

National Policy Statement on Electricity Transmission

Implementation Guidance for Local Authorities



DRAFT v3.1

14 July 2009

National Policy Statement on Electricity Transmission

Implementation Guidance for Local Authorities

Contents

1	Introduction	4
	Purpose and Key Messages of this Guidance	4
	Other Associated Guidance	4
	Focus and Approach of this Guidance	5
	Structure of this Guidance.....	5
2	Background to the National Policy Statement on Electricity Transmission	6
	Reasons for the NPSET	6
	Relevance for Decision-making on Consents and Designations	6
	Terminology	7
3	Analysis of Need to Respond to the National Policy Statement on Electricity Transmission	8
4	Suggested Examples of Regional and District Policy Responses	29
	Appendix A – Supporting Information on NPS Policies by Transpower New Zealand Limited	39
	Benefits of the National Grid	39
	Constraints on Avoiding Effects	39
	Transmission Network Planning and Development.....	40
	Undergrounding Transmission Lines.....	42

1 Introduction

Purpose and Key Messages of this Guidance

The purpose of this guidance is to provide local authorities with direction on how the National Policy Statement on Electricity Transmission (NPSET), which came into effect on 10 April 2008, could be best given effect to through regional and district planning instruments.

The NPSET requires local authorities to give effect to its provisions in plans made under the Resource Management Act 1991 (RMA) by initiating a plan change or review within four years of its approval: that is, by 10 April 2012. Over this period, it is expected that many of the first generation of regional policy statements, regional and district plans prepared under the RMA will be reviewed: indeed, a number of local authorities are already well advanced in developing or notifying their second generation plans.

The key messages of this Guidance are:

- The NPSET requires a proactive response in order to give effect to its objective and policies;
- The NPSET imposes obligations on both Transpower New Zealand Limited (Transpower) and local authorities;
- In developing regional and district policies in response to the NPSET, early consultation with Transpower is encouraged, particularly in respect of Transpower's development planning for that particular region or district; and
- Conversely, Transpower will work with councils to provide relevant information in policy development and resource consent process.

Other Associated Guidance

This Guidance is one of three documents prepared to assist local authorities in the implementation of the National Policy Statement and National Environmental Standard on Electricity Transmission. The other two are:

Technical Guidance on the National Policy Statement and National Environmental Standard on Electricity Transmission provides information on the technical aspects of electricity transmission to assist in understanding the form and function of national grid and the issues associated with planning for its long-term development, as well as its ongoing maintenance and upgrading requirements. For example, this supplementary guidance will provide information on common operational and maintenance activities, including the constraints involved with such tasks, such as the how's and why's of raising tower heights. This full guidance will be released as part of the NES guidance package. In the meantime a glossary of relevant terms used in the NPS has been prepared.

Implementing NPSET Policies 10 and 11: Risks of Development Near High Voltage Transmission Lines has been developed by Transpower New Zealand to provide further information on the risks of development and activities on the transmission network, and discussion of alternative methods to manage those risks. This information is intended to assist in the preparation of section 32 evaluation with respect to the implementation of NPSET Policies 10 and 11.

Focus and Approach of this Guidance

This framework recognises the differing circumstances of local authorities around New Zealand, particularly in regard to the nature of existing regional and district policies and provisions and current trends in policy-making at regional and district levels.

At a regional level, while this framework focuses on responses through the regional policy statement, it must be emphasised that regional plans are also expected to give effect to NPSET where such plans have direct application to transmission activities, such as in regard to earthworks, air quality and activities within the coastal marine area.

Local authorities may decide to adapt rather than adopt the provisions outlined in this Guidance, particularly to suit the particular format and structure of the planning instrument, or as part of addressing the specific resource management issues of the region/district.

One of the key messages of this Guidance is that, in developing regional and district policies in response to the National Policy Statement on Electricity Transmission, early consultation with Transpower is encouraged, particularly in respect of Transpower's development planning for that particular region or district. Likewise, Transpower is encouraged to provide quality information to assist local authorities to appropriately manage environmental issues associated with electricity transmission.

The changes made in response to the NPSET could be undertaken in conjunction with responses to other changes in the statutory context relating to energy generation, distribution and use, including the new matters included within section 7 of the RMA that were introduced by the 2004 RMA Amendment Act.

Structure of this Guidance

This Guidance is structured as follows:

- ▶ Section 2 provides background information on some key aspects to the National Policy Statement on Electricity Transmission, and its relevance to resource consent applications;
- ▶ Section 3 provides an analysis of the one objective and fourteen policies contained within the NPSET in terms of the need to respond by regional and territorial authorities; and
- ▶ Section 4 gives examples of a range of regional policy statement and district plan provisions to give effect to the NPSET - these are intended to be a guide only.

The Appendix contains a summary by Transpower New Zealand of the benefits of the national grid, the operational and technical constraints to the use of different methods to avoid, remedy or mitigate adverse environmental effects, and the planning and development process for the transmission network.

2 Background to the National Policy Statement on Electricity Transmission

Reasons for the NPSET

In general, the NPSET seeks to ensure that, in providing for the transmission of electricity within a region or district and in managing the effects of the transmission network on the environment, the operational and long-term development requirements of the network are appropriately considered, and that its linear cross-boundary attributes are fully recognised.

The primary reason for the introduction of the NPSET is to resolve the inconsistencies and problems incurred by the provision (or lack of) for transmission activities within first generation RMA plans and policy statements. Notwithstanding that the nature of the national grid is largely the same from one end of the country to the other, all district plans deal with the national grid differently, and there are considerable variations in policy frameworks throughout the country.

There is therefore a need to promote a more standardised and consistent approach through New Zealand, while recognising that local authorities need to respond to their differing environmental circumstances. While the NPSET does not require a common approach be adopted in all aspects, particularly in terms of responding to the various local or regional environmental contexts, best practice would be to promote consistency and standardisation inasmuch as possible. The purpose of this Guidance is to assist local authorities by providing best practice advice on responding to the direction established by the NPSET.

As this Guidance highlights, both regional and territorial local authorities need to respond proactively to this National Policy Statement before 10 April 2012. Care should be given not to repeat or paraphrase the policies contained within NPSET; the focus should be to provide meaningful implementation at the regional and district level.

It should be emphasised that, as with other policy instruments under the RMA (such as the New Zealand Coastal Policy Statement), there are some inherent tensions between various policies and some competing requirements. Some key areas of tension are cross-referenced in this Guidance. While regional or district level policies may be able to address some of the tensions, often competing requirements can only be addressed on a case-by-case basis by decision-makers in respect to specific resource consent applications or Notices of Requirement.

Relevance for Decision-making on Consents and Designations

While this framework focuses only on the policy responses required by regional councils and territorial authorities under Part 5 of the RMA, it is important to emphasise that decision-makers are also required to apply the NPSET more broadly, as stated in the Preamble to the NPSET:

The national policy statement is to be applied by decision-makers under the Act. The objective and policies are intended to guide decision-makers in drafting plan rules, in making decisions on the notification of the resource consents and in the determination of resource consent applications, and in considering notices of requirement for designations for transmission activities.

In regard to the last two circumstances:

1. When considering an application for a resource consent, the consent authority must have regard to any relevant provisions of a national policy statement (section 104(1)(b)(i) of the RMA); and
2. When considering a notice of requirement, a territorial authority must have particular regard to any relevant provisions of a national policy statement, in accordance with section 171(1)(a)(i) of the RMA.

Therefore, it is anticipated that this Guidance should assist with the implementation of the NPSET when considering resource consents and proposed designations.

Terminology

The NPSET uses a range of terms and phrases in relation to the facilities owned and operated by Transpower. For the purpose of clarity and consistency, in this Guidance, the terms are used in the following circumstances:

<i>Transmission network</i>	when referring to the national grid in its entirety;
<i>Transmission infrastructure</i>	when referring to high voltage transmission lines, substations and any other associated facilities and equipment;
<i>Transmission corridor</i>	when referring to the area of land on either side of a transmission line within which reverse sensitivity issues may arise; and
<i>Transmission activities</i>	when referring to those activities undertaken by Transpower in operating, maintaining, upgrading and developing the transmission network

Transmission corridor - The concept of 'transmission corridor' refers to the corridor management approach, a management method that is commonly applied (explicitly or not) to roads and railway lines. As with road or railway corridors, the purpose of a transmission corridor is two-fold:

- To manage the ability for activities to locate so close to the transmission network as to potentially conflict with the safe and efficient operation and development of transmission infrastructure – such conflict may occur through potential safety issues or through interference or obstruction of necessary transmission activities such as maintenance and minor upgrading; and
- To provide the operator with a reasonable and practicable ability to operate, maintain or upgrade the transmission line, recognising that such activities may have minor residual effects on the environment (i.e. effects over and beyond existing effects), effects that are necessary and acceptable having regard to the national benefits of such work. This provision is sometimes referred to as the 'envelope of effects'.

Upgrades - The National Policy Statement refers to “upgrades” of transmission infrastructure. Upgrades to existing infrastructure are important means of meeting increased capacity needs on the network and can delay or forego the need for investment in a new transmission line. The physical means by which the need for increased capacity may be provided for on any particular existing line may include the following approaches.

- Tower extensions and related measures to allow increases in current carrying capacity, while maintaining minimum safe clearance distances between conductors and the ground, (see Section 3.5)
- Adding circuits
- Adding sub-conductors or re-conductoring

The National Policy Statement uses adjectives in reference to upgrading, including *minor* upgrades, *major* upgrades, and *substantial* upgrades. These terms are neither defined in the National Policy Statement, nor are they used or defined within the electricity sector. It is not clear, for example, whether these terms should be applied in terms of the potential environmental effects, the capacity change afforded by the upgrade or extent/cost of physical work undertaken – there is no direct correlation between these three aspects. However, within the RMA context of the NPS, the most appropriate focus for defining levels of upgrading should be on potential environmental effect.

The National Environmental Standards for Electricity Transmission Activities (NES) addresses the potential environmental effects of transmission upgrade activities. The NES categorises transmission activities by consent type based on the scale and type of potential adverse effects on the environment. It would seem appropriate that upgrade activities classified as permitted in the NES could be considered as constituting minor upgrades in terms of NPSET. The distinction between major and substantial should be determined on a case by case basis.

