Lower South Island and Central North Island Economic Investments

Prepared by: Bruce Smith
Senior Adviser
John Gleadow
Senior Adviser Transmission

Discussion and approval

3 January 2008

Lower South Island and Central North Island Economic Investments

Purpose

1. The purpose of this paper is to:

   (a) brief the Electricity Commission (Commission) Board (Board) on Transpower's progress toward submitting two economic investments (as that term is defined in part A of the Electricity Governance Rules 2003 (Rules)) for the Lower South Island (LSI) and Central North Island regions (CNI); and

   (b) seek guidance as to how generation scenarios could be developed and economic analysis undertaken, for the Grid Investment Test (GIT) analysis.

Introduction and background

2. Transpower staff have indicated to the Commission and industry that they have commenced analysis of a number of economic investments for LSI and CNI. To this end, Transpower staff met with Commission staff on 18 December 2007 to discuss how to approach the GIT analysis.

3. In applying the GIT, the market benefits and costs of a proposed investment or alternative project must be determined for each market development scenario.

4. "Market development scenarios" are defined in clause 28 of the GIT in schedule F4 of section III of part F of the Rules as follows:

> **"Market development scenarios"** means the reasonable future states of the electricity industry, developed for use in determining the **market benefits** and **costs** of a **proposed investment** and **alternative projects**, for each of:
>
> 28.1. the future with a **proposed investment**;
>
> 28.2. the future with each **alternative project**; and
>
> 28.3. the future without the **proposed investment** or any **alternative project**.

5. Clause 6 of the GIT states that in applying the GIT:

> 6.1 the **market development scenarios** must be the possible future scenarios outlined in the **statement of opportunities** unless the **Board** determines that **market development scenarios** proposed by **Transpower**, the proponent of a **transmission alternative** or the **Board** are more appropriate;

6.2 the probability of occurrence of a **market development scenario** must be as set out in a **statement of opportunities** in respect of the relevant possible future scenario; and

6.3 the number of **market development scenarios** used in applying this **grid investment test** must be same as the number of **market development scenarios** set out in the **statement of opportunities**.

6. The Commission published the first Statement of Opportunities (Initial SOO) in 2005. The Initial SOO remains the current SOO, and contains five equally weighted market development scenarios.

7. In September 2006, the Commission developed draft grid planning assumptions (GPAs) as an initial step in preparing the next SOO. This included the preparation and publication of demand forecasts and four generation scenarios for consultation with interested parties.

8. In May 2007, the Commission decided to delay the publication of the next SOO until the NZ Energy Strategy was finalised. However, at the same time, the Commission published the draft GPAs (including demand scenarios) that were developed and consulted on in 2006.

9. Now that the Government's climate change policies have been developed further and the New Zealand Energy Strategy has been finalised, the Commission is recommencing work on preparing the next SOO, which is likely to be published in 2008. As an initial step, and following the receipt of additional information from Transpower, the Commission has revised the generation scenarios and other key inputs to the draft GPAs that were released in May 2007.

10. In particular, the Commission has added a "90% renewables by 2025" scenario which models the NZ Energy Strategy target of 90% of electrical energy produced from renewable resources by 2025. That scenario is additional to the four scenarios anticipated by the draft GPAs released in May 2007. The weightings of the four draft GPAs released in May 2007 have therefore been affected.

11. The Commission is also considering revised assumptions regarding peak capacity requirements when modelling possible future generation developments in the scenarios anticipated by the draft GPAs released in May 2007.

12. In this paper, the five GPAs currently under development by the Commission are referred to as the "revised draft GPAs".

13. Transpower has asked for guidance on how the economic analysis of the anticipated LSI and CNI proposals could be carried out, and in particular a practical process by which the market development scenarios anticipated by the revised draft GPAs could be modified.

Analysis

14. Of the two regions, the LSI is the most complex in terms of applying the GIT to an investment proposal, due to the intermittent nature of wind generation and uncertainty over wind generation cost in the LSI, compared to other locations in New Zealand.

