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John Gleadow  
Director Transmission  
Electricity Commission  
PO Box 10041  
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Dear John

**Re: Investigation of the value of unserved energy**

This letter provides some comments from Transpower New Zealand Limited on the stage 1 report by Concept Economics and the New Zealand Centre for Advanced Engineering, which comprises the first part of the Commission's investigation of the value of unserved energy.

Transpower believes that the approach mapped out by the report is broadly appropriate. However, in some respects the scope of the study is too narrow. The comments below also address some methodological concerns, factual errors and proposed modifications to the report.

**Scope of the study**

Page 34 states that the focus of the study is on unplanned (rather than planned) outages. This is satisfactory for the value of lost load (VoLL), but for grid planning purposes it would be useful to identify a value of unserved energy that reflects the costs that would be incurred if expected supply shortfalls (generally due to forecast load growth) were not met by planned investment. At present, Transpower assumes that diesel generation sets fill supply gaps of this sort on a case by case basis, but the appropriateness or otherwise of this approach should be investigated further. VoLL is the right figure to use for losses due to unexpected outages, but not for what could be styled "planned" unserved energy.

The study scope outlined in the stage 1 report also does propose to consider the costs produced by high impact low probability (HILP) events. The costs caused by events of this sort can be wide scale, multi sector and non linear as scale increases. While rare, their impact on total expected costs can be significant. Transpower has recently received a report from G.H. Thorpe and L.J. Hoch of Oakley Greenwood Pty Ltd, which investigates VoLL in relation to HILP events. We are attaching a copy of

this report with this letter in the hope that it may help inform the next stages of the investigation.

### **Methodological issues**

The widely differing values of VoLL identified overseas are probably not due to the characteristics of customers and the different activities undertaken in different countries, as suggested by the report. The differences are more likely to be due, in the main, to differences in the estimation methods used (at least for the first world countries). Given this, it would seem prudent for the investigation to use more than one estimation method and then attempt to assess the sensitivity of the resulting figures to the methodology used.

The way in which VoLL is used in Part F and the Grid Investment Test assumes that consumers who suffer loss of supply are risk neutral – any unserved energy resulting from a supply loss event is valued at the single VoLL rate, no matter how large the event. In fact, there is evidence to support the view that consumers are risk averse, meaning that they are willing to pay more to avoid large events and that, therefore, the value of VoLL should increase as the size of the event increases.

Technological change, increasing capital intensity and the increasing real cost of generating electricity mean that it would be reasonable to expect that the real value of supply reliability would increase in the future. This could be significant, given the way the grid investment test uses VoLL to value the benefits of very long-lived investments, but there appears to be no mention of this issue in the stage 1 report. Please contact Conrad Edwards at Transpower if anyone from the investigation team would like to discuss this point further.

The use of VoLL is likely, in the future, to extend beyond project evaluation to include the use of VoLL pricing in the wholesale energy market in some circumstances and its application to the valuation of system security procedures. The investigation should consider how potentially different VoLL values might be derived for these different applications.

The survey approach may itself introduce some bias to the estimate. The report acknowledges that bias may derive from consumers' unfamiliarity with the particular circumstances that they being asked to consider in order to assess their own willingness to pay to avoid particular experiences. However, the survey method may also not capture some costs that apply at the national level (e.g. loss of investment reputation) since those experiencing the critical changes of view and value that affect this factor are likely to be outside the country. The methodology should attempt to compensate for these sorts of biases to the extent that this is feasible.

In Transpower's view, to be of practical use VoLL should be expressed at a GXP level by time and duration of outage, and these estimates should be updated at least every three years.

With respect to the survey data, it may be worth investigating whether the sample sizes of the customers from each lines company would be sufficient to develop separate regional VoLL figures.

Where the interview subjects are industrial consumers, it might be useful to include a question about consequential Resource Management Act consent breaches.

The questions about household size and home ownership in the draft residential customer survey may not be necessary. The number of questions should be kept to the minimum necessary to help encourage participation.

### **Errors and proposed modifications**

#### Section 5.2.1.2

In addition to MEUG members, Fonterra, Pike River Coal and local authorities should be added. With respect to the report's statement "it is unclear whether all 'large' New Zealand electricity customers are members of MEUG, for instance Comalco or Glenbrook Steel" it should be noted that Rio Tinto Aluminium and Comalco are the same entity as are Glenbrook Steel and New Zealand Steel.

#### Section 5.3.5.1, point 2 (time of day)

Transpower does not agree with the assertion that there is a correlation between the timing of peak loads and when asset failures occur. The report refers to page 50 of Transpower's 2008 Annual Planning Report to support this claim. The 2008 Annual Planning Report does not, in fact, contain this statement. Transpower therefore recommends that the statement and the reference be deleted from the report.

### **General point**

#### Section 2.1.2, 2nd bullet point

The second sub-point suggests that, for commercial and industrial customers, the incremental value of unserved energy (USE) tends to decrease relative to outage duration. This may be too broad a generalisation. After significant capital has been destroyed the USE tends to fall, but up to that point it often increases. For example, for an aluminium smelter, USE is moderate up to the point that the pot lines start to freeze, very high while the major capital destruction is occurring and lower after that time. The same sort of pattern applies to pulp and paper mills, milk processing plants and other manufacturers and processors of perishable products.

Yours sincerely



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