Confirmed Pricing Methodology

Final Design Principles

29 March 2002
Coverage

This document discusses and develops the design principles Transpower will use in deriving its pricing methodologies.

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1. **Terminology/Definitions/Conventions**

1.1 The use of *italics*

Words in *italics* have a specific definition for the purposes of this document and are included in Appendix B, Glossary.

1.2 Abbreviations

The following documents are referenced at various times and will be referred to in the following manner:

The Statement to the Commerce Commission of the Economic Policy of the Government: Further Development of New Zealand’s Electricity Industry, dated 17 February 2002, is referred to as the Government Policy Statement, or GPS.

The Rulebook version, submitted by EGEC to the Commerce Commission for approval on 7 December 2001, is referred to as the Rulebook.

1.3 Use of the terms “objectives” and “principles”

The words “objectives” and “principles” are used in several places in this document and in referenced material, often separately but not with a consistent difference. Since the two are similar, no difference shall be attributed between “objectives” and “principles” other than directly due to their wording: references to objectives will be taken to include references to principles, and vice versa.

1.4 Use of the terms “costs”, “price” and “charge”

The word “cost” is used to refer to the actual cost of an item or a service and is usually expressed in dollars. The terms “price” and “charge” refer to the amount a Transpower customer is charged for the provision of a transmission service. The terms “price” and “charge” are used interchangeably and can be in dollars or expressed as a rate ie dollars per unit.

1.5 Use of the terms “sunk” and “fixed” as they relate to costs

Because *sunk* and *fixed costs* are similar in the sense that they do not vary with use in the short term (as discussed in section 6.1), they are often grouped together in discussions of pricing. For example the term “sunk cost recovery” has often been used to describe Transpower’s current and past pricing methodologies for transmission charges, which recover both the *sunk* (capital) and *fixed* (operating and maintenance) costs of the grid. The discussion of *sunk* costs is often hampered by such inconsistency. To avoid ambiguity, this document differentiates between the terms.
1.6 Terms for different sets of referenced principles

Discussion of different objectives, principles, outcomes etc. can rapidly become confusing and long-winded. This document refers to different sets of objectives and principles according to the following terminology:

- The GPS objectives and principles for the pricing of transmission services, given in Attachment 1 to the GPS, are referred to as GPS pricing principles. The subset of those objectives and principles deemed relevant to transmission pricing and as derived in section 4 of this document, are called relevant GPS pricing principles.

- Other GPS objectives and principles, referred to in the GPS under “Guiding Principles for the electricity industry”, are referred to as GPS guiding principles. The subset of those objectives and principles deemed relevant to transmission pricing and as derived in section 5 of this document, are called relevant GPS guiding principles.

- Rulebook objectives and principles for the pricing of transmission services, given in Part F Sec III of the Rulebook, are referred to as Rulebook pricing principles.

- The Rulebook guiding principles for the electricity industry in general, (given in Part A of the Rulebook) are referred to as Rulebook guiding principles. The subset of those principles deemed relevant to transmission pricing, are called relevant Rulebook guiding principles.

1.7 Labelling of principles

Some of the principles are lengthy, such as the GPS pricing principle “The pricing of new and replacement investments in the grid should provide Transpower customer’s with strong incentives to identify least cost investment options, including energy efficiency and demand management options”.

Using the full form in writing would be cumbersome and oral discussion of the principles will invariably refer to them in shorthand, so to avoid confusion a consistent set of labels will be used.

While the labels used consistently in this document are not intended to encapsulate or in any way replace the wording of the principle itself, they are chosen to roughly describe the principle for ease of cross-reference. 

Labels are in bold text. Where a principle is described in this document with a bold header and plain text, then the header is the label and the plain text is the principle.

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1 The GPS does not include labels of its pricing principles or guiding principles.
2. **INTRODUCTION**

Transpower is committed through its Statement of Corporate Intent (SCI) to delivering the outcomes sought by the Government in Attachment 1 of the GPS, a statement of economic policy, as referred to in s26 of the Commerce Act 1986.

Quoting from the GPS:

“The Government’s overall objective is to ensure that electricity is delivered in an efficient, fair, reliable and environmentally sustainable manner to all classes of consumer. Industry arrangements should promote the satisfaction of consumers’ electricity requirements in a manner which is least cost to the economy as a whole and consistent with sustainable development.”

The GPS focuses on the needs of the consumer and is a statement of outcomes that must be delivered by the electricity industry as a whole.

It expresses the Government’s continued preference for delivering those outcomes via market-driven solutions, in the belief that a market-driven approach will capture the benefits of competition through a robust process of price discovery, and placing new investment risks and benefits in the hands of those with the correct incentives to manage them.

*Industry participants* in those markets should possess both the information and the incentives to make decisions that satisfy the requirements of their customers.

Transpower believes that, within the context of the GPS, the *design principles* as derived in this document, will result in efficient outcomes at the margin of the transmission network. In this way, they will make the best contribution that transmission pricing can to *electricity industry efficiency*².

These *design principles* Transpower will be used in developing a pricing methodology to be submitted to the Electricity Governance Board, or *EGB*, in accordance with the process in Part F of the *Rulebook* for establishing a *confirmed pricing methodology*.

The *design principles* have been derived following a consultation process with interested parties, as described in Transpower’s “Confirmed Pricing Methodology – Process – Final Report”, dated 21 December 2001³. Briefly:

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² However, transmission is only one link in the electricity supply chain and where costs are allocated to agents of consumers rather than the consumers themselves. Transpower cannot account for the efficient pass through of costs to ensure that efficiencies are ultimately captured for consumers. Transparency and efficient bundling of charges in the supply chain to enable consumer choice will ensure that the policy outcomes are delivered.

³ Available on Transpower’s website at http://www.transpower.co.nz
The *Rulebook* process specifies three stages that Transpower must go through before the *EGB* can confirm a pricing methodology:

- Develop an appropriate process for developing the *design principles* and pricing methodology through consultation with stakeholders and the *EGB*
- Develop *design principles* through consultation with stakeholders and the *EGB*
- Develop a pricing methodology compliant with the *design principles*

The *Rulebook* process then requires that Transpower submit its methodology to the *EGB* so it can consider if an appropriate process has been followed, if the methodology conforms to the *design principles* and if the methodology conforms to the *Rulebook pricing principles*.

If the *EGB* is satisfied that the criteria have been met, the pricing methodology is confirmed, otherwise it is returned to Transpower for further work.\(^4\)

Transpower believes that any future *EGB* will emphasise the effectiveness of Transpower’s consultation in confirming Transpower’s pricing methodology. Although the Part F rules do not require Transpower to consult on its pricing methodology Transpower firmly believes that the integrity of the process depends on the transparent translation of the *design principles* into a pricing methodology. There is scope for options identified during development of the pricing methodology to be usefully discussed with stakeholders and therefore Transpower will discuss these as appropriate and a consultation phase has been added following development of a draft pricing methodology.