15. This is in contrast to the CNI, where the generation developed will primarily be new geothermal, with some possibility of peaking hydro enhancements to existing plant. The primary uncertainty is over the development cost and likelihood of the geothermal resource compared with other generation types, as the only substantial geothermal resource is in the region.

16. The following discussion is concerned with the more difficult LSI economic investments. The approach developed for the LSI case is then applied to the CNI investment analysis.

17. Previously Transpower has indicated broad agreement with the type of analysis undertaken by System Studies Group (SSG) for the Commission in order to understand issues with transmission constraints and renewable generation development in the LSI (although Transpower generally does not agree that it is appropriate for the Commission to analyse power flow). The SSG analysis focused on possible energy spill in the LSI as a function of installed new wind generation capacity.

18. As noted by Contact Energy (Transpower regional forum, Dunedin, 29 Nov 2007) the SSG-type of analysis would probably not enable an economic investment to pass the Grid Investment Test using the revised draft GPAs, despite the likelihood of low cost transmission enhancements.

19. This is because the generation scenarios in the revised draft GPAs do not contain sufficient LSI new generation, that spill would be much of a problem. Insufficient LSI generation means that a proposed economic investment will not generate enough economic benefits such that the expected net market benefits of the proposal would be greater than zero (as is required by clause 4.2.2 of the GIT), and therefore the relevant economic investment would not satisfy the GIT.

20. For example, as listed in Table 1, there is currently 1500 MW of possible wind farm capacity either under investigation, or progressing through the RMA process.

Table 1 Lower South Island schemes in the public domain.

Name/Location	Developer	Capacity	Status
Lake Mahinerangi (south of Dunedin)	TrustPower	200 MW	Resource consents given but 178 conditions attached. To be built in 100 MW increments.
Project Hayes (Lammerlaw Range)	Meridian	Up to 630 MW	Resource consents granted for all 176 turbines, conditional on detailed plan with traffic and environmental impacts.

Comalco (Tiwai Point)	Unknown	up to 200 MW	In April 05 Comalco announced it was spending $6 million to study the feasibility of producing its own power. This seems less likely now that new contracts are in place.
Rock and Pillar Range, Middlemarch	Wind Power Otago	up to 70 MW	To be built in three stages. Monitoring equipment in place.
Cairnmuir Hill (southeast of Cromwell)	Roaring 40s	up to 60 MW	Granted consent by Central Otago District Council to erect monitoring tower.
Kaiwera Downs (10km SE of Gore, nr Mataura)	TrustPower	240 MW (up to 83 turbines)	Consents 7 Nov 07. May be constructed in phases.
Otaraia (15km from Gore)	TrustPower	up to 100 MW	Still monitoring the site. Could lodge resource consent applications by mid-2007.
Mt Benger (5km SW of Roxburgh)	Contact	unknown	Set up 80m tower in May 06 to monitor the site.

21. In contrast, the revised draft GPAs assume mean LSI generation over five scenarios of 140 MW.

22. The revised draft GPAs were produced as a least cost expansion plan using the Generation Expansion Model (GEM)[1]. For the purpose of the GEM model, wind generation is costed at a national fixed cost of 2500 $/kW of installed capacity. However LSI wind farm developments are accorded a lower capacity factor (annual energy function vs installed capacity * 8760), reflecting the fact that the wind resource there is generally presumed to be of lower quality than that in the lower North Island.

23. GEM will tend to favour North Island wind generation proposals since they:

    (a) are of higher capacity factor and hence lower energy cost;

    (b) avoid the HVdc charge; and

    (c) contribute to North Island peak demand (at the rate of 20% of installed capacity)

24. Additionally, Clutha hydro schemes were estimated by Parsons Brinckerhoff Associates (PBA) to be in the region of $4000-$5000 per kW, and therefore not likely to be economic.

