

Market Design Review
Electricity Commission
PO Box 10041
Wellington

20 July 2007

Submission on ‘Market Design Review – Survey of Market Performance’ Issues Paper

1. Background to New Zealand Wind Energy Association

- 1.1 The New Zealand Wind Energy Association (“NZWEA”) is a non-Governmental, non-profit industry association that promotes the responsible, sustainable and significant utilisation of New Zealand’s abundant wind resource as a reliable, renewable, clean and commercially viable energy source.
- 1.2 The association’s membership includes around 70 companies with an interest in wind energy. These companies encompass the full range of electricity sector activities including the owners and operators of generation plants and transmission and distribution networks as well as other interested parties such as wind turbine manufacturers, consultants, financial organisations and law firms.

2. NZWEA’s interest in the Market Design Review

- 2.1 Wind energy is a growing source of electricity generation in New Zealand. It provided around 2% of New Zealand’s electricity supply in 2006 and installed generation capacity is nearly doubling from 170 MW to 321 MW in 2007. Further development is expected in the future as Government policy responds to public concerns regarding climate change and as rising fuel prices lead to increased recognition of the role that renewable energy sources play in ensuring security of energy supply and security of energy price.
- 2.2 Today a number of wind energy projects are under development, are seeking resource consent or are under investigation. All of these projects will be influenced by the design and operation of the electricity market.
- 2.3 The focus of the members of the NZWEA is on the generation of electricity from the wind so our main interest in the review is in the area of the wholesale market. We have not reviewed and will not be commenting on the retail market issues.

- 2.4 The wind industry is also interested in developments in the area of demand side participation, though primarily in the manner in which demand side activities can influence the wholesale market rather than in the direct facilitation of the demand side market.

3. The Electricity Commission's Wind Generation Investigation Project (WGIP)

- 3.1 The NZWEA notes that the Electricity Commission is currently undertaking the Wind Generation Integration Project (WGIP). This project is seeking to identify the effect of large scale wind generation on the operation of the New Zealand power system and electricity market. That project has recently (13 July 2007) released the first set of reports from the 'Implications' phase of the study. The project will then move on to identify the 'Options' available to manage the identified 'Implications' and then make recommendations regarding changes in the power system and electricity market that will enable on-going wind energy development in an equitable and cost-effective manner.
- 3.2 The Market Design Review issues paper ('Review') discusses the potential impact of wind energy on the electricity market in a number of areas. The NZWEA notes that many of these are areas that have been identified in the WGIP. Accordingly NZWEA recommends that the best means of addressing these issues should be through the continuation of the WGIP rather than through any new or additional studies.
- 3.3 NZWEA also notes that the set of nine WGIP studies that were released last week contains a lot of information that could have informed this submission on the Review. However, due to the large amount of material discussed in those reports and the short time available between their being published and the closing date for this submission NZWEA has been unable to use those documents as a reference in this submission.

4. General Comments

- 4.1 NZWEA notes the comment included inside the front page of the paper where it is identified that "...some information is incomplete or missing" and has identified at least a couple of areas where errors may have occurred. We suggest that any ongoing work streams review the data that has been collected and presented, assess its validity and seek to improve the quality of the data where necessary before going too much further with the development of possible solutions or changes.
- 4.2 Much of the analysis uses as its basis a "business as usual" case where historic trends are expected to continue. This is particularly the case for discussion on the wholesale market in regard to the generation mix and its dispatch. However there are several reasons to believe that future scenarios may look somewhat different to some of these historic trends. These might include:
- Government climate change policy (particularly any requirement to significantly increase the use of renewable forms of electricity generation);
 - The forecast shortfall in the supply of natural gas (together with related price increases and a move towards less flexible supply agreements);

- Greater interest and uptake in demand side participation;
- Peak electricity demand increasing faster than average demand, etc.

Any on-going analysis should bear these potential changes in mind so that the market design remains relevant to the actual market dynamics.

5. Comments on Wholesale Market Issues

5.1 Capacity Margin

- 5.1.1 NZWEA suggests that the maintenance of an adequate energy supply margin is likely to be the end result of a market that is designed and operating well, rather than a variable that should be controlled or regulated to ensure good market operation.
- 5.1.2 NZWEA understands that dry-year security margins are already being considered in the existing Commission work programme.
- 5.1.3 The impact of increased amounts of wind energy on dry-year security will also be influenced by the Commission's WGIP. NZWEA recommends that work on WGIP be given a high priority to ensure that the outcomes are able to be reflected in other work streams.
- 5.1.4 Accordingly NZWEA recommends that further detailed analysis of capacity margins be given a low priority in any ongoing work.

5.2 Future Investment Decisions

- 5.2.1 As with capacity margin above, NZWEA believes that a market that is operating correctly should ensure that sufficient new generation is always developed. Attempting to control this aspect of the market might create distortions that affect other areas of the market's operation. Accordingly NZWEA recommends that the Commission's activities in this area focus on assessing and monitoring security levels.
- 5.2.1 There appears to be some inconsistency in the manner in which the Commission has assessed "likely" and "possible" projects that might contribute to future supply margin (i.e. projects with consent are listed as "possible" while some without are "likely"). However NZWEA agrees that new investment decisions are likely to be made that will ensure a reasonable level of supply security going forward.

