



SUBMISSION BY
GENESIS POWER LIMITED
trading as Genesis Energy

ON

Scenarios for the Wind Generation Investigation Project
December 2005

9 February 2006

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Date: 9 February 2006

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Introduction

1. Genesis Power Limited (trading as Genesis Energy) welcomes the opportunity to provide comment to the Electricity Commission on their consultation paper entitled 'Scenarios for the Wind Generation Investigation Project', dated December 2005.
2. Genesis Energy is a state owned enterprise, involved in electricity generation and the retail of electricity and gas. Genesis Energy owns and operates over 1600MW of generation assets, including the Huntly Thermal Power Station, Tongariro Hydro Power Scheme, the Waikaremoana Hydro Scheme, Hau Nui Wind Farm and a number of co-generation plants. Genesis Energy is also one of New Zealand's largest electricity and gas retailers with approximately 640,000 customers.

Executive Summary

3. The Electricity Commission, in a paper entitled 'Scenarios for the Wind Generation Investigation Project' dated December 2005, has invited participant comments on the first phase of the Wind Generation Investigation Project (the 'WGIP') and the development of a number of wind generation installation scenarios. The proposed scenarios represent wind generation investment that could potentially occur over the next ten years. The scenarios are to be used to examine impacts on the electricity market and power system of increasing volumes of wind generation.
4. In general, Genesis Energy agrees with the approach taken by the Electricity Commission in developing the scenarios for the wind generation investigation project. This high level submission supports an investigative and planned direction within which intermittent generation can be effectively included in New Zealand's electricity market.

Our Approach to this Submission

5. Genesis Energy recognises the advancement of industry research and development in renewable energy sources coupled with the effective integration of intermittent generation into the New Zealand electricity market.
6. Genesis Energy has taken a practical approach in response to the Electricity Commission's paper, 'Scenarios for the Wind Generation Investigation project', and although a number of critical issues and assumptions have not been explored in full Genesis Energy regards the development of these scenarios as an important step towards determining possible future impacts on the power system and market.

Specific Comments

7. Genesis Energy's responses to the Electricity Commission's specific questions are attached as Appendix One to this report. In terms of the key issues that have arisen out of the consultation paper for Genesis Energy, these relate to:
 - a. The desire to see the North-South Island split included in the dispersed scenarios changed from a 70/30 mix to a 60/40 split. Genesis Energy feels a larger South Island representation is warranted, based on recent wind generation announcements and also to place greater emphasis on the potential power system issues surrounding South Island transmission constraints and frequency keeping;
 - b. A keenness for the Electricity Commission to explore a reduction in the two hour offer rule, with reference to non-wind generators, to counter the unknown variability and unpredictability of intermittent generation. Genesis Energy understands the current SPD upgrade being undertaken by the System Operator allows for this functionality and therefore a reduction in the two hour gate closure is both a realistic and achievable goal; and

- c. The fact that the ability of the power system to cope with intermittent generation, on an inter-regional or regional basis is central to investor decision making, market rule development and power system operations. Genesis Energy would like to see more emphasis placed upon transmission capability as the WGIP progresses.

Conclusion

8. Genesis Energy is happy to discuss further any aspect of its submission with the Electricity Commission.
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Appendix One: Genesis Energy's Response to Electricity Commission's Specific Questions

#	QUESTION	COMMENT
1	<p><i>Do you agree with the approach taken to developing the aggregate wind generation penetration scenarios? Do you consider the aggregate quantities determined for the Very High, High and Low penetration scenarios to be reasonable? If you answer no to either of these questions, please explain your reasons and provide alternative rationale /scenarios.</i></p>	<p>In general Genesis Energy agrees with the Electricity Commission's approach taken to developing the aggregate wind generation penetration scenarios, and considers the aggregate quantities to be reasonable, with one exception – Genesis Energy recommends an increase to the Very High scenario, currently 2000MWs, to 2500MWs ensuring recent announcements of South Island wind generation projects are captured in this upper limit.</p> <p>In addition to the above increase Genesis Energy believes a shift from the 70%/30% North to South Island split be adjusted to a 60%/40% split for the dispersed scenarios, giving greater representation to possible South Island power system control issues. Please refer to comments on question 7 for more information on this recommendation.</p> <p>By way of context to this response, Genesis Energy assumes that the Electricity Commission will have the flexibility to alter its modelling and scenarios as and when new "committed" wind generation projects, as well as non-wind based projects, are announced.</p>
2	<p><i>Do you have any comments to make with regard to the Correlations analysis and conclusions?</i></p>	<p>The correlation analysis and conclusions seem to fall into line with current industry thoughts and research.</p> <p>Wind generation spread more widely across the country suggests a dampening effect on system control issues surrounding intermittent generators. These conclusions are supported by international research, with specific reference to Thomas Ackermann's presentation in Wellington (December 2005).</p>