25. Since the preparation of the revised draft GPAs, more information has come to light that could justify a change in the LSI scenarios to include more South Island generation:

    (a) the Hayes and Mahinerangi schemes have received consent under the Resource Management Act 1991;

[1] Discuss why not quite least cost.

(b) the Climate Change (Emissions Trading and Renewable Preference) Bill has been introduced in Parliament. The Bill, if enacted, will implement a moratorium on the development of new thermal generation power stations; and

(c) the Commission has collected additional information on renewable generation potential as part of its 'Transmission to Enable Renewables' (TTER) project.

26. In considering scenarios for the purposes of analysing an investment proposal, the Board will need to consider the degree of reliance placed on generator assessment of scheme potential and economics, the degree of reliance on confidential information, and finally the type of economic analysis to be undertaken.

27. Although the Commission's work on the next SOO is ongoing (and further work on the revised draft GPAs is part of this workstream), a new SOO will not be in place prior to Transpower preparing and submitting its next investment proposals. The Commission may there wish to consider the degree to which it wishes to be involved in assisting Transpower to prepare scenarios for the purposes of applying the GIT to the anticipated proposals.

28. While it is appropriate for the Commission to engage with Transpower on a free and frank basis prior to receiving an investment proposal, the Commission can only determine (in terms of clause 6.1 of the GIT) which scenarios are appropriate for the purposes of applying the GIT to a particular investment proposal when the Commission has received the proposal as part of a grid upgrade plan.

29. Transpower is required by law to undertake its required consultation on the investment (as required by rule 14 of section III of part F) with an open mind. If the Commission determined the scenarios prior to receiving the proposal, the validity of Transpower's consultation could be challenged on the basis that Transpower had acted under dictation from the Commission

Lower South Island Economic Investment Analysis

30. The primary benefit of economic transmission investments (i.e., an economic investment as defined in part A of the Rules) is that they permit lower cost generation to be dispatched, lower cost generation to be constructed, and less generation in total to be constructed. Other benefits may be a reduction in generators ability to exercise market power, and a reduction in transmission losses.

31. In the New Zealand system, a reduction in dispatch costs may manifest as a reduction in hydro spill. This means that rather than analyse operation of the entire power system to determine the utilisation of all plant, it is often simpler to consider just the amount of spill.

32. For expediency, the Commission and SSG agreed that SSG would use this approach when they considered the amount of spill in the LSI as a function of installed LSI wind generation. In applying the GIT, a variant of this approach may be acceptable for Transpower. SSG determined the amount of spill as being equal to the sum of the

amounts by which an unconstrained operation of the LSI generation would have resulted in a demand for export of energy from the region, greater than the transmission capacity.

33. Unconstrained operation was modelled as just the actual historical half-hourly generation profile from 2000-2007 for existing plant, and new wind generation being a scaled and time-shifted version of the historical Te Apiti generation.

34. SSG therefore estimated an upper bound on the amount of spill, and consequently the benefit of possible transmission investments. It is fairly obvious that hydro storage in the region could be used to hold some of this 'spill energy' for short periods of time, and release it in other periods when transmission is not constrained (eg during high demand or low wind output).

35. Although the initial SSG work has over-estimated the operational benefits of transmission investment, another benefit not currently considered at all is the enablement of lower cost generation development.

36. In terms of the economic analysis, two substantial issues therefore remain:

    (a) Should lower South Island hydro storage be modelled as reducing energy spill, to the detriment of the case for an economic investment?

    (b) Should the "access to low cost LSI generation" benefit resulting from transmission investment be modelled in some type of market expansion or GEM model?

37. Commission staff have undertaken a simple analysis of both issues with a view to understanding their materiality.

Spill

38. The SSG analysis was modified to include the utilisation of some storage at Manapouri power station. The storage available was assumed to be no more than 16GWh (about 4% of the available storage), with 730MW of available generation capacity. Operation of the scheme to 'store spill' was modelled as a simple dynamic simulation in which the following rules were applied to the historical data:

    (a) If desired LSI export exceeds transmission capacity, back off MAN generation, potentially to zero (this assumes no intra regional constraints in meeting Tiwai demand).