3 Analysis of Need to Respond to the National Policy Statement on Electricity Transmission

The following table examines the policies contained within the NPSET to determine whether there should be either a regional or district policy response to each NPSET policy.

NPS OBJECTIVE	REGIONAL RESPONSE?	TERRITORIAL RESPONSE?
---------------	--------------------	-----------------------

NPS OBJECTIVE	REGIONAL RESPONSE?	TERRITORIAL RESPONSE?
<p>OBJECTIVE To recognise the national significance of the electricity transmission network by facilitating the operation, maintenance and upgrade of the existing transmission network and the establishment of new transmission resources to meet the needs of present and future generations, while:</p> <ul style="list-style-type: none"> • managing the adverse environmental effects of the network; and • managing the adverse effects of other activities on the network. 	<p><i>Yes – through both the provisions of regional policy statements and the provisions of relevant regional plans</i></p> <p>The objective of the NPSET and its associated policies are required to be given effect by regional planning instruments as relevant. At an appropriate point before 10 April 2012, regional councils will need to review their current policies and provisions to determine whether they are adequately giving effect to the NPSET. The purpose of this review needs to be more than determining whether any provision is ‘not inconsistent with’ – provisions must be evaluated to determine whether they are giving effect to the NPSET. The term ‘giving effect’ is a proactive one, indicating that some form of response will be needed as relevant to ensure that priority is afforded to the transmission network as nationally significant resource. Furthermore, the word “facilitating” in the objective indicates a proactive response, requiring local authorities determine ways to aid or assist in the “operation, maintenance and upgrade of the existing transmission network and the establishment of new transmission resources” while managing adverse effects ‘of’ and ‘on’ the network.</p> <p>Accordingly, regional councils must provide some form of specific recognition and provision for the transmission network in their plans. If such response is part of a suite of provisions on infrastructure or network utilities, provisions for the transmission network should not be diluted by more generic policies and provisions.</p>	<p><i>Yes – through appropriate District Plan objectives, policies, method and rules</i></p> <p>As with regional planning instruments, District Plans will need to be reviewed to determine whether they are giving effect to the NPSET, in a proactive manner by 10 April 2012.</p> <p>Accordingly, territorial local authorities must provide some form of specific recognition and provision for the transmission network in their plans. If such response is part of a suite of provisions on infrastructure or network utilities, provisions for the transmission network should not be diluted by more generic policies and provisions.</p>

NPS POLICY	REGIONAL RESPONSE?	REFERENCE	TERRITORIAL RESPONSE?	REFERENCE
<p>RECOGNITION OF THE NATIONAL BENEFITS OF TRANSMISSION</p> <p>Policy 1 – In achieving the purpose of the Act, decision-makers must recognise and provide for the national, regional and local benefits of sustainable, secure and efficient electricity transmission. The benefits relevant to any particular project or development of the electricity transmission network may include:</p> <ul style="list-style-type: none"> i) maintained or improved security of supply of electricity; or ii) efficient transfer of energy through a reduction of transmission losses; or iii) the facilitation of the use and development of new electricity generation, including renewable generation which assists in the management of the effects of climate change; or iv) enhanced supply of electricity through the removal of points of congestion. <p>The above list of benefits is not intended to be exhaustive and a particular policy, plan, project or development may have or recognise other benefits.</p> <p><i>Note - Supporting information on the benefits of the grid are provided in Appendix A</i></p>	<p><i>Yes – through RPS objectives, policies and methods on significant infrastructure and/or energy, providing directions on regional plan responses</i></p> <p>As all regions in New Zealand contain part of the electricity transmission network, the benefits of these assets should be recognised and provided for by each RPS to give effect to this Policy. The term “provide for” is a proactive one, meaning ‘make preparation for’, thus requiring an active and enabling response by regional councils.</p> <p>The form, function and environmental context of transmission assets varies considerably: some regions contain only spur lines for supplying those regions, while others contain critical components to the national supply of electricity within the country. However, all of the benefits identified in Policy 1 are relevant to all parts of the network, and thus to all regions.</p> <p>Increasingly, RPS’s contain policies on “regionally significant infrastructure” such as airports, ports, gas pipelines, and public wastewater treatment plants. While such policies provide a rational nexus for giving effect to NPSET Policy 1, such an approach must not dilute or confuse national benefits with regional benefits – i.e. the transmission network provides a scale of national benefits not afforded by many regional facilities.</p>	<p>Objective R1.1 Objective R1.2 Objective R1.3 Objective R1.4</p> <p>Policy R2.1 Policy R2.2 Policy R2.3 Policy R2.4 Policy R2.5 Policy R2.6 Policy R2.7 Policy R2.8 Policy R2.9 Policy R2.10</p> <p>Method R3.1 Method R3.2 Method R3.3 Method R3.4 Method R3.5 Method R3.6</p>	<p><i>Yes – through District Plan objectives, policies, method and rules on network utilities, infrastructure and/or energy</i></p> <p>As every district (other than the Chatham Islands) contains part of the electricity transmission network, albeit of different capacities, the benefits of these assets as identified in Policy 1 apply across the country, and should therefore be recognised by and given due provision within district plans. The term “provide for” is a proactive one, meaning ‘make preparation for’, thus requiring an active and enabling response by local authorities.</p> <p>Increasingly, district plans include provisions on significant district infrastructure or, more commonly, network utilities and energy. While such provisions provide a rational nexus for giving effect to Policy 1 NPSET and for providing explicit recognition of the benefits of electricity transmission, such an approach must not dilute or confuse national benefits with district benefits – i.e. the transmission network provides a scale of national benefits not afforded by many district facilities.</p> <p>In addition to the benefits identified in the NPS, projects will also have specific benefits. For significant upgrading work or proposed new lines, these benefits will be identified by Transpower when seeking statutory approvals under the RMA.</p>	<p>Objective D1.1 Objective D1.2</p> <p>Policy D2.1 Policy D2.2 Policy D2.3 Policy D2.4 Policy D2.5 Policy D2.6 Policy D2.7 Policy D2.8</p> <p>Method D3.1 Method D3.2 Method D3.3 Method D3.4 Method D3.5 Method D3.6</p>

NPS POLICY	REGIONAL RESPONSE?	REFERENCE	TERRITORIAL RESPONSE?	REFERENCE
<p>MANAGING THE ENVIRONMENT EFFECTS OF TRANSMISSION</p> <p>Policy 2 – In achieving the purpose of the Act, decision-makers must recognise and provide for the effective operation, maintenance, upgrading and development of the electricity transmission network.</p>	<p><i>Yes – through RPS objectives, policies and methods on significant infrastructure and/or energy</i></p> <p>Giving effect to this policy is a critical element to responding to NPSET, and relates to the regional council's function under s30(1)(gb) RMA to integrate infrastructure with land use planning.</p> <p>The term "recognise" requires some form of explicit identification of the transmission network within a region, while the term "provide for" is a proactive one, meaning 'make preparation for', thus requiring an active and enabling response by regional councils.</p> <p>Therefore, an important facet of this policy is that regional councils must be satisfied that they have duly recognised and provided for the transmission network as part of their functions under the Act.</p> <p>This Policy is an overarching one, relating to both provision for the ongoing operation, maintenance and minor upgrading of transmission infrastructure (NPSET Policies 3 and 5) and to the long-term planning and development of the transmission network (NPSET Policies 6, 7, 8, 13 and 14).</p> <p>Implementing this policy requires a balancing approach, recognising the importance and benefits of electricity transmission in managing the use and development of the transmission network and its effects. In particular, it requires a proactive approach in identifying opportunities for providing for the use and development of the transmission network, in accordance with the principles of</p>	<p>Objective R1.1 Objective R1.2 Objective R1.3 Objective R1.4</p> <p>Policy R2.1 Policy R2.2 Policy R2.3 Policy R2.4 Policy R2.5 Policy R2.6 Policy R2.7 Policy R2.8 Policy R2.9 Policy R2.10</p> <p>Method R3.1 Method R3.2 Method R3.3 Method R3.4 Method R3.5 Method R3.6</p>	<p><i>Yes – through District Plan provisions on network utilities, infrastructure and/or energy</i></p> <p>Responding to this Policy should be part of responding to NPSET Policy 1, and should be given effect through district plan objectives, policies and rules to protect electricity transmission network or enable their operation, maintenance, upgrade and development.</p> <p>The term "provide for" is a proactive one, meaning 'make preparation for', thus requiring an active and enabling response by local authorities.</p> <p>The "effective operation, maintenance, and minor upgrading" aspects of this policy would be largely implemented through the impending National Environmental Standards on Transmission Activities (NESTA). This NES provides definitions of the terms "operation", "maintenance" and "upgrading", making provision for such work through various performance standards and activity classifications, based on the scale and type of environmental effects. However, the NES neither specifically covers new line development, nor does it define or address "major or substantial upgrading".</p> <p>Another important part of the response to this Policy would be district plan provisions (rules) for managing the adverse effects of third parties: for example, in making decisions on land development proposals that may adversely affect the long-term use and development of transmission infrastructure. This example emphasises the role that the NPSET has in guiding decision-making on consents.</p> <p>Such policies can be provided through a corridor</p>	<p>Objective D1.1 Objective D1.2</p> <p>Policy D2.1 Policy D2.2 Policy D2.3 Policy D2.4 Policy D2.5 Policy D2.6 Policy D2.7 Policy D2.8</p> <p>Method D3.1 Method D3.2 Method D3.3 Method D3.4 Method D3.5 Method D3.6</p>