Given the process to date Transpower considers the principles to be robust and stable and sufficient to drive methodology development. This is crucial for the integrity of process and successful outcomes.

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\(^4\) Note that if the *EGB* or Transpower consider their different views irreconcilable, either party can request the Minister of Energy recommend to the Governor-General that an order in council instruct the Commerce Commission to determine a pricing methodology.
During the next phase of the process Transpower will develop and present a pricing methodology it considers consistent with the design principles developed during this phase. It will be important that Transpower relates its methodology to the relevant principles. Discussion around the interpretations Transpower has made in linking pricing methodology to principles and their practical implications is likely to form the basis of consultation in the next phase.
3. WHAT ARE DESIGN PRINCIPLES

The design principles provide the basis for Transpower to develop a transmission pricing methodology. They are a set of statements that describe the principles the methodology must conform to. The EGB, in considering the confirmation of that methodology, checks it for consistency against the design principles.

Since Transpower’s SCI requires consistency with the objectives and principles for the provision of transmission services as outlined in Attachment 1 of the GPS, we use this reference as a starting point: the design principles must include the relevant GPS pricing principles.

One approach to establishing the design principles would be to simply use the relevant GPS pricing principles. These principles are specific to transmission pricing and while they are obviously applicable, the section in the GPS “Guiding Principles for the electricity industry”, also includes some relevant objectives and principles. In particular they include some principles which help frame the “least-cost to the economy as a whole” approach and which will assist in making trade-offs during development of the methodology. Therefore relevant GPS guiding principles are also developed (in section 5). However, even though including relevant GPS guiding principles helps, both the relevant GPS pricing principles and relevant GPS guiding principles are purposely worded rather broadly and on their own could lead to a myriad of methodologies. So, it would be useful to provide some interpretations and prioritisation to limit the set of efficient methodologies.

Another way of looking at this is that the ultimate intention is for there to be a chain of logic from high level objectives and principles through to the detailed formulae that prescribe the method for how Transpower customer’s charges for transmission services are calculated. The stepping stones are increasingly specific sets of objectives and principles.

For that reason, we derive a set of interpreted principles which seek to clarify or add detail to the relevant GPS pricing principles and relevant GPS guiding principles.

The justification for each interpreted principle is derived in detail in section 6.

In summary, the design principles should encompass and add detail to the relevant GPS pricing principles and relevant GPS guiding principles to assist in designing and confirming a transmission pricing methodology.

The design principles will therefore include:

- a set of relevant GPS pricing principles, derived from the GPS pricing principles, as discussed in section 4.
- a set of relevant GPS guiding principles derived from the GPS guiding principles, as discussed in section 5.
- a set of interpreted principles, as discussed in section 6, which:
  - seek to add detail to the relevant GPS pricing principles and relevant GPS guiding principles
  - add other relevant principles consistent with but additional to the GPS.
The relationships between these terms and the different sets of principles is illustrated schematically below:

![Figure 2 – Relationship between various sets of principles](image)

Although the role of the Rulebook pricing principles and Rulebook guiding principles have not been mentioned so far, they are included in Figure 3. As discussed previously, Transpower is obliged, through its SCI, to design its pricing methodology consistent with the GPS pricing principles. The Rulebook, however, defines a set of principles (Rulebook pricing principles) and includes guiding principles (the Rulebook guiding principles) and require the EGB to assess a pricing methodology submitted for confirmation against both the design principles and those criteria, rather than the GPS.

Differences between the two sets of principles are discussed and compared in Appendix A. Briefly, the two are essentially identical, except with respect to how conflicts between principles should be resolved.

The GPS requires that conflicts should be resolved consistent with the objective:

“...to ensure that electricity is delivered in an efficient, fair, reliable and environmentally sustainable manner...”

while the Rulebook requires that conflicts be resolved consistent with the objective of:

“...satisfying the electricity requirements of consumers in a manner that is least cost to the economy as a whole and is consistent with sustainable development...”.

As the pricing methodology has not yet been developed, it is too early to say whether this difference will have any impact in practice.

Although Transpower’s pricing methodology will be designed against the GPS, our submission to the EGB will include a consistency check against the Rulebook criteria and a full discussion of any differences that result.
4. Deriving the relevant GPS pricing principles

This section lists the GPS pricing principles in Table 1, then justifies some exclusions, to derive a set of relevant GPS pricing principles. The relevant GPS pricing principles are summarised in the diagram in section 7. The principles in Table 1 are in no particular order.

<table>
<thead>
<tr>
<th>Proposed label and GPS text for pricing principle</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Least-distortionary sunk cost allocation</strong></td>
</tr>
<tr>
<td><em>Sunk</em> costs should be allocated in a way that minimises distortions to production/consumption and investment decisions made by <em>grid users</em>.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Charges should fully recover costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>After allowing for financial losses and costs properly chargeable to the shareholder, Transpower's charges should recover the full economic costs of its services.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Efficient pricing of new investments</th>
</tr>
</thead>
<tbody>
<tr>
<td>The pricing of new and replacement investments in the grid should provide <em>grid users</em> with strong incentives to identify least cost investment options, including energy efficiency and demand management options.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Locational signals for new entrants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pricing for <em>new entrants</em> should provide clear locational signals.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>User pays for connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>The costs of connection should as far as possible be allocated on a <em>user pays</em> basis.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prices reflect cost including risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services are priced in a manner that fully reflects their costs including risk.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Marginal costs signalled</th>
</tr>
</thead>
<tbody>
<tr>
<td>The overall pricing structure should include a variable element that reflects the marginal costs of supply in order to provide an incentive to minimise network constraints.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prices facilitate nationally efficient resource use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services are priced in a manner that promotes nationally efficient use of transmission services by <em>grid users</em> and so facilitates efficient resource use.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prices facilitate efficient use of Transpower’s resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services are priced in a manner that promotes efficient use of Transpower's resources.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prices facilitate nationally efficient use of electricity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services are priced in a manner that facilitates nationally efficient supply, delivery and use of electricity.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Consider practicality, transaction costs, consistency and certainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>The application of the principles should take into account practical considerations, transaction costs and the desirability of consistency and certainty.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Methodology is transparent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services are priced in a manner that is transparent.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maintenance should consider the cost of losses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transpower should take into account the cost of transmission losses when planning maintenance.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resolution of conflicts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where the principles conflict, those conflicts should be resolved in a manner that is most consistent with the Government's energy policy objectives.</td>
</tr>
</tbody>
</table>
Note that the **Resolution of conflicts** principle is included in the GPS as an implementation guideline for resolving issues where the principles conflict. It is required as a *design principle* and is included here for neatness.