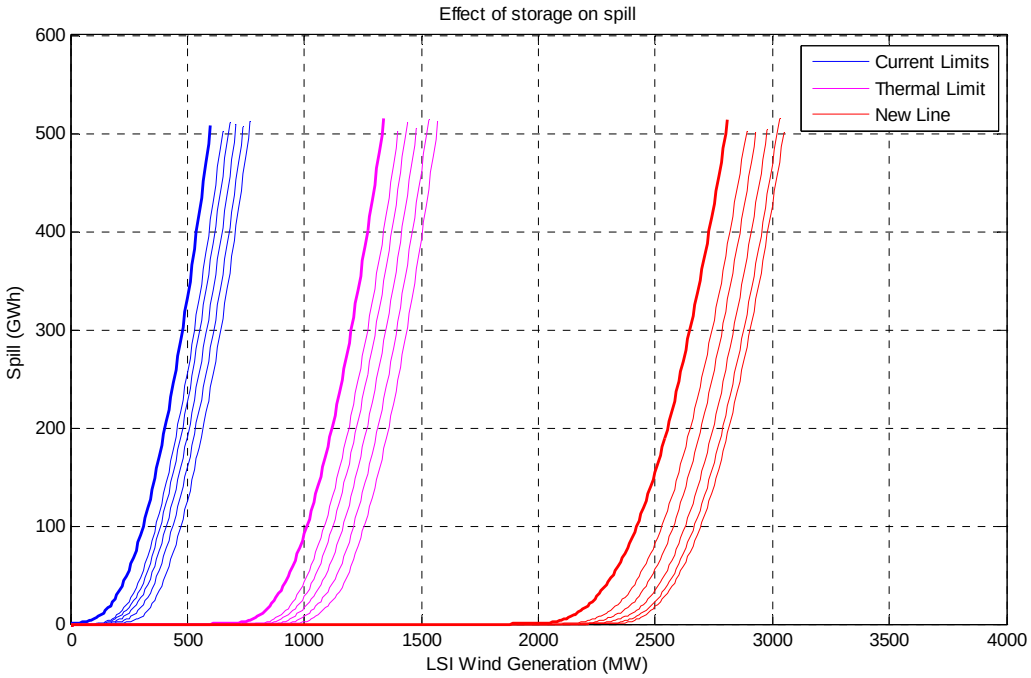
    (b) If desired export is less than the transmission capacity, ramp up MAN to maximum output in order to get the wind balancing storage back to zero as fast as possible.

39. This simple model (technically a state machine) is good enough for an order of magnitude estimate of the ability of local storage to reduce spill.

40. Figure 1 illustrates the resulting modified graph of spill vs installed wind generation capacity (like SSG, assumed to be a scaled version of Te Apiti). The bold lines indicate the

situation with no modelled storage, and storage is then modelled as being 1,2,4,8 and 16GWh. Despite the doubling of storage between successive solutions, it can be seen that spill decreases roughly linearly. This is because on the whole, episodes of excessive generation within the region are quite short - ie the wind will only blow hard for short periods of time, and during the relative lulls, the stored energy can be exported, returning the storage to zero.

Figure 1: The effect of increasing quantities of installed LSI wind generation, on LSI spill, taking account of some LSI storage. The bold lines represent the case with no storage, increasing next to 1 GWh of storage, then 2,4,8 and 16GWh. Note that the total storage in Manapouri is approximately 400GWh.



41. It is fairly clear that local storage could be used to enable possibly 200MW of more wind generation, for the same amount of spill. In the real world, the response of the market will be better than the no storage case, but not as good as an optimal use of storage to prevent spill and balance dry year reserve.