NPS POLICY	REGIONAL RESPONSE?	REFERENCE	TERRITORIAL RESPONSE?	REFERENCE
	<p>sustainable management.</p> <p>In responding to this policy, an RPS should contain policies for the protection of the Grid from the adverse effects of third parties to limit constraints on the effective operation, maintenance, upgrading and development of the network (refer to NPSET Policies 10 and 11). In conjunction, it should promote the provision of corridor management approach (refer to 'Transmission Corridor' in the Terminology section), providing for the ongoing operation, maintenance and minor upgrading of the transmission network. This approach recognises the need to provide for common transmission line activities, focusing policy frameworks on the potentially more significant effects associated with new line and major upgrading.</p> <p>The RPS can provide direction on the need to provide for the development of the transmission network within a region, using the consent process to ensure a robust assessment of a proposed new line or major upgrading in which the benefits and costs are weighed, and opportunities to avoid, remedy or mitigate adverse effects are identified.</p> <p>Another important role of regional policy statements in this respect is to address the cross-boundary issues associated with managing electricity transmission network within a region to ensure a consistent approach by the constituent districts, particularly in regard to cross-boundary transmission upgrades and development.</p>		<p>management approach, within which sensitive land use activities should be managed to reduce safety issues and to limit constraints imposed by the proximity of structures and land uses on the ongoing operation and maintenance of the transmission infrastructure.</p> <p>Another element of a corridor management approach is to provide for performance and development standards for transmission activities that allow for the operation, maintenance and minor upgrading of transmission infrastructure.</p> <p>Even in areas of high value, through which a transmission line may traverse, it is important to ensure the reasonable operation, maintenance and minor upgrading of transmission infrastructure. Many of the potential effects stemming from transmission activities can be addressed through the resource consent process (i.e. through consent conditions.)</p>	

NPS POLICY	REGIONAL RESPONSE?	REFERENCE	TERRITORIAL RESPONSE?	REFERENCE
<p>Policy 3 – When considering measures to avoid, remedy or mitigate adverse environmental effects of transmission activities, decision-makers must consider the constraints imposed on achieving those measures by the technical and operational requirements of the network.</p> <p><i>Note – a short discussion on the constraints imposed on achieving measures to avoid, remedy or mitigate adverse environmental effects is presented in Appendix A to this Guidance.</i></p>	<p><i>Yes, through provisions to manage adverse environmental effects of transmission activities.</i></p> <p>This policy is directed towards the decision-making process for resource consents and designations. However, there is an onus on Transpower to consider and propose measures to avoid remedy or mitigate the adverse environmental effects of transmission activities.</p> <p>This policy seeks to ensure that, in setting conditions (of resource consents or designations), recognition needs to be given to the underlying technical and operational requirements of the network. The adverse effects of such facilities cannot always be avoided without unreasonable cost or constraints on the operation and use of transmission infrastructure. The RPS could seek to have the best practicable option principle applied – what is the best practicable method to avoid, remedy or mitigate adverse effects in a manner that recognises the technical and operational constraints, and the need to optimise reliability and security of transmission.</p> <p>Therefore, RPS policies could address this policy as part of its provisions on recognising the technical and operational requirements of the network.</p> <p>An RPS should provide explicit direction on dealing with a new line or major upgrading on a holistic basis, recognising that transmission lines usually traverse many districts. In considering how to avoid, remedy or mitigate the adverse effects, such as through financial contributions, an RPS could require councils to adopt a “whole-of-line” approach, recognising the</p>	<p>Objective R1.2 Objective R1.3 Objective R1.4</p> <p>Policy R2.1 Policy R2.2 Policy R2.4 Policy R2.8 Policy R2.10</p> <p>Method R3.2</p>	<p><i>Yes, through provisions on managing adverse environmental effects of transmission activities.</i></p> <p>District plan policies for the electricity transmission network could address this matter as part of their provisions on recognising the technical and operational requirements of the network: for example, in directing flexible approaches to condition setting such as the use of outline development plans and management plans for designations.</p> <p>As with the RPS, it is recommended that an effective approach would be the application of the best practicable option principle in considering measures to avoid, remedy or mitigate adverse effects, which would take into account the practicality, costs and technical and operational constraints involved with alternative methods. For example, undergrounding high voltage transmission lines entails not only technical constraints and significant costs, but also imposes significant constraints on the use of the land above the line. Refer to Appendix A for further detail.</p> <p>When developing rules for environments traversed by the National Grid, decision-makers should ensure that the Grid is not unduly constrained by those provisions which fail to recognise the technical and operational requirements of the network, such as a lack of provision for:</p> <ul style="list-style-type: none"> • Changes in the height of conductors, including provision for swing and sag; • Achievement of safe clearance distances; • Achieving a connection between electricity supply 	<p>Objective D1.1 Objective D1.2</p> <p>Policy D2.2 Policy D2.5</p> <p>Method D3.1 Method D3.2</p>

NPS POLICY	REGIONAL RESPONSE?	REFERENCE	TERRITORIAL RESPONSE?	REFERENCE
	<p>differing values of alternative methods to avoid remedy or mitigate adverse effects at differing scales. For example, the benefits of imposing any changes in route or in requiring the provision of offsets should be measured against the entire route.</p>		<p>sources and substations or points of direct distribution;</p> <ul style="list-style-type: none"> • Following a reasonably direct route between connection points; and • Other design and engineering constraints. <p>Policy 3 has direct significance for decision-making on resource consent applications and notices of requirement.</p> <p>The variables associated with the potential constraints from technical and operational requirements of the network make it impracticable to specify any defined list that would provide meaningful guidance to decision-makers. This limitation imposes an obligation on Transpower to ensure that the specific constraints relating to any particular project or transmission asset are adequately identified in any application.</p> <p>Refer to the Technical Guidance on the NPS and NES on Electricity Transmission (to be released as part of the NES guidance package) for further detail on these matters.</p>	

NPS POLICY	REGIONAL RESPONSE?	REFERENCE	TERRITORIAL RESPONSE?	REFERENCE
<p>Policy 4 – When considering the environmental effects of new transmission infrastructure or major upgrades of existing transmission infrastructure, decision-makers must have regard to the extent to which any adverse effects have been avoided, remedied or mitigated by the route, site and method selection.</p> <p><i>Note – information on the planning processes involved with the transmission network, including route, site and method selection, is provided in Appendix A, with more detail to be found in the Technical Guidance on the NPS and NES on Electricity Transmission</i></p>	<p><i>Yes, through a direction to the district plans as part of broader policy on managing adverse effects.</i></p> <p>RPS policies could address this matter under a policy on managing the effects of nationally significant infrastructure within a region, with regard to ensuring a consistent approach to new or upgraded lines across districts within the region. In particular, a policy could require specific recognition in the decision-making process of what reduction in effects has been achieved through site/route selection.</p> <p>As with NPSET Policy 3, the RPS should direct a “whole-of-line” approach to considering how to avoid, remedy or mitigate the adverse effects of major transmission line projects.</p> <p>In applying Policy 4, regard must also be given to the direction under NPSET Policy 3 in terms of recognising the constraints imposed on avoiding, remedying or mitigating adverse effects by the technical and operational requirements of the network.</p> <p>The Technical Guidance on the NPS and NES on Electricity Transmission provides information on the route, site and method selection process used by Transpower.</p>	<p>Objective R1.2 Objective R1.3</p> <p>Policy R2.1 Policy R2.2 Policy R2.7 Policy R2.9</p> <p>Method R3.2</p>	<p><i>Yes, through provisions on managing adverse effects of transmission activities.</i></p> <p>In responding to recommended Policy 3, some provision could be included within a policy on managing the effects of new/upgraded infrastructure and network utilities. In particular, specific recognition of the reduction in effects achieved through site/route selection should be made in consenting projects – for example, the benefits achieved by avoiding significant adverse effects on landscape through route selection and alternative alignments within a route.</p> <p>The application of the <i>net environmental benefits</i> concept would be appropriate, in terms of determining the overall preferred route, taking all matters – costs and benefits – into account. The application of the net environmental benefits has to be undertaken on a case-by-case basis, taking into account the specific context and circumstances of particular proposals.</p> <p>Policy 4 has direct significance for decision-making on resource consent applications and notices of requirement. In applying Policy 4, regard must also be given to the direction under NPSET Policy 3 in terms of recognising the constraints imposed on avoiding, remedying or mitigating adverse effects by the technical and operational requirements of the network.</p> <p>It should be noted that the Electricity Commission currently has a role in assessing and agreeing to any specific proposal for new electricity infrastructure, including the costs of both the works and any of the measures to avoid, remedy or mitigate effects.</p>	<p>Objective D1.1 Objective D1.2</p> <p>Policy D2.2 Policy D2.5</p> <p>Method D3.1 Method D3.2</p>

NPS POLICY	REGIONAL RESPONSE?	REFERENCE	TERRITORIAL RESPONSE?	REFERENCE
<p>Policy 5 – When considering the environmental effects of transmission activities associated with transmission assets, decision-makers must enable the reasonable operational, maintenance and minor upgrade requirements of established electricity transmission assets.</p>	<p><i>Yes, it should be addressed through policy on regionally significant infrastructure or other relevant policies</i></p> <p>This matter should be addressed as part of RPS policies for regionally significant infrastructure (see commentary on NPSET Policy 2). Part of this response should be to ensure recognition that, in assessing the effects of minor upgrading, the effects of the existing transmission infrastructure provide a “baseline”, and that the effects of any proposed changes should be considered as incremental (or marginal) to those baseline effects.</p> <p>Addressing this policy therefore requires an identification and assessment of the marginal effects of proposed works with the operational, maintenance and minor upgrade requirements of established assets. It also places an onus on Transpower to ensure that these requirements are described in a manner that facilitates understanding.</p>	<p>Objective R1.1</p> <p>Policy R2.2</p> <p>Policy R2.3</p> <p>Method R3.1</p>	<p><i>Probably no specific policy needed</i></p> <p>Should be addressed through a District Plan policy giving effect to NPSET Policy 2.</p> <p>This would be a relevant policy for decision-makers giving effect to the impending National Environmental Standards on Transmission Activities (NESTA) for transmission line proposals requiring resource consent under that NES.</p> <p>Prior to NESTA coming into effect, however, Policy 5 would direct that any conditions imposed on transmission projects should not unreasonably constrain the operational, maintenance and minor upgrade requirements of established electricity transmission assets.</p> <p>Transpower should supply Information on its assets when it applies for certificates of compliance for permitted activities, particularly those in which there is potential for ‘creep’ (for example, tower height). This information will over time provide local authorities with base data on specific assets.</p>	<p>Objective D1.1</p> <p>Policy D2.4</p> <p>Policy D2.8</p>