#	QUESTION	COMMENT
3	<p><i>Do you agree that the factors outlined above are the relevant factors to consider in developing regional wind generation penetration scenarios? Do you agree with the high level regional assessment? If not, please explain your reasoning.</i></p>	<p>Genesis Energy considers the first of the three factors to be of considerably more relevance than the latter two.</p> <p>Genesis Energy believes the primary factor to be identified as an investment driver is the “quality of regional wind resource”. A renewable fuel source such as wind in a particular region is surely likened to a hydrological catchments area. Regions without good quality of wind resource would not be expected to attract a second phase of investment analysis.</p> <p>Regional investment would not be driven, to the same extent, by the differences in nodal prices from region to region, or the existing volume of wind generation in a particular region, unless of course limits are established and placed upon these individual regions.</p> <p>Genesis Energy feels the “regional average nodal prices” and the factor of “existing volume of wind generation in regions” are better dealt with in conjunction with transmission capacity and constraints, when modelling power flows in and between regions, and System Operator control issue discussions.</p>

#	QUESTION	COMMENT
4	<p><i>Do you have any comments to make with regard to the identified limiting and causing factors? Do you believe this list is complete or should other factors also be considered?</i></p>	<p>The limiting and causing factors identified seem to be fair and reasonable.</p> <p>One additional market factor Genesis Energy would like to see explored is a change to the two hour offer rule where currently non-wind generators lack the ability to react to the variability and unpredictability of wind generation output. A reduction in the two hour offer window, whether this be market wide or for specific regional generators (possibly under additional ancillary service contracts), could ease a number of the limiting factors identified.</p> <p>Genesis Energy understands the current System Operator upgrade of SPD will enable reductions to the two hour gate closure through the dynamic modelling of constraints. Further development of this key market issue has the potential to affect the speed in which intermittent generation is fully integrated into the market and represents a very realistic option.</p> <p>Genesis Energy would expect the System Operator to have considerable input into this topic over the next six to twelve months.</p>

#	QUESTION	COMMENT
5	<p><i>Do you agree with the Common Assumptions listed above and consider the list to be complete? If not, what additions, amendments or deletions would you recommend? Please explain your reasoning.</i></p>	<p>Genesis Energy generally agrees with the common assumptions made to promote the development of the regional scenarios.</p> <p>Genesis Energy would like to stress the importance of point (C), having the necessary market rules in place to accommodate new wind generation, and point (K), transmission constraints and capacity supporting wind generation investment.</p> <p>Significant investment is already taking place in wind generation research and implementation where firm marketplace rules are yet to be finalised. Without these working rules in place wind generation investment is somewhat tinged with uncertainty and considered an impediment to uptake.</p> <p>Transmission constraints within regions as well as into/out of regions will no doubt have major impacts both on investor decisions but also the physical stability and ability of the System Operator to control the national grid effectively.</p> <p>Further detailed work is required in order to gain better insight into intermittent generation limits on a regional and national basis, as well as impacts on non-wind based generation required to counter intermittent generation variability and unpredictability.</p>
6	<p><i>Do you believe that the scenarios outlined above reflect the information used to develop them? If no, how would you change the Scenarios and why?</i></p>	<p>Genesis Energy agrees that the scenarios reflect the information used to develop them.</p>

#	QUESTION	COMMENT
7	<p><i>Do you agree that the four scenarios outlined above are sufficient to enable consideration of all necessary power system and market impacts? If not, what additions, amendments or deletions do you recommend in order to develop a complete set of scenarios for the intended purpose?</i></p>	<p>One concern Genesis Energy has is the level of possible penetration allocated to the South Island. Indications from the market suggest possible wind farms in the South Island could be larger, in terms of individual output, than the North Island. Combine this with demand growth and the overall load size in the South Island and it is possible that South Island intermittent generators could pose a significant problem for the System Operator.</p> <p>Therefore, Genesis Energy believes it is important not to lose sight of the significance South Island intermittent generators could play when it comes to power system control issues, both regionally and nationally.</p> <p>To this end, Genesis Energy proposes a 60%/40% North to South Island split with regards to the dispersed scenarios rather than the current 70%/30% split.</p> <p>Genesis Energy agrees with the 90%/10% split when testing the upper limits of penetration, concentrated in the North Island.</p>
8	<p><i>General comments</i></p>	<p>The introduction clearly states that the paper makes no statement on which scenario is more likely than the others. Genesis Energy considers this appropriate and would also recommend a similar clarification surrounding the assumptions regarding transmission be made, other than the very brief pt K of paragraph 94.</p>