### 4.1 Exclusion of the Cost of Losses principle

While the **Maintenance should consider the cost of losses** principle may have an impact on charges through its effect on the costs of transmission maintenance to be allocated, it does not affect the development of the pricing methodology. It is an important principle in terms of grid operation, but not transmission pricing, so is excluded from the *design principles*.

### 4.2 Exclusion of Least-distortionary sunk cost allocation principle

The **Least-distortionary sunk cost allocation** principle is replaced by an *interpreted principle* **Least-distortionary sunk and fixed cost allocation**. The reasoning is fully discussed in section 6.3.

### 4.3 Exclusion of Resolution of conflicts principle

The **Resolution of conflicts** principle is replaced by an *interpreted principle* also called **Resolution of conflicts**. The reasoning is fully discussed in section 6.10.
5. DERIVING THE RELEVANT GPS GUIDING PRINCIPLES

As discussed in section 3, the GPS includes a set of GPS guiding principles made up of specific objectives, principles and outcomes sought for the electricity industry in general. This section considers each of those guiding principles and derives a set of relevant GPS guiding principles for inclusion as design principles.

No GPS guiding principles would need to be included as design principles if both:

- the GPS pricing principles and any interpreted principles derived from them included all issues of relevance to developing and confirming a transmission pricing methodology; and
- there were no conflicts between the GPS pricing principles and hence no trade-offs to be made between them.

However, neither of these is the case.

An obvious example is compliance with legislation. The GPS requires the EGB to ensure that the Commerce Act 1986 and all other relevant laws are observed. A transmission pricing methodology could affect competitive outcomes and so this is clearly relevant to development and confirmation of a methodology, but is not explicit in any of the GPS pricing principles.

A further example is signalled by the GPS requirement that, where the GPS pricing principles conflict, those conflicts should be resolved in a manner that is most consistent with the Government's energy policy objectives. The GPS states explicitly elsewhere that this objective is “…to ensure that electricity is delivered in an efficient, fair, reliable and environmentally sustainable manner to all classes of consumer”. The remaining GPS guiding principles specify objectives, principles and outcomes sought to achieve this overall objective. Given the inevitability of conflict between some GPS pricing principles, and given that the statement of the Government's energy policy objective is at a higher level of abstraction than the GPS pricing principles some of the GPS guiding principles are included as design principles in case of conflict.

The following table itemises each of the GPS guiding principles, and proposes whether or not there are potential implications for a transmission pricing methodology. If there are implications, the issue of whether or not those implications are already fully covered by a GPS pricing principle or GPS pricing principles is then considered. If so, then the GPS guiding principle will not assist in resolving conflict between principles. But if not, then it is designated a relevant GPS guiding principle and becomes a design principle.
Table 2 – GPS guiding principles

<table>
<thead>
<tr>
<th>Proposed label and GPS guiding principle</th>
<th>Implications for a pricing methodology?</th>
<th>Is this a relevant GPS guiding principle?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimise hydro spill</td>
<td>Yes</td>
<td>No: This requirement is already fully covered by the GPS pricing principles Prices facilitate nationally efficient resource use and Prices facilitate efficient use of Transpower’s resources.</td>
</tr>
<tr>
<td>a) energy and other resources are used efficiently, and in particular, hydro spill is minimised;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security of supply should be efficiently managed</td>
<td>Yes</td>
<td>No: The GPS pricing principles Prices reflect cost including risk and Prices facilitate nationally efficient use of electricity fully cover pricing methodology aspects. Note though, that these principles do need to be supported by processes which allow customers to trade-off service levels and price.</td>
</tr>
<tr>
<td>b) risks relating to security of supply, in particular the risks of dry years and inadequate transmission and distribution security, are properly and efficiently managed;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full costs of transporting electricity are signalled</td>
<td>Yes</td>
<td>Yes: Adds detail and clarifies several of the GPS pricing principles, for example Prices reflect cost including risk and Locational signals for new entrants.</td>
</tr>
<tr>
<td>c) the full costs of producing and transporting each additional unit of electricity are signalled so that investors and consumers can make decisions consistent with obtaining the most value from electricity;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electricity costs should be subject to downward pressure</td>
<td>Yes</td>
<td>No: This is more related to revenue setting than the pricing methodology. To the extent that Prices reflect cost including risk and transmission is subject to competitive pressure through processes which Promote enhanced competition, other design principles cover the relevant aspects already.</td>
</tr>
<tr>
<td>d) delivered electricity costs and prices are subject to sustained downward pressure;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customers trade-off quality and price</td>
<td>Yes</td>
<td>Yes: But note that Security of supply should be efficiently managed imposes responsibilities on Transpower. Connected parties will probably be required to maintain minimum quality requirements if they wish to be connected to the grid.</td>
</tr>
<tr>
<td>e) the quality of electricity services, and in particular trade-offs between quality and price, should as far as possible reflect customers’ preferences;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transmission losses and constraints are signalled</td>
<td>Yes</td>
<td>Yes: This is partially covered by the GPS pricing principle Marginal costs signalled, but it adds detail.</td>
</tr>
<tr>
<td>f) Transmission losses and constraints are signalled to ensure that overall costs to the economy, including the costs of insufficient competition in local regions, are minimised; and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimise greenhouse gas emissions</td>
<td>Yes</td>
<td>No: This requirement is already fully covered by the principles Prices facilitate nationally efficient resource use and Prices facilitate efficient use of Transpower’s resources.</td>
</tr>
<tr>
<td>g) greenhouse gas emissions are minimised.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 2 – GPS guiding principles (cont)

<table>
<thead>
<tr>
<th>Proposed label and GPS guiding principle</th>
<th>Implications for a pricing methodology?</th>
<th>Is this a relevant GPS guiding principle?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promote enhanced competition</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>h) promote enhanced competition wherever possible and, where it is not, seek outcomes that mirror as far as possible those that would apply in competitive markets;</td>
<td>Yes: Although the pricing methodology may not contribute directly to a competitive market, a poorly designed methodology could lead to an anti-competitive outcome, so this principle is relevant to prevent that possibility.</td>
<td></td>
</tr>
<tr>
<td>Facilitate demand-side participation</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>i) facilitate and promote active demand-side participation;</td>
<td>Yes: The pricing component is partially covered in the pricing principles Efficient pricing of new investments and Locational signals for new entrants, but further clarity is added by the interpreted principle Transmission charges must preclude cross-subsidies, as discussed in section 6 of this document.</td>
<td></td>
</tr>
<tr>
<td>Ensure new technologies do not face barriers</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>j) ensure that the use of new electricity technologies and renewables, and distributed generation, is facilitated and that generators using these approaches do not face barriers; and</td>
<td>Yes: The pricing component is partially covered in the pricing principles Efficient pricing of new investments and Locational signals for new entrants, but further clarity is added by the interpreted principle Transmission charges must preclude cross-subsidies, as discussed in section 6 of this document.</td>
<td></td>
</tr>
<tr>
<td>Be consistent with government policies on climate change and energy efficiency</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>k) be consistent with government policies on climate change and energy efficiency.</td>
<td>Yes: Implications will depend on the government policies on climate change and energy efficiency at the time of development and confirmation of the methodology. No: Replaced by an interpreted principle. See section 7.11 for details</td>
<td></td>
</tr>
</tbody>
</table>

Greenhouse gas emissions are to be minimised through these arrangements, in particular by minimising hydro spill, efficiently managing transmission losses and constraints, ensuring consistency with climate change and energy efficiency policies, promoting demand-side participation and facilitating new generation technologies and renewables.