42. In an ideal world, generators will not attempt to game the constraint. When the constraint binds, hydro plant will be constrained back. Plant that can reduce output without spilling will generally be constrained back first. This is essentially the situation that has been modelled. Knowing they will be constrained back, hydro generators should operate with more storage reserve, balancing the risk of spill from wind balancing against the risk of dry year shortage.

43. However, given that generators are trying to export from the region, it is probable that they will still want access to the high prices outside the region. They therefore have an incentive to reduce offer quantities to prevent the constraint binding. Since wind generation output will be difficult to predict, they will effectively use a larger storage range, increasing operational costs.

44. This potential misalignment of generator behaviour with the optimal behaviour is part of a larger problem of incentivising generators with hydro storage and fast ramp-rate to make plant available to balance intermittent generation. The Commission's market design review project will be giving consideration to these problems.

45. Currently though, it would seem reasonable to make the assumption that local storage is utilised to reduce spill, but with some inefficiency.

46. If 16GWh of MAN storage were simply set aside for wind balancing, this would have the effect of reducing the available range for managing dry year risk, potentially increasing system operational costs. To investigate this, the SDDP model was used to calculate system operational costs with MAN storage reduced by 16GWh.

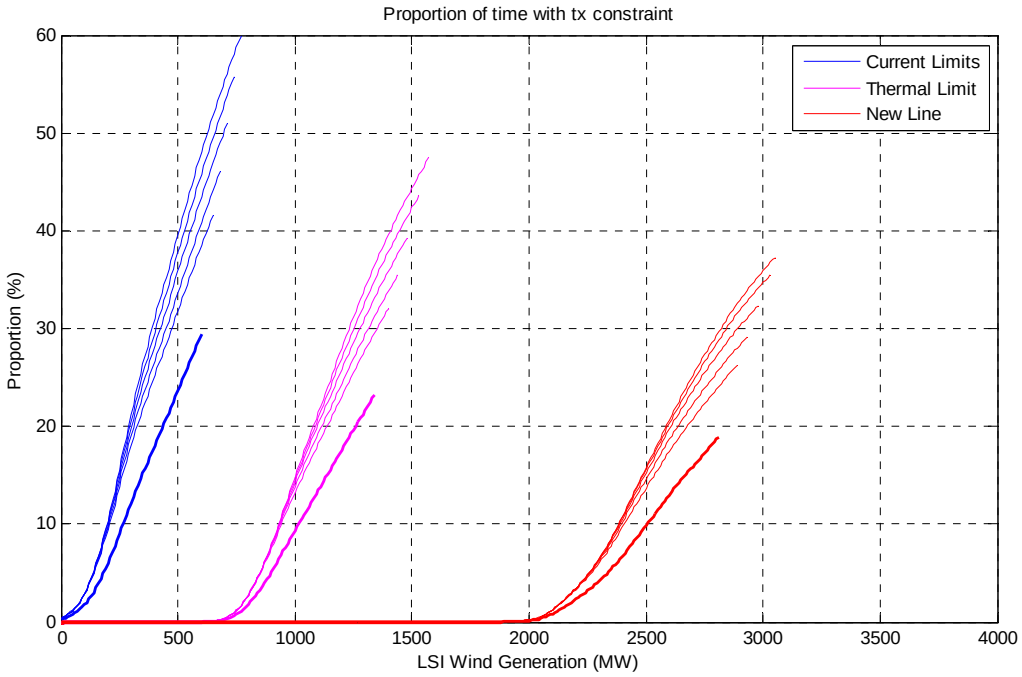
47. The SDDP model could not determine any difference in system operational costs, as the change in MAN storage is too small compared to the fidelity of the model.

48. At the TTER workshop, Meridian Energy Ltd stated that they had found a substantial cost through SDDP modelling, but staff have not had the opportunity yet to compare the modelling.