NPS POLICY	REGIONAL RESPONSE?	REFERENCE	TERRITORIAL RESPONSE?	REFERENCE
<p>Policy 6 – Substantial upgrades of transmission infrastructure should be used as an opportunity to reduce existing adverse effects of transmission including such effects on sensitive activities where appropriate</p> <p><i>Note: In the NPS, sensitive activities are defined as “includes schools, residential buildings and hospitals”. The NPS does not explain the sensitivity, but it is likely to be based on environmental effects (such as amenity values) and relative risks to safety and health. While some matters can be scientifically quantified, many of the ‘effects’ associated with reverse sensitivity issues are related to matters of perception and subjectivity, and are difficult to quantify.</i></p>	<p><i>May have some relevance for regional policies</i></p> <p>Much of the onus of responding to Policy 6 is on Transpower, which when preparing applications for consents or designations is under an obligation to demonstrate that it has examined opportunities and alternatives when proposing substantial upgrades of transmission infrastructure.</p> <p>“Upgrade” refers to making changes to existing transmission lines, usually to provide either for increased security in transmission or increased capacity to transmit electricity. The options for upgrading an existing line are therefore different to those that might be considered for a new line. (refer to the Technical Guidance on the NPS and NES on Electricity Transmission)</p> <p>While the exact meaning of “substantial” is not defined, in the context of this policy, it clearly relates to an upgrade of an existing line that is beyond minor. Policy 6 indicates that a substantial upgrade project for which consent (or designation) is sought should provide opportunities to achieve environmental enhancements.</p> <p>It may be appropriate to consider Policy 6 in developing regional policies on significant infrastructure within a region, particularly in reference to policies on existing infrastructure.</p>	<p>Policy R2.2</p>	<p><i>May have some relevance for district plan provisions</i></p> <p>Policy 6 may have some relevance for District Plan policy-making. At a broad level, this aspect should also be addressed in response to NPSET Policy 4.</p> <p>Much of the onus of responding to Policy 6 is on Transpower, which when preparing applications for consent or designations, is under an obligation to demonstrate that it has examined opportunities and alternatives when proposing substantial upgrades of transmission infrastructure. As noted, the options for upgrading are not the same as those for a new line.</p> <p>This Policy must be read in conjunction with Policy 3, in that there may be technical and operational requirements of the network that constrain the ability to reduce existing effects. Undergrounding transmission lines is commonly suggested as a method of reducing existing effects – however, there are some significant constraints involved with this method that limits its appropriateness and feasibility (refer to the Technical Guidance on the NPS and NES on Electricity Transmission for further discussion on undergrounding lines).</p> <p>The scope of upgrade options to be considered in regard to any particular transmission infrastructure has to relate to the scale and extent of existing adverse effects – it is more feasible to consider more costly upgrading options where the scale of existing adverse effects along one route is more significant than other routes (for example, urban areas</p>	<p>Policy D2.2</p>

NPS POLICY	REGIONAL RESPONSE?	REFERENCE	TERRITORIAL RESPONSE?	REFERENCE
			<p>compared with rural environments).</p> <p>It may be appropriate to consider Policy 6 in developing district plan provisions on significant infrastructure within a district, particularly where there is a significant resource management issue in which the presence of existing transmission line(s) is relevant: for example, in developing policies on residential areas. In such circumstances, there should be some policy guidance on how to respond to such issues, particularly where there are significant constraints involved in making major changes to routes or transmission methods. Again, in the development of such policies, dialogue with Transpower should be sought.</p>	

NPS POLICY	REGIONAL RESPONSE?	REFERENCE	TERRITORIAL RESPONSE?	REFERENCE
<p>Policy 7 – Planning and development of the transmission system should minimise adverse effects on urban amenity and avoid adverse effects on town centres and areas of high recreational value or amenity and existing sensitive activities</p> <p><i>Note – information on the planning processes involved with the transmission network, including route, site and method selection, is provided in Appendix A, with more detail to be found in the Technical Guidance on the NPS and NES on Electricity Transmission</i></p>	<p><i>Yes through provisions to manage the adverse effects of transmission activities</i></p> <p>At a regional level direction should be given on appropriate locations for future transmission assets. In particular, this policy should be reflected in growth strategies and in any regional policies to protect urban amenity and sensitive areas and activities.</p> <p>This Policy is also relevant for decision-makers when considering specific resource consent applications and/or Notices of Requirement, with the onus on Transpower to demonstrate that it has examined opportunities and alternatives for minimising adverse effects when planning and developing transmission infrastructure. In this regard, the best practicable option principle is potentially useful tool (see commentary on NPSET Policy 3).</p> <p>There is also a presumption that high value areas are identified in plans. Policy 7 may have some relevance for regional policy-making on any of the matters specified in Policy 7, or, more broadly, on managing the effects of regionally significant infrastructure.</p>	<p>Objective R1.4</p> <p>Policy R2.1</p> <p>Method R3.1</p> <p>Method R3.6</p>	<p><i>May have some relevance for district plan policies on specific issues relating to urban amenity values, town centres and reverse sensitivity</i></p> <p>Policy 7 is relevant for decision-makers when considering specific applications for resource consent or notices of requirement. Much of the onus of responding to Policy 7 is on Transpower, which is under an obligation to demonstrate that it has examined opportunities and alternatives for minimising adverse effects when planning and developing transmission infrastructure.</p> <p>There may be significant operational and technical constraints involved with alternative methods. In this regard, the best practicable option principle is potentially useful tool (see commentary on NPSET Policy 3).</p> <p>Policy 7 has an urban focus, and is therefore the counterpart to the Policy 8, which has a rural focus.</p> <p>There are two aspects to Policy 7: the development of existing transmission assets within urban areas, and any proposed new lines. It should be emphasised that where possible Transpower seeks to avoid urban areas when planning new lines.</p> <p>In regard to changes to existing assets, the concept of marginal effects (discussed in reference to Policy 5) is relevant, which recognises that existing transmission lines within urban areas are part of the existing environmental baseline. In regard to any substantial upgrades of existing lines in urban areas, the comments on responding to Policy 6 are also relevant.</p> <p>There is a presumption that high value areas are</p>	<p>Policy D2.2</p> <p>Policy D2.3</p>

NPS POLICY	REGIONAL RESPONSE?	REFERENCE	TERRITORIAL RESPONSE?	REFERENCE
			<p>identified in plans. A district plan may have a particular resource management issue in which this Policy may be relevant, such as managing residential areas in which there is an existing transmission line. In developing such policies, district plans should contain clear explanations of the values to which provisions on these issues relate – for example, any areas identified as having “high recreation values”.</p> <p>Councils should be cautious in introducing policies and provisions such as blanket urban amenity protection that would effectively prevent Transpower from considering alternative methods to respond to Policy 7. Preferably, policies should provide guidance on the appropriate means to minimise adverse effects or, at the least, recognise the technical and operational constraints involved with the use of alternative methods (refer NPSET Policy 5).</p> <p>Councils should work with Transpower in reviewing policies on the relevant aspects of Policy 7.</p>	

NPS POLICY	REGIONAL RESPONSE?	REFERENCE	TERRITORIAL RESPONSE?	REFERENCE
<p>Policy 8 – In rural environments, planning and development of the transmission system should seek to avoid adverse effects on outstanding natural landscapes, areas of high natural character and areas of high recreation value and amenity and existing sensitive activities</p> <p><i>Note – information on the planning processes involved with the transmission network, including route, site and method selection, is provided in Appendix A, with more detail to be found in the Technical Guidance on the NPS and NES on Electricity Transmission</i></p>	<p><i>Yes through provisions to manage the adverse effects of transmission activities</i></p> <p>Policy 8 is most relevant for decision-making on resource consent applications and Notices of Requirement. The onus of responding to Policy 8 is largely on Transpower, which is under an obligation to demonstrate that it has examined opportunities and alternatives for avoiding adverse effects when planning and developing transmission infrastructure. In this regard, the concept of Best Practicable Option is useful tool (see commentary on NPSET Policy 3).</p> <p>This policy comes within the broader ambit of NPSET Policy 4 in regard to managing the effects of the development of transmission infrastructure. This could include requirement for an analysis of alternative routes, sites and methods, and possibly include criteria or matters to consider in that process.</p> <p>The critical aspect of Policy 8 is the phrase “should seek to avoid”, which emphasises a proactive and constructive approach to the selection of routes, and assessment of effects. A regional policy could be to encourage councils to use conditions to avoid adverse effects on areas of high value.</p> <p>There is a presumption that high value areas are identified in plans. An RPS could include criteria for determining appropriateness, particularly in regard to outstanding landscapes (a s6(a) matter) and areas of high natural character, such as avoidance of ridgelines.</p> <p>Alternatively this policy could, in part, be responded to</p>	<p>Objective R1.2</p> <p>Policy R2.4</p> <p>Method R3.1</p> <p>Method R3.6</p>	<p><i>May have some relevance for district plan policies on specific issues</i></p> <p>The onus of responding to Policy 8 is largely on Transpower, which is under an obligation to demonstrate that it has examined opportunities and alternatives for avoiding adverse effects when planning and developing transmission infrastructure. In this regard, the concept of Best Practicable Option is a useful tool (see commentary on NPSET Policy 3).</p> <p>The rural focus of Policy 8 is the counterpart to the urban focus of Policy 7.</p> <p>In regard to any substantial upgrades of existing lines in rural areas, the response to Policy 6 is relevant.</p> <p>Policy 8 should also be addressed by Transpower in response to NPSET Policy 4. A district plan may have a resource management issue in which Policy 8 may be particularly relevant.</p> <p>There is a presumption that high value areas are identified in plans. Further, a district plan could include policies to proactively identify opportunities for identifying best practicable options for avoiding adverse effects for areas that may come within the scope of NPSET Policy 8. In particular, landscape policies should include a proactive provisions for finding measures that would avoid adverse effects on outstanding landscapes and natural features, areas with high natural character, and, if relevant, areas of high recreation and high amenity values.</p> <p>Councils should work with Transpower in reviewing policies on the relevant aspects of Policy 7.</p>	<p>Policy D2.2</p> <p>Policy D2.7</p> <p>Policy D2.8</p>