The Electricity Governance Board should also ensure that:

<table>
<thead>
<tr>
<th>Customers trade-off service and price</th>
<th></th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>l) services that are most efficiently provided on a common basis are provided at a quality and quantity, set through a process of collective agreement with participants, which enables those participants to make trade-offs between alternative levels of service and price;</td>
<td>Yes: The pricing component is only partially covered in the GPS pricing principle Prices reflect cost including risk.</td>
<td></td>
</tr>
<tr>
<td>Common services and rules reduced if more efficient alternatives available</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>m) the range of common services and mandatory rules is reduced over time where technological developments challenge the efficiency of ongoing compulsion;</td>
<td>Yes: No: The current relevance of this requirement is fully covered by the GPS guiding principles Facilitate demand-side participation and Ensure new technologies do not face barriers.</td>
<td></td>
</tr>
<tr>
<td>Proposed label and GPS guiding principle</td>
<td>Implications for a pricing methodology?</td>
<td>Is this a relevant GPS guiding principle?</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>---------------------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>Services should be contestable wherever possible n) the provision of services is contestable wherever possible;</td>
<td>Yes</td>
<td>No: This requirement is already fully covered by the principles Prices reflect cost including risk, User pays for connection and Efficient pricing of new investments.</td>
</tr>
<tr>
<td>Rules and standards to be enforced through a supervisory body o) rules and standards are robust and enforceable through a supervisory body that is neutral, separate from the body responsible for rule-making, and has sufficient power to monitor and enforce the rules (including fines for rule breaches);</td>
<td>Yes: To the extent the GPS requires that transmission charges established consistent with a confirmed pricing methodology are to be enforceable on the same basis as other rules set by the EGB. No</td>
<td></td>
</tr>
<tr>
<td>Dispute resolution processes are to be provided p) where appropriate, efficient and effective alternative dispute resolution processes are provided;</td>
<td>Yes: To the extent they are required to confirm a pricing methodology and can be used by Transpower and Transpower customers to resolve invoice disputes on an ongoing basis. No</td>
<td></td>
</tr>
<tr>
<td>Rules should be consistent with Guiding Principles q) processes by which rules are set and changed: are transparent; do not provide for or allow bias towards any party and, in particular, limit the potential for any party to amend rules in a manner which introduces bias inconsistent with these Guiding Principles; and achieve a balance between providing certainty and the need to ensure that progress in setting and amending the rules meets the Government's expectations for rapid evolution of the market; and</td>
<td>Yes: This affects the process for obtaining a confirmed pricing methodology, but not the principles. No</td>
<td></td>
</tr>
<tr>
<td>Commerce Act 1986 and all other relevant laws are observed r) the Commerce Act 1986 and all other relevant laws are observed.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
6. **INTERPRETED PRINCIPLES BASED ON RELEVANT GPS PRICING PRINCIPLES AND RELEVANT GPS GUIDING PRINCIPLES**

This section draws out some implications of the relevant GPS pricing principles and relevant GPS guiding principles in order to establish some interpreted principles for inclusion as design principles. These interpreted principles are included both to add detail and to clarify Transpower’s interpretation of some of the more general principles. They help narrow the range of possible methodologies.

6.1 **Defining sunk, fixed, variable and new investment costs**

As in all industries, costs can be considered to fall into four generic categories: *sunk*, *fixed*, *variable* and new investment. For clarity and to provide a common language for further discussions, the following definitions are assumed for developing the pricing methodology:

<table>
<thead>
<tr>
<th>Generic type of cost</th>
<th>What they are</th>
<th>Examples relating to the provision of transmission services</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sunk costs</strong></td>
<td>Costs that have been incurred, cannot be recouped as the assets have no alternative purpose, and which are recoverable under legislation(^5). Hence the costs are unavoidable.</td>
<td>The capital costs of those existing assets recoverable under legislation (whether valued by historical cost, ODV or some other means). The relevance of only including costs recoverable under legislation is that this ensures only efficient sunk costs are recovered.</td>
</tr>
<tr>
<td><strong>Fixed costs</strong></td>
<td>Costs that do not change with use in the short term. Unlike sunk costs, they are avoidable in the long term.</td>
<td>Operating and maintenance costs for assets, where those costs are independent of use in the short-term eg the painting costs for transmission towers. These costs are avoidable in the long term, for example, if the towers are taken out of service.</td>
</tr>
<tr>
<td><strong>Variable costs</strong></td>
<td>Costs that depend on use and so are avoidable in the short and long term.</td>
<td>Variable transmission service costs include those caused by the wear and tear on the “moving parts” of the grid resulting from the actions of Transpower customers eg the number of substation switch operations or reversals of flow through the HVDC inter-island link. Variable transmission costs (ie rentals) are the effect of interaction between the grid and grid users on losses and constraints and hence the costs of transmission.</td>
</tr>
<tr>
<td><strong>New investment costs</strong></td>
<td>Cost that are avoidable by not proceeding with an investment, but are sunk or fixed(^6) once committed to.</td>
<td>Construction of a new line or upgrade of an existing one.</td>
</tr>
</tbody>
</table>

\(^5\) Under existing legislation, Transpower reviews the national grid using the Ministry of Economic Development’s ODV framework each year. This framework requires Transpower to derive an optimum grid taking into account available generation, forward demands and currently available technology. Transpower’s revenue is then determined based on the assets required for the optimised grid only and the value of those assets no longer required becomes a shareholder cost. For the purposes of this document, the term sunk costs refers to sunk costs recoverable under legislation only.