Generation Development

49. The issue of price separation could be an impediment to development of renewable generation in the region, even if spill were managed down to zero through judicious use of the local storage. Figure 2 illustrates how the percentage of time the region is in a price separated zone increases with wind generation and storage.

Figure 2: The effect of increasing quantities of installed LSI wind generation, on the proportion of time the LSI region is behind a transmission constraint to the north, taking account of some LSI storage. The bold lines represent the case with no storage, increasing next to 1 GWh of storage, then 2,4,8 and 16GWh.



50. The expressed view of wind generators has been that they will not build plant behind a constraint, even if the constraint binds infrequently. Other sites that do not have such a constraint are more attractive. In practice this will mean that plant will only be built up to some low frequency of transmission constraint, rather than some larger quantity that might be economic from a national good point of view.

Developing scenarios for the GIT

51. In terms of applying the GIT to an investment proposal, there are two main pathways to navigate through the above issues:

    (a) An a priori modification of the scenarios in the revised draft GPAs, followed by economic analysis of operational benefits (reduced spill) caused by transmission investments.

    (b) Generation development is assumed to be enabled by transmission investments. In this case the resulting generation development is endogenous to the model (that is, the model assumes that generation will always be developed to meet demand) and generic generation plant is introduced as determined by a GEM or similar market expansion type model. In this situation, it would be necessary for the Commission to determine the scenario inputs - plant capital cost estimates for example when it considers the relevant investment proposal.

52. In the first case, the newly developed scenarios might be produced by GEM, or they might be 'ad hoc' and utilise information provided by generators. Only operational benefits can be calculated under this approach.

53. Information provided by generators would have to justify the preference for constructing scenarios with more generation in the LSI as opposed to other locations in New Zealand, that possibly do not require investment in transmission enhancements on the interconnected grid.

54. One possibility would be for generators to provide a more information relating to the expected development cost and performance for their proposed schemes that is able to be publicly disclosed during the consultation required under rule 14, or verified or tested through consultation.

55. If the information is able to be verified or tested in this way, it could support a model such as GEM having a preference for including the schemes in the future expansion plans. If the information is not able to be verified or tested through consultation, then the use of the information in terms of the GIT analysis may be limited, and/or the Commission may decide not use information at all.

56. If the resulting scenarios result in high levels of constraint binding, perhaps partially due to the use of local storage to minimise spill, the scenarios may not appear to be credible. It could be argued the market would not have provided so much generation behind a constraint. This type of shortcoming can be redressed to some extent by using a market expansion model to produce the scenarios as part of the GIT economic analysis. This is the second approach.

57. For this to work, it would have to be the case that new LSI generation is modelled as lower cost (capital and operational) than other New Zealand generation the market would have developed, otherwise the option to build generation enabled by the proposed transmission investment will not be taken up. Even if sub-optimal generation was modelled as proceeding as a result of the transmission investment, there would be no benefit under the grid investment test, if it was considered the market could have developed equally meritorious sites elsewhere.

58. For a robust application of the GIT in the second case, it really must be the case that the LSI generation options are better than other generation in the country. Currently (apart from some Clutha schemes) this assertion seems a little dubious, but the Commission is not privy to information held by generators. Factors which may influence their choice of sites to develop include economies of scale, ease of civil works, ease of consenting, prior relationship with land owners and communities etc.

59. Most of these issues would be rolled up in a model like GEM into an assumption of lower capital cost of development. This was explored for the LSI wind schemes by instructing GEM to use successively lower capital cost estimates for the LSI wind schemes, until the model found a clear preference for those schemes.

60. When the capital cost estimates were reduced by 30% relative to other wind farms throughout New Zealand, the model found the LSI schemes to be preferred. There was a noticeable shift when capital costs were reduced by 15% as well, but not significant.

61. For example, by 2015, the mean quantity of wind generation installed in the LSI over all scenarios (equally weighted) was originally 140MW, but with the capital cost estimates reduced by 30%, that increased to 300MW.