NPS POLICY	REGIONAL RESPONSE?	REFERENCE	TERRITORIAL RESPONSE?	REFERENCE
	<p>through other RPS policies (for example, on outstanding landscapes).</p> <p>Alternatively (or in conjunction), an RPS could include policies to encourage and enable project developments that avoid areas of high value as a positive form of response to this Policy.</p>			

NPS POLICY	REGIONAL RESPONSE?	REFERENCE	TERRITORIAL RESPONSE?	REFERENCE
<p>Policy 9 – Provisions dealing with electric and magnetic fields associated with the electricity transmission network must be based on the <i>International Commission on Non-ionising Radiation Protection Guidelines</i> for limiting exposure to time varying electric magnetic fields (up to 300 GHz) (Health Physics, 1998, 74(4): 494-522) and recommendations from the World Health Organisation monograph Environment Health Criteria (No 238, June 2007) or revisions thereof and any applicable New Zealand standards or national environmental standards</p>	<p><i>Not necessary</i></p>	<p>Objective R1.2</p>	<p><i>Partly – through a district plan's policy on managing new lines or major upgrades</i></p> <p>This Policy would be largely implemented through the impending National Environmental Standards on Transmission Activities. However, the NES does not cover new lines and, therefore, some policy for new lines referring to ICNIRP may be appropriate; supported by a specific permitted activity standard on EMF that mirrors that within the NES. For new lines it is also appropriate to consider the application of prudent avoidance or very low cost precautionary measures in line with World Health Organisation Recommendations. There is some consideration of this issue in the Technical Guidance on the NPS and NES on Electricity Transmission and in particular the EMF reference materials identified in the guidance.</p> <p>It is important to highlight that Policy 9 does not require councils to deal with EMF.</p>	<p>Policy D2.1 Policy D2.2</p>

NPS POLICY	REGIONAL RESPONSE?	REFERENCE	TERRITORIAL RESPONSE?	REFERENCE
<p>MANAGING THE ADVERSE EFFECTS OF THIRD PARTIES ON THE TRANSMISSION NETWORK</p> <p>Policy 10 – In achieving the purpose of the Act, decision-makers must to the extent reasonably possible manage activities to avoid reverse sensitivity effects on the electricity transmission network and to ensure that operation, maintenance, upgrading, and development of the electricity transmission network is not compromised</p> <p><i>Note: Refer to the “Technical Guidance on Electricity Transmission” on how third party development can compromise the operation, maintenance, upgrading, and development of the electricity transmission network.</i></p>	<p><i>Yes – through a policy that avoids compromising the electricity transmission network, including addressing reverse sensitivity issues</i></p> <p>No specific policy needed other than through policy on regionally significant infrastructure (possibly a part of a policy in response to Policy 1 and 2). A policy to require a corridor management approach could be appropriate, either separately or as part of a policy on the consistent cross-boundary management of electricity transmission network within a region. Such a policy would require a consistent minimum width of corridor to be applied throughout the Districts, although wider corridors may be applied if required.</p> <p>The phrase “reasonably possible” reflects that it may not be reasonable or practicable to avoid all adverse effects, both because of the operational and technical constraints of Transpower, but also because of the potential impositions on the property-owners that controls could have on their ability to reasonably use their land.</p>	<p>Objective R1.1 Objective R1.3</p> <p>Policy R2.1 Policy R2.2 Policy R2.4 Policy R2.6 Policy R2.7 Policy R2.8 Policy R2.9 Policy R2.10</p> <p>Method R3.1 Method R3.3 Method R3.5</p>	<p><i>Yes – through policies, methods and rules that provide a corridor management approach</i></p> <p>A District Plan should have a policy to apply a Corridor Management approach, within which appropriate controls are imposed. Such controls should provide an envelope of effects to allow for the ongoing operation, maintenance, and minor upgrading of the transmission infrastructure. Such controls would also seek to prevent activities that may endanger people by being in too close proximity to transmission line.</p> <p>This would be supported by District Plan policies on providing for transmission infrastructure and its operation, maintenance, and minor upgrading.</p> <p>It must be emphasised that there is a need for a minimum corridor width to be consistently applied within a district, although wider corridors may be applied if required. Policy 11 is relevant to responding to Policy 10, particularly in terms of the identification and use of buffer corridors. In identifying corridors, the emphasis should be on soundly based safety and operational needs.</p> <p>There is a large degree of subjectivity and perception involved with assessing amenity effects as they relate to reverse sensitivity. Amenity concerns can often be managed by good design of developments and mitigation options.</p>	<p>Policy D2.2 Policy D2.5 Policy D2.6</p> <p>Method D3.1 Method D3.4 Method D3.5 Method D3.6</p>

NPS POLICY	REGIONAL RESPONSE?	REFERENCE	TERRITORIAL RESPONSE?	REFERENCE
<p>Policy 11 – Local authorities must consult with the operator of the national grid, to identify an appropriate buffer corridor within which it can be expected that sensitive activities will generally not be provided for in plans and/or given resource consent. To assist local authorities to identify these corridors, they may request the operator of the national grid to provide local authorities with its medium to long-term plans for the alteration or upgrading of each affected section of the national grid (so as to facilitate the long-term strategic planning of the grid)</p> <p>Note: <i>In the NPS, ‘sensitive activities’ are defined as “includes schools, residential buildings and hospitals”. The NPS does not explain the sensitivity, but it is likely to be based on environmental effects (such as amenity values) and relative risks to safety and health.</i></p>	<p><i>Yes – through policies on the strategic integration of infrastructure with land use</i></p> <p>Under s30(1)(gb), regional authorities have the responsibility of the strategic integration of infrastructure, which include transmission lines, with land use through objectives, policies and methods. Such integration is particularly important in developing any policies on urban growth management in terms of providing for regionally significant infrastructure, including transmission corridors.</p> <p>Transpower can assist by providing its Annual Plan which identifies its 10 year view of grid development on a region by region basis and its longer term grid development strategy. However, it must be emphasised that such planning is dynamic over time and will change as requirements, pressures and resources change.</p> <p>Early dialogue with Transpower in regard to its long-term planning is a critical element to responding to Policy 11.</p>	<p>Objective R1.3</p> <p>Policy R2.1 Policy R2.2 Policy R2.4 Policy R2.6 Policy R2.7 Policy R2.8 Policy R2.9 Policy R2.10</p> <p>Method R3.1 Method R3.3 Method R3.5</p>	<p><i>Yes – through policies, methods and rules on providing a corridor management approach</i></p> <p>Through the application of Corridor Management approach, with appropriate controls that provide for the ongoing operation, maintenance, and minor upgrading of transmission infrastructure. This would be supported by District Plan policy on providing for transmission infrastructure.</p> <p>A District Plan could include a method to have a Council work with Transpower. Transpower can assist by providing its Annual Plan which identifies its 10 year view of grid development on a region by region basis and its longer term grid development strategy. However, it must be emphasised that such planning is dynamic over time and will change as requirements, pressures and resources change.</p> <p>The creation of buffers would not result in ‘sterilised’ land use corridors, as a range of land use can still occur within such corridors with little or minimal risks of adverse effects on the operational and maintenance requirements of Transpower. Furthermore, the resource consent process for some activities within the buffer would ensure that appropriate design and performance controls could be imposed without unduly impeding land use.</p>	<p>Policy D2.1 Policy D2.2 Policy D2.5 Policy D2.6</p> <p>Method D3.2 Method D3.4 Method D3.5 Method D3.6</p>

NPS POLICY	REGIONAL RESPONSE?	REFERENCE	TERRITORIAL RESPONSE?	REFERENCE
<p>MAPS</p> <p>Policy 12 – Territorial authorities must identify the electricity transmission network on their relevant planning maps whether or not the network is designated.</p>	<p><i>Yes if maps used</i></p> <p>If a RPS uses maps where reference to the presence of a transmission line would be appropriate/useful (for example, regional growth strategies).</p> <p>Identification of transmission lines on maps within Regional Plans may also be appropriate.</p> <p>An RPS could require a consistent approach in identifying the electricity transmission network be adopted by district plans.</p>	<p>Policy R2.8</p> <p>Policy R2.9</p> <p>Method R3.1</p> <p>Method R3.2</p> <p>Method R3.3</p> <p>Method R3.5</p>	<p><i>Yes – through a district plan method</i></p> <p>In addition, transmission buffer corridors should be identified where map scale permits.</p> <p>Transpower will continue to supply all local authorities with GIS information on the location of existing transmission assets.</p> <p>Preferably, as scale permits, the location of specific towers, lines and substations should be shown on maps, particularly in urban areas where the specific location of towers is most important.</p>	<p>Policy D2.1</p> <p>Policy D2.5</p> <p>Policy D2.6</p> <p>Method D3.5</p> <p>Method D3.6</p>

NPS POLICY	REGIONAL RESPONSE?	REFERENCE	TERRITORIAL RESPONSE?	REFERENCE
<p>LONG-TERM STRATEGIC PLANNING FOR TRANSMISSION ASSETS</p> <p>Policy 13 – Decision-makers must recognise that the designation process can facilitate long-term planning for the development, operation and maintenance of electricity transmission infrastructure</p> <p><i>Note – information on the planning processes involved with the transmission network, including route, site and method selection, is provided in Appendix A, with more detail to be found in the Technical Guidance on the NPS and NES on Electricity Transmission</i></p>	<p><i>Yes – through a specific RPS policy on designations</i></p> <p>In making provision for the planning and development of the electricity transmission network, an RPS should contain a policy to provide for a long-term corridor management approach that includes the use of designations when sought by Transpower.</p> <p>In particular, a regional policy should recognise the long-term and dynamic nature of network planning and development by encouraging flexibility through the use of outline plans (s176A RMA) and management plan conditions of designations. Such conditions should provide for an ‘envelope of effects’ that allow for the ongoing operation, maintenance, and minor upgrading of a new or upgraded line (refer to discussion on corridor management under the Introduction). For example, flexibility in the choice of technology (such as thermal rating) where the effects differ slightly from the existing situation.</p> <p>In responding to NPSET Policy 4 an RPS should ensure consistency in approach between districts on cross-boundary projects – i.e., consistency in duration of and conditions on corridor designations. This could refer to the ability of Transpower to use designations as a mechanism for providing flexibility and long-term planning of transmission corridors.</p> <p>If Transpower elects to designate its lines, it should be sufficient for the designation to broadly describe the maximum extent of the potential adverse effects, without having to provide the detailed design of the line. This would provide both certainty and flexibility, and thus facilitate the long-term planning of transmission corridors in accordance with NPSET Policy 13.</p>	<p>Objective R1.1</p> <p>Policy R2.3</p> <p>Policy R2.8</p> <p>Method R3.1</p> <p>Method R3.5</p>	<p><i>Yes – through a specific district plan policy and methods</i></p> <p>Through district plan policies on providing for infrastructure, some reference should be made to the use of the designation process by Transpower, and the need to ensure any such conditions provide some flexibility in allowing for the ongoing operation, maintenance, and minor upgrading of the new or upgraded transmission line, such as the use of outline plans, and management plan conditions. Such conditions should provide for an ‘envelope of effects’ that allow for the ongoing operation, maintenance, and minor upgrading of a new or upgraded line. The appropriate information required for such conditions could be specified in the information requirements for Notices of Requirement.</p>	<p>Policy D2.4</p> <p>Policy D2.5</p> <p>Policy D2.8</p> <p>Method D3.1</p> <p>Method D3.2</p> <p>Method D3.5</p>