\(^6\) Costs that will become variable with a new investment are no different in concept from variable costs resulting from existing assets.
The commonly accepted manner of charging for these costs is consistent with the nature of the costs. This is schematically illustrated in the figure below:

![Figure 3 – Efficient manner of charging for costs](image)

<table>
<thead>
<tr>
<th>Type of cost</th>
<th>Sunk</th>
<th>Fixed</th>
<th>Variable</th>
<th>New investment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Efficient manner of charging</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Short-term</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Long-term</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Unavoidable</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost is unavoidable so charge should also be unavoidable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Avoidable</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costs are avoidable so charge should also be avoidable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Avoidable before commitment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sunk and fixed after</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Any discussion of *fixed* and *variable* costs requires reference to the time frame over which they are variable or fixed. The relevant time-frames in a discussion of *design principles* for a transmission pricing methodology are related to transmission assets. The engineering and economic life of transmission assets is typically measured in decades. The following terms are therefore used in this document:

- **Short term**: weeks or less
- **Medium term**: months and years
- **Long term**: decades
6.2 Integrated approach to transmission pricing

The costs that must be recovered throughout the electricity industry are sunk, fixed, variable and new investment. For the market to produce signals for efficient production/consumption and new investment decisions, the costs that need to be recovered must form part of an integrated pricing regime supported by appropriate market structures and processes. As required in the GPS:

“...Industry arrangements should promote the satisfaction of consumers’ electricity requirements in a manner which is least cost to the economy as a whole…”

To achieve this overall objective, the various elements of the transmission price signal cannot be designed on their own. It is essential that each element only recovers the portion of the costs it is supposed to (to avoid over-recovery of costs) and that the signals provided are consistent and do not conflict with each other.

Figure 4 – Pricing signals in an efficient transmission market

Variable costs are most efficiently allocated through marginal cost pricing that delivers correct signals for production, consumption, new investment and divestment decision making.

Once a decision to invest is reached, the full cost of a new investment should be allocated to beneficiaries so that consistent signals for the trade-off between transmission and other solutions can be made. This clear allocation of new investment costs to beneficiaries also creates a clear allocation of the resultant sunk costs.

Finally, the sunk and fixed costs should be allocated in a manner that does not prevent variable prices from reflecting marginal costs.

An interpreted principle then, is that the pricing signals for sunk, fixed and variable costs,
grid use and new investment must be as consistent as possible. The pricing methodology for the recovery of each cost category should be designed so that they contribute to the overall signal and support rather than distort each other.

If any one element changes, others may need to. For example, variable transmission costs (losses and constraints, or rentals) are currently signalled through nodal pricing. If nodal pricing were to disappear an alternative, but equivalent way of maintaining overall consistency of pricing signals across the market would be needed.

<table>
<thead>
<tr>
<th>Proposed interpreted principle</th>
<th>Integrated approach to transmission pricing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The pricing signals for sunk, fixed and variable costs, grid use and new investment must be as consistent as possible and not conflict with each other.</td>
</tr>
</tbody>
</table>

6.3 Least-distortionary sunk and fixed cost allocation

As discussed in section 1.5, the common use of the term “sunk costs” is as a generic term for both sunk and fixed costs, and because both sunk and fixed costs should be allocated in the same manner, Transpower believes that the GPS pricing principle, Least-distortionary sunk cost allocation uses sunk cost in the generic sense to include fixed costs. For clarity therefore, Transpower proposes to exclude the GPS pricing principle, Least-distortionary sunk cost allocation

<table>
<thead>
<tr>
<th>Proposed exclusion</th>
<th>Least-distortionary sunk cost allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sunk costs should be allocated in a way that minimises distortions to production/consumption and investment decisions made by grid users</td>
</tr>
</tbody>
</table>

and replace it with the following interpreted principle:

<table>
<thead>
<tr>
<th>Proposed interpreted principle</th>
<th>Least-distortionary sunk and fixed cost allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sunk and fixed costs should be allocated in a way that minimises distortions to production/consumption and investment decisions made by grid users</td>
</tr>
</tbody>
</table>

whereby the word “sunk” is replaced by “sunk and fixed”.

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6.4 Sunk costs should be recovered by fixed and unavoidable charges

Efficient investment is key to the pursuit of an affordable and reliable electricity supply. This requires that investment occurs in the right technology, at the right location and at the right time. This outcome is commonly termed “dynamically efficient investment”.

Because of the large and lumpy nature of investment in the electricity industry, it is critical that new investment decisions are made on the basis of their impact on the economy as a whole. For economic efficiency, sunk and fixed costs should be allocated in a way that does not distort new investment decision-making: future actions should be unaffected by the recovery of sunk costs, because they have no effect on those sunk costs. Outside economics, this is known as “Don’t cry over spilt milk”.

Because of their nature, the economically most efficient sunk cost allocation methodology is to recover the full efficient sunk costs over the lifetime of the assets through fixed\(^8\) and unavoidable (i.e. mandatory) charges to incumbents. Incumbents’ behaviour (including consumption, production, investment and divestment) would not change their charge, and new entrants would not be charged.

However, it may not be realistic to expect all relevant Transpower customers to commit to paying long term fixed charges for the recovery of the sunk costs of transmission assets. Rather, if a Transpower customer has a long-term change in its demand for transmission services, then its charges need to be adjusted to reflect it and new entrants should be charged on the same basis as other Transpower customers.

Nevertheless, the more fixed the charges, the greater the degree of economic efficiency. Sunk cost charges should therefore be fixed over as long a time frame as possible. Then, at least over that timeframe, the allocation of sunk costs does not change behaviour.

Similarly for fixed costs, but unlike sunk costs they are avoidable in the long term, so we differentiate between them. The following interpreted principles are therefore proposed, but are expressed as “should” rather than “must”:

---

**Proposed interpreted principle**

**Sunk costs should be recovered through fixed and unavoidable charges**

Sunk costs should be recovered through charges which are, as far as possible, fixed and unavoidable

---

**Proposed interpreted principle**

**Fixed costs should be recovered through fixed charges which are unavoidable in the short term**

Fixed costs should be recovered through fixed charges which are, as far as possible, unavoidable in the short term

---

\(^8\) Fixed charges in this context means that the level of the charges is not dependent on the actions of the customer charged. The fixed charge might vary over time in a defined manner, perhaps linked to measures that the customer does not control, such as transmission asset ODV or CPI.
6.5 Sunk and fixed costs allocated

The relevant GPS pricing principle, Charges should fully recover costs, requires that:

“After allowing for financial losses and costs properly chargeable to the shareholder, Transpower's charges should recover the full economic costs of its services”.

In practice the major components of that service are the sunk and fixed costs of the grid. Assuming that Transpower's charges are not intended to recover more than the full economic costs of its services, this means that the total of all charges for the sunk and fixed costs must equal the full economic sunk and fixed costs. Given a specific or regulated level of sunk and fixed costs, if one party is charged less, another must be charged correspondingly more. In other words, the pricing methodology for Transpower's sunk and fixed costs is an allocation.

<table>
<thead>
<tr>
<th>Proposed interpreted principle</th>
<th>Sunk and fixed costs allocated</th>
</tr>
</thead>
<tbody>
<tr>
<td>The transmission pricing methodology for the recovery of sunk and fixed costs of transmission is an allocation</td>
<td></td>
</tr>
</tbody>
</table>

6.6 Marginal cost pricing

There are two components to the variable costs of transmission:

The variable transmission cost (the cost of losses and constraints ie rentals).