62. This analysis did not include any revision to the list of possible schemes that the model could pick from to place in the LSI region. It is likely that with the list of schemes expanded to include more recent developments, the model would place more than the modelled 300MW.

63. Thus, significant benefits must accrue to the LSI schemes before it could be believed that those schemes are preferred to others in New Zealand. Transpower and LSI generators would have to demonstrate that this degree of confidence that LSI generators should be regarded as having lower costs in GEM.

64. Rather than have the Commission try to second-guess generator information, a possible approach is for the Commission to give credence to generator information if the information falls within the estimation bounds of the Commission's analysis, and the information is able to be verified as discussed above.

65. Even upon the completion of the TTER project, the cost estimates available to the Commission will still only be at the pre-feasibility level of plus or minus 25-30%. This estimation bound applies throughout the country, with some schemes being at the high end, and others at the lower. It would be reasonable for the Commission to assume that generators are good at discovering those schemes at the low end.

66. It should also be acknowledged that generators have an incentive to provide more quality information publicly if it will assist the Commission in approving scenarios which in turn enable transmission investments that benefit generators, but for which they do not have to pay. Both Contact and Meridian Energy have made comments to staff indicating some realisation that more information may need to be provided to the Commission.

67. Commission staff recommend that the Commission give fairly high credence to information provided by generators in the affected area that is able to be verified or tested through consultation, provided that the claims of generators lie within the bounds of error in independent estimates derived by the Commission. If information provided by generators is within the bounds of error in analysis able to be published by the Commission the Commission should be indifferent to the actual realisation within those bounds. The national level modelling in GEM however, will prevent the Commission from comprehensively siding with generators throughout the country and building too much transmission.

Engaging with Transpower

68. As set out earlier in this paper, clause 6.1 of the GIT sets the scenarios in the SOO as the default market development scenarios that must be used in applying the GIT to an investment proposal, unless the Commission determines that other scenarios proposed by

the Commission, Transpower, or a designated Transmission customer are more appropriate.

69. The Commission can only determine that scenarios other than those in the SOO are more appropriate for the purpose of applying the GIT to an investment proposal when the investment proposal when been submitted to the Commission as part of a GUP

70. However, the Commission may engage with Transpower prior to Transpower submitting a proposal for approval for the purpose of providing free and frank views on possible market development scenarios.

71. This approach is aligned with Transpower's desire to be have leeway to modify scenarios during the process of preparing a GUP. It also enables Transpower to internalise a modelling process where scenarios are slightly modified to prevent a 'spurious' failure of the GIT.

72. This could arise if the Commission produced scenarios that were on the 'cusp' of enabling a proposal to pass the GIT, with failure to pass due to an assumption or parameter that had no significance.

73. Alternatively, apparently credible scenarios could turn out to be not credible, following the GIT analysis (for example the GIT analysis might reveal that transmission from the region would be constrained too often for it to be believable that such generation would have been developed).

74. It is a common error to believe that the modelling process is purely linear, from assumption to analysis to results, when actually the materiality of many assumptions made at the start of the development process only becomes obvious at the end of the process.

75. For example, the Commission may be faced with a number of equally valid alternative assumptions at the start of the process. In this context, the Commission will be indifferent to the specific assumption adopted.

76. However, at the end of the process it may become apparent that the results of the GIT analysis hinges upon the arbitrary adoption of one of a number of equally valid alternative assumptions. This may mean that the GIT results are not robust.

77. It is therefore important for the Commission to keep reviewing assumptions made through the process to ensure that, in combination, the assumptions underlying the market develop scenarios produce credible scenarios on the basis of which robust GIT results may be calculated.