NPS POLICY	REGIONAL RESPONSE?	REFERENCE	TERRITORIAL RESPONSE?	REFERENCE
<p>Policy 14 – Regional councils must include objectives, policies and methods to facilitate long-term planning for investment in transmission infrastructure and its integration with land uses</p> <p><i>Note – information on the planning processes involved with the transmission network, including route, site and method selection, is provided in Appendix A, with more detail to be found in the Technical Guidance on the NPS and NES on Electricity Transmission</i></p>	<p>Yes – through an RPS policy on integrated land use planning in regard to transmission corridor management, and through the provisions of Regional Plans</p> <p>Responding to this Policy comes under the function of regional councils under s30(1)(gb) to provide the strategic integration of infrastructure with land use. The RPS response should be either as part of provisions relating to urban growth or, if none, as part of the RPS policies on regionally significant infrastructure. RPS Policies should cover:</p> <ul style="list-style-type: none"> ▶ Urban growth and structure planning to take into account existing corridors and designations ▶ Consultation with Transpower when developing structure plans, urban growth strategies, plan changes and reviews <p>Responding to this Policy is in part connected with the response to Policy 13, particularly in terms of the need to provide flexibility in the long-term development of transmission corridors.</p> <p>It may also be appropriate to address this Policy through the provisions of Regional Coastal Plans and other regional plans.</p> <p>Regional councils should proactively consult Transpower when undertaking longer term planning exercises in areas where there are existing or planned transmission lines.</p>	<p>Objective R1.1 Objective R1.2 Objective R1.3 Objective R1.4</p> <p>Policy R2.8 Policy R2.9</p> <p>Method R3.1 Method R3.5 Method R3.6</p>	<p>No</p> <p>Not specifically required under NPS. However, it may be appropriate for district plans to include a policy on recognising and providing for significant infrastructure in their growth management policies and/or in any policies on managing district infrastructure</p> <p>Responding to this Policy is, in part, connected with the response to Policy 13, particularly in terms of the need to provide flexibility in the long-term development of transmission corridors</p> <p>Councils should proactively consult Transpower when undertaking longer term planning exercises in areas where there are existing or planned transmission lines.</p> <p>It should be emphasised that the planning for the development of the transmission network is a dynamic process. For example, the provision of new electricity generation facilities within an area will serve to shape Transpower's planning as to where new transmission lines are required.</p>	<p>Policy D2.2 Policy D2.3 Policy D2.4</p> <p>Method D3.1</p>

4 Suggested Examples of Regional and District Policy Responses

This section outlines the potential responses that could be made on regional policy statements and district plans to the directions under the National Policy Statement on Electricity Transmission. The responses seek to adopt the simplest most coordinated approach, by addressing all relevant NPSET policies in as integrated form as appropriate. The responses have also been developed to have regard to the types of issues currently addressed under regional policy statement and district plans.

GIVING EFFECT TO THE NATIONAL POLICY STATEMENT ON ELECTRICITY TRANSMISSION –	REGIONAL POLICY STATEMENTS
RPS OBJECTIVE(S)	
OBJECTIVE UNDER SECTION ON ENERGY OR REGIONALLY SIGNIFICANT INFRASTRUCTURE	
<ul style="list-style-type: none"> ▶ Objective RI.1 – <i>To recognise and provide for the sustainable, secure and efficient transmission of electricity within and through the Region by safeguarding the operational, maintenance and upgrading requirements of existing transmission infrastructure and by facilitating the long term planning, development and use of transmission infrastructure on a consistent basis within the region.</i> ▶ Objective RI.2 – <i>To minimise adverse effects from transmission activities on urban amenity and avoid adverse effects on town centres, outstanding natural landscapes, areas of high natural character and high recreation value or amenity and existing sensitive uses while recognising the technical and operational requirements and constraints of the transmission network, and the need to promote a consistent and a “whole of line” approach.</i> 	
<p>If a regional policy statement contains specific provisions for identifying and managing regionally significant infrastructure, then the transmission network within the region should be a key element of such provisions, provided the national benefits of the transmission network are not confused with or diluted by other regionally significant infrastructure (i.e. other infrastructure without a comparable level of national benefits). Preferably, providing specific objective(s) for the transmission network within the region is the most focused approach.</p>	
<p>Transpower is preparing technical guidance to assist in identifying the particular benefits of the transmission network within the region, which would include those listed in NPSET Policy 1, but also:</p>	
<ul style="list-style-type: none"> ▶ The benefits of a secure, efficient and reliable supply of electricity for the social and economic wellbeing of the region, and the health and safety of its inhabitants; 	

GIVING EFFECT TO THE NATIONAL POLICY STATEMENT ON ELECTRICITY TRANSMISSION –

REGIONAL POLICY STATEMENTS

- ▶ The transmission of energy generated within the region for the national grid and/or the local distribution system; and
- ▶ Ensuring the secure and efficient transmission of electricity through the region to other regions within New Zealand.

OBJECTIVE UNDER SECTION ON URBAN GROWTH (GENERALLY OR SPECIFIC TO AN AREA)

In regard to any provisions within a regional policy statement relating to the management of urban growth/form, appropriate references to transmission corridors should be incorporated. An appropriate objective could be as follows:

Objective RI.3– To ensure that land use, urban growth and other forms of land development avoid adverse effects on the operation, maintenance, upgrading and long term development of electricity transmission corridors

Such an objective could more broadly refer to regionally significant infrastructure, where that term would include the transmission network. This objective would also apply to land uses controlled by regional plans – for example, earthworks.

The term ‘corridor’ recognises that the most appropriate method to manage the long-term use and development of the transmission network is by identifying an appropriate linear area of land within which transmission lines and other assets are located. The term refers to an identified area of land and airspace surrounding transmission lines (including areas designated for transmission lines) in which activities that pose a potential risk to the safe and efficient use of the line itself, to the safety of the persons undertaking such activities, and to public safety are controlled to avoid such effects (refer to discussion on the corridor management approach in the Introduction).

- ▶ ***Objective RI.4 – To minimise adverse effects from transmission activities on urban amenity and avoid adverse effects on town centres, outstanding natural landscapes, areas of high natural character and high recreation value or amenity and existing sensitive uses and while recognising the technical and operational requirements and constraints of the transmission network, and the need to promote a consistent and a “whole of line” approach.***

RPS POLICIES

Policies for achieving the objective(s) for energy and/or regionally significant infrastructure should address a number of requirements under the NPSET, both in terms of managing the effects of transmission activities and the effects of third parties on the transmission network. Such policies should also address the enabling of short-term regular operational and minor upgrading activities for the transmission network, as well as the long-term planning and development requirements of the transmission network within the

GIVING EFFECT TO THE NATIONAL POLICY STATEMENT ON ELECTRICITY TRANSMISSION –

REGIONAL POLICY STATEMENTS

region.

At a regional level, the purpose of such policies is not only to guide decision-making at a regional level (for example, for regional consents and permits), but, as importantly, to ensure a consistent and coordinated response to the management of electricity transmission within the region, among the constituent territorial authorities. In managing the effects of transmission activities, a regional policy statement could include the following policies:

Policy R2.1 – *In managing the effects of existing transmission activities, territorial authorities shall take into account the benefits of the transmission infrastructure and the constraints imposed by the technical and operational requirements of the transmission network, and shall apply a consistent and coordinated approach to the provision for the operation, maintenance and upgrades to a transmission corridor that traverses local authority boundaries.*

Policy R2.2 – *When new transmission lines or major upgrades to existing transmission infrastructure within the region are proposed, including proposals that may extend beyond the region, local authorities shall assess the affected transmission corridor in its entirety, having regard to the benefits of the work, and the extent to which adverse effects have been avoided, remedied or mitigated within or beyond the region, including reducing adverse effects.*

Policy R2.3 – *When considering resource consent applications or proposed Notices of Requirement from Transpower in respect of the National Grid, including transmission corridors, territorial authorities within and across regional boundaries shall work together in a consistent and co-ordinated manner and shall focus on the broad extent of the potential effects of the establishment, operation and maintenance of the facility over time, rather than on the detailed design of the project.*

Policy R2.4 – *In managing areas of urban amenity, town centres, outstanding natural landscapes, areas of high, natural character and high recreational value or amenity and sensitive activities, territorial authorities shall take into account the development, operation and maintenance of transmission infrastructure in these areas.*

In terms of the adverse effects of third parties, policies could include the following:

Policy R2.5 – *To avoid, remedy or mitigate reverse sensitivity effects on the region's electricity transmission network, territorial authorities shall apply consistent policies to manage the location, design or form of potentially sensitive activities or development in close proximity to the transmission network in such a way that it does not adversely affect the continued safe and efficient operation and development of the network.*

Policy R2.6 – *Local authorities within the region shall identify and protect (existing) transmission corridors by ensuring that development within*

GIVING EFFECT TO THE NATIONAL POLICY STATEMENT ON ELECTRICITY TRANSMISSION –

REGIONAL POLICY STATEMENTS

these corridors does not generate adverse effects on the National Grid, including constraining its operation, maintenance and upgrading, generating reverse sensitivity effects and/or effects on public safety, and reducing visual amenity.