The variable transmission service cost (largely Transpower’s variable operating and maintenance costs).

Several of the relevant GPS pricing principles and relevant GPS guiding principles require that both variable costs be signalled:

Marginal costs signalled, which says:

“The overall pricing structure should include a variable element that reflects the marginal costs of supply in order to provide an incentive to minimise network constraints” and:

Transmission losses and constraints are signalled, which says:

“Transmission losses and constraints are signalled to ensure that overall costs to the economy, including the costs of insufficient competition in local regions, are minimised.”

The signal to satisfy these two principles is currently provided by nodal pricing. Nodal prices reflect the marginal cost of generation and transmission losses and the effect of any transmission constraints (including the costs of insufficient competition in local regions). Nodal prices thereby provide investment signals to minimise losses and remove constraints. It is worth noting that to be effective, it is crucial that the price signal provided by nodal pricing recognises and reflects the physical nature of the electricity systems it represents.

Prices facilitate nationally efficient resource use
Prices facilitate efficient use of Transpower’s resources
Prices facilitate nationally efficient use of electricity
Charges should fully recover costs

All these require that the full costs of transmission are signalled, so that Transpower customers can make trade-offs between transmission and alternatives. The full costs of transmission include sunk, fixed and variable costs. Again, this implies that the marginal pricing model must properly represent the physical system it models, otherwise the full cost of losses and constraints will not be reflected in future investment decisions.

Locational signals for new entrants

This requires that the full cost implications be signalled for proposed new investments, so that investors and consumers can make appropriate decisions. A generator, for example, should be aware of the full cost implications when deciding whether to install new plant remotely, or close to load. The generator needs to be aware of not only the connection costs, but also the variable (ongoing) costs of transmission, ie both the variable transmission cost (currently provided by nodal prices) and the variable transmission service cost.

In all the above examples, the outcomes can only be efficient if the variable costs are allocated to the parties who have choices, ie those making consumption or investment decisions. Those parties caused the need for the variable cost to be incurred, so the interpreted principle is expressed as follows:

<table>
<thead>
<tr>
<th>Proposed interpreted principle</th>
<th>Marginal cost pricing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable costs should be charged to the causer</td>
<td></td>
</tr>
</tbody>
</table>

6.7 New investments charged to beneficiaries

The relevant GPS pricing principles and relevant GPS guiding principles:

Efficient pricing of new investments
Charges should fully recover costs
Prices facilitate nationally efficient resource use
Prices facilitate efficient use of Transpower’s resources
Prices facilitate nationally efficient use of electricity
Facilitate demand-side participation
Ensure new technologies do not face barriers
Customers trade-off quality and price
Customers trade-off service and price

all have something to say about the pricing of new investments. The common theme is the government’s desire for dynamic efficiency (the efficient use of resources over time) in the electricity industry. This is important because of the large costs involved in getting it wrong, which could have a significant impact on New Zealand’s international competitiveness, and would flow-on to have a negative impact on the New Zealand economy.
Transmission pricing has an important role to play in bringing about dynamic efficiency by presenting customers with information about the cost of their usage decisions, enabling them to make the trade-offs between service and price. This facilitates efficient decisions in relation to what capital investment is needed, where it should be located and when it should be built.

Allocating the full costs of investment to the expected beneficiaries (as opposed to say, all customers nationally) will provide the correct signals for efficient trade-offs between transmission and other solutions. Many of the alternatives to transmission are local solutions only (e.g., distributed generation, demand-side management) so unless the beneficiaries see the full cost of the transmission solution, inefficient decisions could be made.

<table>
<thead>
<tr>
<th>Proposed interpreted principle</th>
<th>New investments charged to beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full cost of new investments must be allocated to expected beneficiaries</td>
</tr>
</tbody>
</table>

### 6.8 Transmission charges must preclude cross-subsidies

A long list of relevant GPS pricing principles and relevant GPS guiding principles point towards another well known and established test that an economically efficient pricing methodology should pass - that of no cross-subsidies:

- Least-distortionary sunk and fixed cost allocation
- Charges should fully recover costs
- Efficient pricing of new investments
- User pays for connection
- Prices reflect cost including risk
- Prices facilitate efficient use of Transpower’s resources
- Prices facilitate nationally efficient use of electricity
- Methodology is transparent
- Promote enhanced competition
- Facilitate demand-side participation
- Ensure new technologies do not face barriers

The presence of cross-subsidies would mean the pricing methodology did not meet the above criteria. So it is proposed to include an interpreted principle that precludes cross-subsidies.

The implication of a “no cross-subsidies” principle is to define a maximum and minimum that a transmission charge should fall between. The Ministry of Economic Development describes the requirement as: “A cross-subsidy may exist where one customer is charged insufficient incremental revenue to recover the incremental cost (including return on capital) of supplying the service or product to the customer, but the company still earns sufficient overall revenue from all its services to achieve a normal rate of return on its total asset base. (Incremental or marginal revenue (cost) is the revenue (cost) that would be foregone (saved)
if that particular service was no longer provided.) Where over-charging is possible there can be a loss of productive efficiency, and where there is under or over-charging there can also be a loss of allocative efficiency.  

In brief, this means that in order to avoid cross-subsidies, no service or set of services should be charged at a level higher than the stand-alone cost of the service, or lower than the incremental cost.  

This is important because if charges are in this band, there is no economic incentive to invest to bypass efficient sunk transmission investment.  

Here the term stand-alone cost is used in the context of a transmission solution: the proposed interpreted principle for economic value, discussed below, covers the cap on charges for a non-transmission solution.  

Proposed interpreted principle  

Transmission charges must preclude cross-subsidies  

Transmission charges for the sunk, fixed, variable and new investment costs of providing a service must not be less than the incremental cost, nor more than the stand-alone cost, of providing that service through a transmission solution.  

6.9 Economic value  

It is clearly not practicable to charge customers more for a service than the value to them of that service: it would then not be economic for them to take the service and they would seek alternatives.  

The relevant GPS pricing principles:  

Charges should fully recover costs  

Prices facilitate efficient use of Transpower’s resources  

both suggest that inefficient bypass of Transpower’s transmission services is not a desirable outcome. We would be unable to recover our full efficient economic costs and our efficient assets would effectively be devalued and duplicated, resulting in additional costs to the economy as a whole.  

So as long as the Transmission charges must preclude cross-subsidies principle is not compromised, the allocation of sunk, fixed and new investment costs to customers is bounded by the economic value of the service to them.  

There is further justification for this principle in the relevant GPS pricing principles:  

Least-distortionary sunk cost allocation  

Prices facilitate nationally efficient resource use  

Prices facilitate efficient use of Transpower’s resources  

---  


10 See for example Baumol and Sidak, Transmission Pricing and Stranded Costs in the Electric Power Industry, page 52. Their conclusions have been supported in the New Zealand legal context by Kerrin Vautier (see letter Transpower and Cross-Subsidisation of 2 April 1998).
Prices facilitate nationally efficient use of electricity

because bypass might require an investment in alternative assets, which could be inefficient.