78. Commission staff therefore suggest the following process for modifying the scenarios anticipated by the revised draft GPAs to enable LSI economic investments to be prepared by:

(a) the Commission revises capital cost estimates for LSI schemes as a result of information collected during the TTER project;

(b) assisted by GEM modelling, the Commission establishes indicative reasonable bounds (provided on a without prejudice basis) within which Transpower could construct scenarios;

(c) Transpower proposes new scenarios for the LSI region as part of applying the GIT to the LSI investment proposal submitted as part of the 2007 GUP. Transpower make the decision as to whether they wish to model the GIT using a priori scenarios or endogenous generation expansion.; and

(d) Commission staff suggest to Transpower that, in applying the GIT, Transpower model local storage in the region, as this is a reasonable view of how the current market would operate, and this assumption is detrimental to the transmission proposal.

Central North Island Economic Investment Analysis

79. The situation in the CNI is more clear cut from an economic perspective, but more difficult in terms of the power system analysis compared with the LSI transmission investment case.

80. The region is connected to two other regions through the Wairekei triangle, and energy is transported through the region, predominantly from South to North. It will need to be modelled as a mesh network in the power system studies, as opposed to a spur connection as in the LSI case.

81. A major part of the case for transmission investments in the region is the of enablement of lower cost geothermal generation.

82. Geothermal development in the region generally must be base-loaded, and generally cannot follow load or spill steam. Consequently this type of plant will not develop behind a transmission constraint if it will affect dispatch of the plant, however there is some hydro plant in the region that could spill or store water, and as for the LSI analysis, this needs to be modelled.

83. It is fairly uncontroversial that geothermal developments are high on the merit order in a national sense. Currently restrictions on development are modelled in GEM to reflect the uncertain size of the finite resource, and likelihood of schemes being consented.

84. It is hoped that these uncertainties will be better characterised through the transmission to enable renewables project, and Transpower engagement with stakeholders during the preparation of the economic analysis.

85. Possible additions to the MW capacity of existing hydro in the region may be a lower cost method of contributing to the North Island peak demand than building thermal peakers or

pumped hydro schemes in other locations. If so, these plant will need a constraint-free connection through to Whakamaru (south end of the new 220kV NIGU transmission line).

86. The economic analysis by Transpower will likely produce generation scenarios as an endogenous response to assumed increases in transmission capacity, rather than the use of a priori scenarios. This will enable the benefit of enabling more geothermal and hydro peaking capacity development to be quantified.

87. Analogous to the process for the LSI, Commission staff suggest the following approach to modifying the scenarios anticipated by the revised draft GPAs:

    (a) the Commission revises capital cost, size, and likelihood estimates for CNI geothermal, wind, and hydro peaking schemes as a result of information collected during the TTER project;

    (b) Transpower proposes new scenarios for the CNI region as part of applying the GIT to the CNI investment proposal submitted as part of the 2007 GUP,

    (c) Commission staff suggest to Transpower that, in applying the GIT, Transpower model local spill and storage in the region, as this is a reasonable view of how the current market would operate, and this assumption is detrimental to the transmission proposal.

Process for the GUP preparation

88. Transpower have advised that they intend collecting information about possible generation schemes and economics through their stakeholder forums and from a specially established industry working group. This will follow and build upon information collected by the Commission through the Transmission to Enable Renewables consultation.

89. This will enable Transpower to then formulate new generation scenarios, with some guidance from the Commission.

90. An indicative timetable has been proposed to Transpower and is provided as Appendix A. Transpower have indicated that they want to extend this timetable to allow for an industry working group process. Staff expect Transpower will provide a revised timetable before the Board meeting, and this will be made available to Commissioners at that time.

Recommendations

91. It is recommended that the Board:

    (a) **Provide feedback** on the proposed approach to the economic analysis of the Central North Island and Lower South Island economic investments.

    (b) **Note** the process that the Commission will suggest to Transpower for the purpose of developing scenarios for the anticipated LSI and CNI projects; and

(c) **Agree** that it is not appropriate for the Commission to rely on information from generators that is unable to be verified or tested.

Bruce Smith
Senior Adviser