Policy R2.7 – *To ensure that potential risks to safety from the operation of the transmission network are minimised as far as practicable, and to provide for the efficient operation and maintenance of transmission lines, territorial authorities shall apply an appropriate and consistent separation distance between the transmission infrastructure and activities that involve or have the potential to involve the congregation of people or involve structures or other obstacles that could interfere with the safe and efficient operation of the transmission network.*

Policy R2.8– *In planning for changes in land use, including urban development and intensification, territorial authorities shall seek to achieve a pattern, form and design of land use that does not adversely affect the efficient operation, use and upgrading of transmission corridors (including corridors defined by designations) by accommodating growth and development in such a way that it –*

- ▶ *Does not adversely affect the secure supply of electricity*
- ▶ *Does not give rise to potential adverse health and safety effects*
- ▶ *Does not compromise physical access to the transmission network for the purposes of inspection, maintenance and upgrading*
- ▶ *Does not compromise the range of potential options for upgrading or redeveloping transmission assets within the transmission corridor*

This latter policy could be relevant to urban growth policies with a regional policy statement (see following section).

Policy R2.9 – *In planning for changes in land use, including urban development and intensification, territorial authorities shall seek to ensure that the rate, location and form of development is integrated with the provision and location of transmission corridors [or ‘strategic infrastructure’], and, in doing so, shall consult with Transpower when developing structure plans, urban growth strategies, plan changes and reviews.*

Policy R2.10 – *In facilitating the long-term planning of the development, operation and maintenance of transmission infrastructure, territorial authorities shall recognise the dynamic nature of transmission corridors by addressing and controlling to the extent necessary the broad effects likely to be generated, rather than by placing emphasis on a particular detailed design.*

METHODS

The following methods would be ways to implement the above policies:

GIVING EFFECT TO THE NATIONAL POLICY STATEMENT ON ELECTRICITY TRANSMISSION –

REGIONAL POLICY STATEMENTS

Method R3.1– District plans shall include objectives, policies and methods (including rules) to recognise transmission corridors within their district, to identify transmission lines on planning maps, and to provide controls on subdivision and land use as necessary to ensure that the operation, maintenance, upgrading and development of transmission infrastructure is not compromised as a result of the adverse effects of incompatible land uses (including structures).

Method R3.2– Notification of Transpower where resource consent applications may have adverse effects on the operation, maintenance and minor upgrading of existing transmission assets.

Method R3.3– In consultation with Transpower, growth and development strategies, including structure plans and comprehensive development plans, should identify transmission corridors within the subject area (including designations), and contain provisions designed to recognise the benefits of, and protect the long-term operation, maintenance, and development of such corridors

Method R3.4– Local authorities shall consult with Transpower about proposed development works, subdivision, land uses, discharges or other activities with the potential to adversely affect transmission corridors (including designations)

Method R3.5– The location of transmission corridors (including designations for future corridors) shall be included in councils' property information systems (including GIS).

Method R3.6 – District plans shall recognise the presence of existing transmission infrastructure in areas of outstanding natural landscapes, areas of high natural character and areas of high recreation value and amenity.

Use of maps within a regional policy statement

Maps should show the location of any high voltage transmission lines (including substations) on any map(s) within an RPS where its presence would be a relevant matter

GIVING EFFECT TO THE NATIONAL POLICY STATEMENT ON ELECTRICITY TRANSMISSION –

DISTRICT PLANS

Most district plans contains specific objectives and policies for network utilities which includes the electricity transmission network; some of these district plans also include broader energy matters in conjunction with their provisions for network utilities. In future, district plans may adopt the regional approach of providing for electricity transmission under a broader “significant infrastructure” policy framework.

The recommended responses have been written independently of these different approaches, focusing on providing a direct response to the directions under the National Policy Statement on Electricity Transmission. It is acknowledged, though, that territorial authorities may seek to provide an integrated approach to managing the effects of all network utilities/significant infrastructure within their districts, and accordingly seek to develop policies that address electricity transmission within broader provisions. However, if this integrated approach is undertaken, it will be essential that the key elements required to respond to the NPS are not lost or diluted.

OBJECTIVE

General overall objectives could be:

Objective D1.1– *The provision for the sustainable, secure and efficient use and development of the electricity transmission network within the District/City while seeking that adverse effects on the environment are avoided, remedied or mitigated to the extent practicable, recognising the technical and operational requirements and constraints of the network*

Objective D1.2 – *To recognise the importance of the national grid to the district’s, region’s and nation’s social, economic wellbeing*

To recognise and provide for the benefits of electricity transmission within each district/city, a number of policies may be required to address the key relevant policies of the National Policy Statement on Electricity Transmission. Such policies could includes the following:

POLICIES

Policy D2.1 – *To manage the reverse sensitivity effects generated by subdivision and land development within electricity transmission corridors to avoid, remedy or mitigate the adverse effects on both the safe, secure and efficient use and development of the transmission network and on the safety and amenity values of the community*

Note: any explanation to this policy should define ‘corridor management’ as setting minimum buffer distances from the transmission line and other assets to manage activities both within immediate proximity and adjacent to the line

GIVING EFFECT TO THE NATIONAL POLICY STATEMENT ON ELECTRICITY TRANSMISSION –

DISTRICT PLANS

Policy D2.2 – *To enable the continued operation and/or redevelopment of existing and provision for new transmission infrastructure by:*

- ▶ *Permitting the operation, maintenance, upgrading and development of existing transmission corridors where such works can be carried out without significantly changing the adverse effects associated with the existing corridor*
- ▶ *Avoiding, remedying or mitigating adverse effects to the extent practicable, having regard to the benefits of the works together with technical and operational requirements and constraints.*

Note: this is a generic policy, and could be used on a more refined basis for policies on specific rural and urban zones, such as specifically addressing policies 7 and 8 – it's trying to promote a broadly constructive approach ("identify opportunities") in avoiding adverse effects.

Policy D2.3 – *Recognise and provide for existing and future transmission corridors when identifying and managing areas of new urban development (including urban intensification, peri-urban/rural-residential development) to ensure the safe and efficient use and development of the transmission network*

Policy D2.4 – *Facilitate the long-term planning of the development, operation and maintenance of transmission infrastructure within the District/City by the provision of flexibility in the use of designations or land use controls*

In addition, there should be policy support for rules relating to the management of those land use activities within the transmission corridor that have significant potential to adversely affect the safety and operational requirements of the grid (i.e., buildings, structures, earthworks and vegetation). In particular, there should be a specific policy to address the control of buildings and structures that are proposed to be located within 12 metres either side of the centreline of the transmission line which generally should be avoided. "Close proximity" should be defined as being within 32m of the centreline of a transmission line, while "immediate proximity" should be defined as being within 12m of the centreline of a transmission line. "Tall vegetation" refers to shrubs or trees that will grow higher than 2m upon maturity.

Policy D2.5 – *Control buildings, structures and vegetation within close proximity to existing transmission corridors to avoid, remedy or mitigate any adverse effects on the safe and efficient development, operation and maintenance of transmission infrastructure*

Policy D2.6 – *To generally avoid locating building, structures, earthworks and tall vegetation under or within immediate proximity to a transmission line.*

GIVING EFFECT TO THE NATIONAL POLICY STATEMENT ON ELECTRICITY TRANSMISSION –

DISTRICT PLANS

METHODS

The following methods would be ways to implement the above policies:

Method D3.1 – Consult with Transpower in the application of policies relating to the transmission network within the District/City, including in the development of structure plans, development strategies and plan changes and reviews, and about proposed development works, subdivision or land uses with the potential to adversely affect transmission assets (including designations)

Method D3.2 – Use designations for the transmission network that provide for the long-term planning for the development, operation and maintenance of transmission infrastructure within the identified corridor, and to provide for flexibility through the use of outline plans and management plan conditions

Method D3.3 – Rules to provide for the development of the transmission network outside the requirements of the National Environmental Standards on Transmission Activities as no more than discretionary activities – i.e., for major upgrading proposals for existing transmission assets or for new transmission assets

Method D3.4 – Rules to control buildings, structures, earthworks and vegetation within 32m either side of the centreline of transmission lines

Method D3.5 – Require growth and development strategies, including structure plans and comprehensive development plans to identify transmission corridors within the subject area (including designations), and to contain provisions designed to recognise and protect the long-term operation, maintenance, and development of such corridors

Method D3.6 – The provision of information on the location of transmission corridors (including designations for future corridors) on the planning maps and within the Council's property information systems (including GIS)

Note: in providing rules relating to the National grid, the most effective approach is to provide separate 'district-wide' rules for transmission network, rather than zone-based rules, the latter approach leading to differing standards and conditions to transmission lines that traverse different zones. A district-wide approach promotes the use of consistent standards within a District Plan.