This principle applies to the allocation of sunk and fixed costs for existing assets and new investments once the initially contracted period is over\(^\text{11}\). It does not apply to new investments during the initially contracted period, immediately after they have been built. If it did and customers had the option to apply an economic value test to new investments, the risks of new investments would all lie with Transpower and the Charges should fully recover costs principle may be violated.

Application of this interpreted principle requires balancing with the Consider practicality, transaction costs, consistency and certainty principle, because, in the short term, the benefit of transmission assets to different customer groups can vary by the half hour, as generator offers, demand and transmission outages change, as do flows and clearing prices. For recovering the sunk costs of transmission assets, which have lifetimes measured in years or decades, it is the net benefit to individual customers or groups of customers over the long term, that is relevant.

<table>
<thead>
<tr>
<th>Proposed interpreted principle</th>
<th>Economic value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission charges for the recovery of sunk and fixed costs must not exceed the economic value of the service</td>
<td></td>
</tr>
</tbody>
</table>

6.10 Resolution of conflicts

The GPS pricing principle Resolution of conflicts states that:

“Where the principles conflict, those conflicts should be resolved in a manner that is most consistent with the Government’s energy policy objectives”

It would be useful to be more specific about the energy policy objective:

- to aid understanding of how to resolve issues, and;
- to remove uncertainty associated with inclusion of Government policy, which may change over time.

The pricing methodology can only be designed and assessed against a specific set of principles, which may include a snapshot of Government policy at the time the methodology was developed. If Government policy does change, Transpower will be obliged to verify whether it’s pricing methodology still conforms and if it does not, seek to change it through the procedures outlined in section III of Part F of the Rulebook.

Hence, an interpreted principle is included, to replace the GPS pricing principle, which explicitly states the current energy policy objective, as given elsewhere in the GPS:

---

\(^\text{11}\) Assuming that new investments will only proceed where Transpower and Transpower customers arrive at an arrangement through negotiation which recovers a satisfactory portion of the investment capital outlay through some form of unavoidable initial contract.
6.11 Energy efficiency

The relevant GPS guiding principle Be consistent with government policies on climate change and energy efficiency requires the pricing methodology to be consistent with government policies on climate change and energy efficiency.

Similar to Resolution of conflicts, we need to remove the uncertainty associated with this approach by stating current Government policy.

The current policy on energy efficiency can be summarised as:

Be consistent with a strategy to promote energy efficiency, energy conservation and renewable energy and move New Zealand towards a sustainable energy future.

The current policy on climate change is more difficult in that it is still being formulated. We propose not including a summary statement on climate change policy, but verifying that the methodology conforms, once the policy is finalised.

Hence, an interpreted principle is included, to replace the relevant GPS guiding principle, which explicitly states the current energy efficiency policy:

Proposed interpreted principle

Energy efficiency

Be consistent with a strategy to promote energy efficiency, energy conservation and renewable energy and move New Zealand towards a sustainable energy future.
This figure provides a summary of the design principles.
8. THE RELATIVE IMPORTANCE OF THE PRINCIPLES

There is a myriad of possible cost allocations, and the criteria need to be used to determine which is most efficient. Conceptually, the choice of cost allocation method can be considered as shown below:

<table>
<thead>
<tr>
<th>Figure 5 – Determining an efficient cost allocation</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Mandatory criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inefficient allocations</td>
</tr>
<tr>
<td><strong>Mandatory criteria</strong></td>
</tr>
<tr>
<td>- Precede economic value. Charge must not exceed the economic value (EV) of the service to the customer</td>
</tr>
<tr>
<td>- Charge ≤ IC ≤ SAC</td>
</tr>
<tr>
<td>- Provide cost-accurate and economic returns. SAC and IC reflect the avoidable cost of providing a service.</td>
</tr>
<tr>
<td>- Less distortionary sunk and fixed cost allocation</td>
</tr>
<tr>
<td>- Sunk, fixed costs allocated to least distort grid user decisions</td>
</tr>
<tr>
<td>- Resolution of conflicts must align with delivery of electricity efficiently, fairly, reliably and sustainable environmentally</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximising criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Most efficient allocation(s)</td>
</tr>
<tr>
<td>- Less efficient allocations</td>
</tr>
<tr>
<td>- Least distortionary sunk and fixed cost allocation</td>
</tr>
<tr>
<td>- Sunk, fixed costs allocated to least distort grid user decisions</td>
</tr>
<tr>
<td>- Resolution of conflicts must align with delivery of electricity efficiently, fairly, reliably and sustainable environmentally</td>
</tr>
</tbody>
</table>

In choosing between alternative allocations, it will sometimes be clear that certain allocations fail to meet the mandatory criteria, and so can be dismissed as options. Of allocations that meet the mandatory criteria, the choice will need to be made on the overall efficiency in meeting the maximising criteria. In practice, these criteria cannot always be maximised together, and trade-offs must be made to maximise overall efficiency.

Some principles are black and white and the pricing methodology must conform to them for economic efficiency. For example precluding cross-subsidies is fundamental to efficient price signalling and the methodology will either conform to the principle or it won’t. It is a principle that must not be breached and can be considered mandatory.

Ideally, **sunk** and **fixed cost** allocation should be made unavoidable, but achieving this is not realistic over the long term, for reasons discussed earlier. So **sunk** and **fixed costs** should be allocated to be minimise distortion, accepting that some trade-offs and hence distortion are inevitable. Such principles can only be maximised and are referred to here as maximising criteria.
For illustrative purposes, the *interpreted principles* would be classified as follows:

**Table 4 – Relative importance of the *interpreted principles***

<table>
<thead>
<tr>
<th>Mandatory criteria</th>
<th>Maximising criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated approach to transmission pricing</td>
<td>Least-distortionary sunk and fixed cost allocation</td>
</tr>
<tr>
<td>Marginal cost pricing</td>
<td>Sunk costs should be recovered by fixed and unavoidable charges</td>
</tr>
<tr>
<td>New investments charged to beneficiaries</td>
<td>Fixed costs should be recovered by fixed charges which are unavoidable in the short term</td>
</tr>
<tr>
<td>Not exceed economic value</td>
<td>Sunk and fixed costs allocated</td>
</tr>
<tr>
<td>Preclude cross-subsidies</td>
<td>Resolution of conflicts</td>
</tr>
</tbody>
</table>

How all of the *design principles* are considered (ie whether they are mandatory or maximising) is a matter which will be dealt with during the initial phase of the methodology development.
9. CONTACTING US

To contact Transpower to discuss any aspect of this report, you can:

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Send a fax to (04) 495 7004 marked Attention: Bruce Girdwood, Pricing Manager

Send printed mail to:

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Transpower New Zealand Ltd
Level 11
Unisys House
56 The Terrace
PO Box 1021
Wellington

Attention: Bruce Girdwood, Pricing Manager

Telephone either Bruce Girdwood on (04) 494 7378 or Michael Parker on (04) 495 6996.
APPENDIX A COMPARISON OF RULEBOOK AND GPS PRICING PRINCIPLES

The design principles derived in this document are based on the GPS pricing principles, GPS guiding principles and a set of interpreted principles. The Rulebook also includes objectives and principles for transmission pricing and oblige the EGB to assess submitted pricing methodologies against these. It is worth considering the differences. The objectives and principles are taken nearly verbatim from the GPS except that:

- The Rulebook removes the GPS pricing principle **Maintenance should consider the cost of losses.** As discussed previously, Transpower agrees that this principle is not relevant to the transmission pricing methodology.

