peaks on towers, but not lightning spikes on poles) above ground level (natural or modified).

Implosive jointing: the compression of a fitting on a conductor or earth wire by means of a compressive implosive force.

Line owner / operator: Transpower New Zealand Ltd, a state-owned enterprise, is the sole owner and operator of the high-voltage electricity transmission network (national grid).

Maintenance: all activities and effects associated with the repair and replacement of transmission lines; for example:

- (a) repair, replacement and reconfiguration of fixtures and fittings, including cross-arms and insulators
- (b) repair and replacement of conductors
- (c) re-tensioning and re-sagging of conductors
- (d) temporary line deviations
- (e) wet and dry abrasive blasting
- (f) non-abrasive washing of towers
- (g) painting of towers and poles
- (h) repair, strengthening, and replacement of towers, poles and support structures, including foundation works
- (i) carrying out earthworks
- (j) trimming and removal of trees and vegetation
- (k) erection of temporary structures and lighting
- (l) maintenance of access tracks, including trimming or removal of vegetation and any earthworks
- (m) use of machinery and vehicles associated with maintenance activities
- (n) construction noise and vibration associated with maintenance activities.

National grid: the high-voltage electricity transmission network owned and operated by Transpower New Zealand Ltd. The technical definition of the national grid contained in the Electricity Governance Rules (Electricity Commission, 2007) is: "the system of transmission lines, substations and other works, including the High Voltage Direct Current link, used to connect grid injection points and grid exit points to convey electricity throughout the North and South Island of New Zealand".

Nip-tuck: Reducing conductor sag (and increasing the tension) across one or more spans by removing a length of conductor from one span (nip) which tightens the conductor in that span and in adjacent spans (tuck).

Non-abrasive washing: washing or water blasting involving the use of water at pressure (approximately 5,000 psi water blast stream), where no treatment chemicals or additives have been added to the water being used.

NZECP 34: the *New Zealand Electrical Code of Practice for Electrical Safe Distances*, reference NZECP 34: 2001 (Ministry of Consumer Affairs, 2001).

Occupied building: a building, as under the Building Act 2004, that is used for habitation or regular occupation, including dwelling houses, schools, hospitals and visitor accommodation.

Operation: all activities and effects associated with the use of transmission lines to convey electricity; for example:

- (a) inspection
- (b) the generation of noise
- (c) switching circuits on and off, and de-energising circuits
- (d) the livening of existing circuits not currently used to convey electricity
- (e) the placement of signs and hazard markers on towers, poles and conductors
- (f) telecommunications
- (g) use of access tracks by machinery and vehicles
- (h) currents varying in the line, depending on time of day, load etc.

Overhead line support: a pole or tower (pylon) used to support electrical conductors (wires).

Pole: a transmission line support structure, comprising up to three vertical supports, as well as its cross-arms, components and guy wires (in addition to the vertical supports).

Removal: in relation to trees and other vegetation, means the relocation, spraying or other activity that results in the permanent destruction of the tree or other vegetation.

Scheduled heritage item: an item, including a site, area or precinct, that has been explicitly scheduled in a district plan for protection of its historic heritage or cultural values.

Scheduled landscape / ecological protection areas: those areas explicitly scheduled or listed in district plans that seek to protect nationally outstanding landscapes and natural features (section 6(b) RMA), areas of significant indigenous vegetation and significant habitats of indigenous fauna (section 6(c) RMA), and also including mapped significant ridgelines and public view shafts. This excludes landscape or ecological management overlays, character or policy areas.

Scheduled transmission heritage item: a transmission line or parts thereof explicitly scheduled in a district plan for protection for its historic heritage values.

Scheduled tree / vegetation: individual trees or areas of vegetation explicitly identified and scheduled in a district plan for the purposes of protection and management.

Suitably qualified electrical engineer: A Qualified Electrical Engineer licensed by the Electricity Workers Registration Board or recognised under the Electricity Act 1992.

Telecommunications: has the same meaning under the Telecommunications Act 2001, but is limited to telecommunication facilities used as part of the operation of the transmission network.

Temporary line deviation: the construction and use of a non-permanent section of transmission line to divert electricity transmission during the repair, maintenance or enhancement of an existing section of transmission line; the temporary line is taken down once the repair, maintenance or enhancement is completed.

Temporary structure: a non-permanent structure (whether or not a building consent is required) required for a specific maintenance or enhancement task, which is removed once the task is completed.

Tower: a lattice-steel transmission line support structure, including all necessary cross-arms and components.

Tower relocation envelope: see diagrams below.



Drawing not to scale

Figure 7: Tower relocation envelope for controlled activities:



Transmission activities: all activities associated with the operation, maintenance and upgrading of transmission lines.

Transmission line: all facilities and structures used or associated with the high-voltage transmission of electricity within the national grid, excluding substations.

Trimming: in relation to trees and other vegetation, includes pruning, limbing-up, or other changes that could affect the health and form of the tree or vegetation.

Upgrading: see Enhancement.

Wet abrasive blasting: the use of an abrasive material which is entrained in water and blasted at pressure onto a structure to abrade surfaces.

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Note: the lines in the www.med.govt.nz URLs represent 4 underscores.