GIVING EFFECT TO THE NATIONAL POLICY STATEMENT ON ELECTRICITY TRANSMISSION –

DISTRICT PLANS

PROVISIONS FOR OUTSTANDING LANDSCAPES AND AREAS OF HIGH LANDSCAPE, RECREATION AND AMENITY VALUES

In developing policies for a district's outstanding landscapes and natural features, as well as area of high landscape amenity, some recognition and provision for transmission lines should be made, particularly where such areas are already traversed by transmission lines or have a reasonably foreseeable potential to be. It may be appropriate for a District Plan to specifically address provision for transmission lines in these areas if particularly relevant, or at least be explicit about the values that make these areas significant. Possible policies and method where relevant:

***Policy D2.7** – To recognise existing transmission lines within outstanding natural landscapes, areas of high natural character, high recreation value and amenity.*

***Policy D2.8** – New transmission infrastructure should only traverse [defined areas] where the infrastructure is subject to a significant functional constraint or where there is no feasible practicable alternative route and/or when significant adverse effects are outweighed by the overall benefits of the proposal*

Planning Maps

Show the location of all high voltage transmission lines (including substations)

Appendix A – Supporting Information on NPS Policies by Transpower New Zealand Limited

Benefits of the National Grid

Investment in the transmission network provides the following benefits. It facilitates:

- a. Both the maintenance and improvement of security of supply of electricity, i.e. the transmission network removes the reliance of electricity users on single points of generation, loss of a generator or loss of a line doesn't necessarily result in loss of supply as there are often multiple supply options; investment further improves security and reliability
- b. The efficient transfer of energy through a reduction of losses; conductors used in transport of electrical power offer some resistance to the power transferred which results in heating of the conductors at cost to efficiency. Transmission at higher voltages reduces current and therefore incurs lower losses. The national grid operates at high voltages. (See Section 3.3 for an explanation of the term voltage)
- c. The efficient development and utilisation of new generation, including new renewable generation which assist in the management of the effects of climate change. Some renewable generation sources are likely to be developed at locations presently not served by the existing transmission network. In addition, wind or tidal generation are intermittent power sources. The likely increase in renewable energy supply may therefore require improvements to existing lines and/or new line investment to ensure capacity and to accommodate variations in power flow.
- d. Enhanced competition in the supply of electricity through removal of points of congestion. That is, increasing the capacity of existing assets or development of new lines or new substations can increase the capacity and flexibility of the grid removing barriers to distant generators hence facilitating competition; and
- e. Sustained business confidence and provides for economic growth.

Constraints on Avoiding Effects

Transmission assets are an extensive, linear and connected system of lines and substations. Thus activities carried out – or not carried out – on one part of the system affect other parts. The interconnectivity within the system limits the options available to avoid, remedy or mitigate adverse environmental effects and therefore the concept of net environmental effects is important.

This 'one system' effect applies at a number of levels, from the process of designing a new transmission line, moving an existing tower along its alignment, through to reconfiguring an existing tower (such as extending its height).

Take for example, a situation where a height extension to a tower is required to maintain a safe ground to conductor separation distance, as a result of a line upgrade. The ground-to-conductor separation distance is required to meet regulations, and if that particular tower height is not increased, then an alternative method needs to be found. Adjacent tower heights may need to be raised, reconfigured or relocated, resulting in similar or more significant impacts for neighbouring amenity values.

In considering the location of a new line, there is an ability to avoid particular areas of community or environmental value. However, this too is a process of tradeoffs as lines cannot zig-zag to avoid every valuable site. In fact, any 'zig-zag' in the design of a line actually creates the most adverse landscape and visual effects since 'angle towers' are required to be much stronger and therefore larger and dog legs in lines are more intrusive in the landscape.

These examples illustrate that, when considered at the local level, options to mitigate identified environmental effects may in fact generate other additional and potentially increased adverse impacts. As a result, the mitigation process tends to be a trade-off of competing effects.

There are also operational requirements and engineering constraints that both dictate and constrain the way the network is managed, and thus the extent to which options to manage the environmental effects of the national grid are practicable.

In an operational sense in particular, the network is a dynamic working asset.

While the network is notionally a "fixed" and permanent asset, routine operational requirements represent the constant change in the network as power is switched around the system. This change has physical results as conductors swing and sag as they heat (or cool) relative to power flows and ambient conditions.

There is a need for regular line condition inspections for maintenance purposes (typically a 6-12 month cycle, occurring on foot or vehicle, and using a range of machinery as required).

Towers may also be reconfigured, strengthened or added to, to improve security (for example, earth peaks added for lightning protection), or as a result of increased load on a particular line.

The work involved in maintenance of the national grid is substantial, covering all 12,000km (plus) of lines, and over 40,000 towers (pylons) and poles around the country. This maintenance work may include, for example, a rolling programme of tower painting or replacement of worn or damaged components, trimming of vegetation, inspection or replacement of tower foundations, or testing conductors to predict remaining life. All of this work occurs at a large scale, has health and safety implications for both workers and the public, and requires mobile plant of various sizes to be available under the lines. All of this work continues around the network, quite apart from works undertaken as part of line upgrades (or new builds).

In terms of the development of new assets, the physical location of the network is largely determined by the location of supply points (i.e. generation) and connection to areas of consumption, referred to in the industry as demand. Opportunities to site new transmission lines in less visually sensitive areas are often constrained by the location of the load, other transmission assets and generation assets to which connection is required.

The highly visible nature of the assets means they are largely very difficult to disguise. There is often an expectation that a lot can be done to avoid, remedy or mitigate the visual appearance of existing or new transmission towers, particularly by under-grounding even one or two spans or lowering towers. Opportunities to underground transmission lines to mitigate visual impacts are heavily constrained by technical and operational requirements and cost implications.

Transmission Network Planning and Development

While there are a number of variable that influence how the transmission network is planned and developed, the main drivers are demand growth and investment in new generation sources. There is a complex process for transmission planning and the approval of further investment in the transmission network; a process that is quite separate from the RMA. This process ensures not only that Transpower invests as required to meet reliability standards, but also that it only invests as much as is necessary. The process identifies needs, requires the development and assessment of a range of transmission and non-transmission solutions, and confirms when and where a transmission solution is required. The Electricity Commission considers, and where satisfied, approves that solution, subject to meeting prevailing standards for grid reliability and efficiency, including economic efficiency.

It should be emphasised that investment in new transmission has lead times of up to seven years, and needs to be planned well ahead and with flexibility to adapt to uncertain future outcomes.

Demand forecasting is undertaken by the Electricity Commission at a national level. Transpower then derives regional energy forecasts by allocating the Commission's national energy demand forecasts across thirteen regions across both islands. Transpower publishes an Annual Planning Report, which identifies its plans for the Network.

Where it is determined that projected demand for electricity is going to outstrip existing transmission capacity, a process of identifying solutions begins, sufficiently in advance of the need date to allow potential investments to be constructed. The processes must comply with the requirements of the rules in Part F of the Electricity Governance Rules. These requirements determine how transmission upgrade projects address a reliability or congestion issue in a particular part of the transmission network. The location of the solution is also relatively fixed as it is predetermined by the location of generation sources, demand nodes and the existing transmission network.

Where it is confirmed that the transmission capacity must be increased, Transpower assesses the potential capacity of the existing infrastructure. Upgrading existing infrastructure is always considered as the first option because it is usually the most cost effective. Typically, consideration would be given to a range of transmission options, including augmenting the capacity of existing transmission lines, building new substations or generation connections, or building new transmission lines.

All investment in the transmission network (other than routine maintenance works) must be approved by the Electricity Commission, which will only approve proposed transmission network upgrades (including new lines) when there is clear, demonstrable need, assessed by compliance with various statutory tests.

Investment in new transmission assets may have significant lead times and needs to be planned well in advance to allow for the:

- ▶ reporting and consultation processes undertaken by Transpower;
- ▶ regulatory approval processes and consultation undertaken by the Electricity Commission;
- ▶ public consultation and RMA authorisations to be secured;
- ▶ property rights to be negotiated; and
- ▶ sufficient time for equipment procurement and construction of the asset.

If a new line is proposed, Transpower applies a robust route selection process by which it can determine the most appropriate location, taking into account the need to avoiding or mitigating environmental effects. This process, called the ACRE model, follows on from investigations into transmission and non-transmission alternatives and the decision to seek formal Electricity Commission approval. The ACRE model (Area-Corridor-Route-Easement) is a staged decision-making tool that involves progressively more detailed investigation and filtering of information to identify, select and confirm a final location for transmission assets. The model integrates information from the relevant disciplines (engineering, environmental and property) to achieve the most appropriate outcome. The preferred route is confirmed only after stakeholder consultation, including with directly affected landowners and other affected parties.

Once the most appropriate route is identified, Transpower will proceed to obtaining the necessary statutory approvals through the designation process under the RMA, as well as obtaining any supplementary resource consents from regional councils.

Further information on the planning and development processes behind the transmission network is provided in the Technical Guidance on the National Policy Statement and National Environmental Standard on Electricity Transmission".

Undergrounding Transmission Lines

Undergrounding of overhead transmission lines is a frequent expectation where new lines are proposed to be built or substantial upgrades undertaken.

Underground cables have obvious benefits in terms of reduced visual intrusion compared to overhead lines. However, there are environmental impacts associated with an underground cable, as well as significant cost and reliability penalties, as identified below. Consequently, the use of underground transmission lines may well be constrained. Some of the considerations are identified below.

Heat Management

Electricity flowing through transmission lines produces heat. With overhead lines this heat is dispersed into the air. With underground cables they must be insulated electrically which makes their manufacture expensive. The earth does not cool cables as well as air, and so larger, insulated cables are needed underground. However, with high currents it can also be necessary to cool the cables, and there are a number of ways that this can be done.

Physical Characteristics

The greater diameter of underground cables means that they are heavier and stiffer than overhead conductors. This characteristic makes underground cables more difficult to transport, or to bend around corners. Taken together, these characteristics limit the continuous length that can be installed at one time. This means that every few hundred metres, sections of cable must be joined.

Earthworks

Underground cables typically involve considerably more earthworks than putting up an overhead line, as a trench needs to be dug along the whole route, whereas overhead lines typically only need earthworks at each tower. In addition, with underground cables, a transition station is needed where the overhead and underground sections meet.

Land Use Constraints

An underground cable route must be kept permanently clear of buildings and other structures that would prevent ready vehicle access.

Any trees should be several metres from the cables and be shallow rooted to minimise any adverse effects on cable operation. This is not necessarily the case with overhead lines where, for example, an overhead line crosses a valley.

Security and Maintenance

Underground cables are more complex than overhead lines, and can be difficult, time-consuming and costly to repair. Cable faults require excavations to find and repairs, a process that may take as long as three weeks to complete. This feature makes underground cables less reliable than overhead lines, and the risk that they will be out of service for longer makes them inferior to overhead lines for the National Grid.

Cost

The Grid Investment Test which is used by the Electricity Commission to assess Transpower's investment proposals favours a least cost solution. The installed cost of a length of 220 kV underground cable is between five and fifteen times more than the same length of 220 kV overhead line. The terrain to be crossed is a big factor in this variation. Cable costs are much more affected by obstacles like gullies or rivers which overhead lines can easily span.