- The Rulebook replaces the term “grid user” by “transmission purchaser” which it defines as a member that may have to pay under the Rulebook for transmission services.  

- The Rulebook replaces the term “Transpower” by “transmission provider” which it defines as a member that provides transmission services or a service that substitutes for transmission or who will provide a transmission service or a service that substitutes for transmission subject to a positive vote under part F, section II.

- The Rulebook generalises the objectives and principles to apply to substitutes for transmission as well as transmission.

- Both the GPS and the Rulebook include a means of resolving any conflicts between the objectives and principles, but state them differently:
  
  - **GPS:** where the principles conflict, those conflicts should be resolved in a manner that is most consistent with the Government’s energy policy objectives. The GPS states this clearly as being “the...overall objective... is to ensure that electricity is delivered in an efficient, fair, reliable and environmentally sustainable manner to all classes of consumer”.

  - **Rulebook:** Any conflicts in the objectives and principles should be resolved in the manner most consistent with the objective of satisfying the electricity requirements of consumers in a manner that is least cost to the economy as a whole and is consistent with sustainable development.

Transpower’s own conclusion of these differences is that only the last is significant. The two different means of resolving conflicts could result in different pricing methodologies. It is less clear whether a methodology designed using one means would conform to the other. At this stage the only action is to note the difference. Although Transpower’s pricing methodology will be designed against the GPS, our submission to the EGB will include a consistency check against the Rulebook criteria and a full discussion of any differences that result.

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12 The full definition is “a member that is invoiced or may be invoiced subject to a positive vote under section II of Part F by a transmission provider for transmission services or a service that substitutes for transmission.”
APPENDIX B GLOSSARY

Beneficiaries are those parties identified as expected to materially benefit as the result of a transmission investment.

Confirmed pricing methodology means a pricing methodology which has been confirmed by the EGB under Part F Section III, rule 5.9.1.

Consumer means a party who is the end-user for energy produced, transmitted and distributed by the electricity industry

Design principles are the principles which will be used in designing a pricing methodology. They include:

• a set of relevant GPS pricing principles derived from the GPS pricing principles, as discussed in section 4.
• a set of relevant GPS guiding principles derived from the GPS guiding principles, as discussed in section 5.
• a set of interpreted principles, as derived in section 6, which:
  • seek to add detail to the relevant GPS pricing principles and relevant GPS guiding principles
  • add other relevant principles consistent with but additional to the GPS

EGB is the Electricity Governance Board, as required to be established per the GPS.

Electricity industry refers collectively to generators, transmission companies, distributors, retailers and other parties involved in the supply of energy to consumers

Fixed and unavoidable costs are the same as fixed costs. The term unavoidable is usually added as a reminder that these costs are unavoidable in the short term.

Fixed costs are costs that do not change with usage in the short term, but are avoidable in the long term eg operating and maintenance costs of transmission towers. These costs are unavoidable in the short term, but avoidable in the long term if the line is taken out of service.


GPS guiding principles are other GPS objectives and principles for the electricity industry, referred to in the GPS under “Guiding Principles for the electricity industry”.

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**GPS pricing principles** are the GPS objectives and principles for the pricing of transmission services, given in Attachment 1 to the GPS.

*Grid user* is any party who uses the grid. *Grid users* may not be *Transpower customers* eg consumers are *grid users* but are not *Transpower customers*.

*Incremental cost* is the cost that would be saved if a particular service were no longer provided.

*Incumbent* is an entity (eg company, household, individual) who currently holds the position described.

*Industry participants* are parties who are a part of the *electricity industry*.

*Interpreted principles*, as derived in section 6, are principles which seek to add detail to the GPS pricing principles and relevant GPS guiding principles or are other relevant principles, consistent with, but additional to the GPS.

*Long term* for the purposes of this document means decades.

*Medium term* for the purposes of this document means months and years.

*New entrant* is a party (eg company, household, individual) who does not as yet, but would like, to receive a particular transmission service.

*New investment costs* are costs that are avoidable by not proceeding with the investment. They are costs which have not yet been incurred or committed to.

*Relevant GPS guiding principles* are the subset of the GPS guiding principles deemed relevant to transmission pricing and as derived in section 6 of this document.

*Relevant GPS pricing principles* are the subset of the GPS pricing principles deemed relevant to transmission pricing and as derived in section 5 of this document.

*Relevant Rulebook guiding principles* are the subset of Rulebook guiding principles relevant to transmission pricing.

*Rulebook* is the Rulebook version submitted by EGEC to the Commerce Commission for approval on 7 December 2001.
Rulebook pricing principles are objectives and principles for the pricing of transmission services, as given in Part F Sec III of the Rulebook.

Rulebook guiding principles are guiding principles for the electricity industry in general, as given in Part A of the Rulebook.

Short term, for the purposes of this document means weeks or less.

Stakeholder is any party, including companies and individuals, who has an interest in Transpower’s pricing methodology.

SCI or Statement of Corporate Intent, is Transpower’s agreement with its owner, the New Zealand Government, outlining the tenets of its operation.

Sunk costs are transmission costs that have been incurred, and cannot be recouped as the assets have no alternative purpose, and which are recoverable under legislation. Hence the costs are unavoidable.

Transpower customer is a party that is invoiced by Transpower for transmission services.

Transmission provider means a member (of the Rulebook) that provides transmission services, or who will provide a transmission service subject to a positive vote under Part F, Section II.

Transmission purchaser means a member (of the Rulebook) that is invoiced or may be invoiced subject to a positive vote under Section II of Part F by a transmission provider for transmission services.

Variable costs are costs which depend on production or use and are not incurred if there is no production or use. They are avoidable costs.

Variable transmission service costs include operating and maintenance costs of the transmission grid “moving parts” eg substation switches.

Variable transmission costs are that component of nodal prices relating to the variable cost of transmission, namely the marginal cost of losses and constraints (ie rentals).