5.3 Medium Term Co-ordination

- 5.3.1 NZWEA agrees that medium term co-ordination of the use of hydro and thermal assets appears to be occurring. NZWEA does not see any reason why this should not be expected to continue but notes that the presence of a wider range of generation sources (i.e. more wind and geothermal) will also have a positive impact on medium term supply security (i.e. increased wind generation can allow increased water storage in the hydro dams).

5.4 Real Time Security

- 5.4.1 NZWEA agrees that real time security of supply appears to be adequate, though it is difficult to determine whether this security is being achieved in the most efficient or economic fashion.
- 5.4.2 The impact of increasing amounts of wind energy on real time security is one of the main focus areas of the WGIP and should continue to be investigated through that project. However it is also worth noting:
- That wind energy is not the only factor that will influence real time security.
 - The data available for understanding the impact of wind energy on the New Zealand system is very limited. Further data should be collected over time and the related analysis updated accordingly.
 - Wind energy penetration into the electricity system is currently less than 2%. It is generally accepted that the penetration levels can be somewhat higher than this (20% is often used as a “rule of thumb”) before issues start to arise. Based on current project implementation timeframes it can be expected to be several years before wind has a significant impact on the system’s operation (analysis and development of the necessary solutions should however have a high priority to ensure that they are in place in advance).
- 5.4.3 The analysis presented in the Review focuses heavily on wind without putting much emphasis on the impact that other aspects of the system may have on its operation. Wind will have an impact but so will the relative inflexibility of the operation of existing thermal plant, for example. Wind energy’s impacts should not be looked at in isolation. The system already provides FIR and frequency keeping for the system without wind, so it is likely that wind will change the way that these are used rather creating a big change in the amount required.
- 5.4.4 NZWEA believes that analysis based on a scenario where over 2000 MW of wind is on the system but the rest of the system operates as it does today is flawed (Figure 63). This quantity of wind generation is unlikely to be operational until 2015-2020, by which time factors such as gas supply and demand and demand response will look quite different than they do today. It is also conceivable that the wind and hydro would not both be run at their maximum at the same time – the hydro might be backed off and so would have spare capacity to respond to the reduction in wind generation.
- 5.4.5 Historic data on the use of fast response hydro may also not correspond to the way that wind, hydro and thermal generation may be coordinated in the future.
- 5.4.6 NZWEA also notes that work conducted on behalf of Meridian Energy by the internationally-recognised wind integration expert, Goran Strbac of Imperial College London has identified that wind integration in New Zealand should be more efficient and cost-effective than elsewhere in the world due to our high wind farm capacity factors and flexible base of hydro generation. Overseas studies are continuing to show wind integration is less costly than had been anticipated so if Goran Strbac’s preliminary work proves to be correct there should be an even lower cost in New Zealand.
- 5.4.7 NZWEA wonders whether the existing mechanisms for identifying, procuring and supplying real time security may not be as efficient or effective as they

could optimally be. We imagine that methodology being used is likely to be conservative and to reflect existing generation technologies, demand profiles and system models. Increasing system complexity is going to create a need for more detailed, complex and flexible system operations. NZWEA believes that this area, i.e. making sure that existing models, etc. are sufficiently accurate and detailed, should be the initial focus of any future work (and might ideally be considered as an individual project outside of the Review).

5.5 Long Run Marginal Costs (LRMC)

- 5.5.1 NZWEA agrees that LRMC and wholesale electricity prices are strongly related; however we believe that the analysis of LRMC in the Review, particularly in relation to wind does not appear to be correct.
- 5.5.2 The Review suggests an average LRMC for wind energy of over \$100 per MWh. However it is unlikely that any electricity generator would be investing the time and money that they are already spending on developing their wind energy projects if this value is correct, as these costs are well in excess of those for other forms of generation (even when a price on carbon is included). NZWEA suggests that the LRMC for many wind energy projects are as much as \$20 to \$30 per MWh lower than that used in the Review.
- 5.5.3 NZWEA recommends that the Commission engage more closely with developers seeking to build wind energy projects to better understand the costs. As a guide, Windpower Monthly magazine collected costs from various global wind energy projects last year and calculated an average installed cost of €1175 per kW (NZ\$ 2000 per kW). While each site and country will have its own cost factors this is still around 30% less than the cost NZWEA understands was used in this study (NZ\$ 2783 per kW). NZWEA also recommends that the Commission avoids using the LRMC for wind calculated for this Review in any other work until some more accurate data is obtained.
- 5.5.4 NZWEA suggests that as the analysis appears to show that wholesale prices do not appear to be running ahead of LRMC that this area be given a low priority in the on-going Review process.

5.6 Ancillary Services – Instantaneous Reserves

- 5.6.1 NZWEA agrees that the instantaneous reserves market appears to be providing sufficient reserve, but wonders whether there is opportunity for further optimisation (see also 5.4.7 above).
- 5.6.2 The Review does not appear to have linked its work on demand side participation (Chapter 4) with the potential for that increased demand side participation to play a greater role in the reserve market.
- 5.6.3 NZWEA believes that increased understanding of reserve availability and requirements (see also 5.4.7) and a review of the way it is procured and supplied should have a relatively high priority in the on-going Review.
- 5.6.2 The work on the identification of reserve requirements for wind energy that forms part of the WGIP should also be given a high priority in the Commission's work programme.

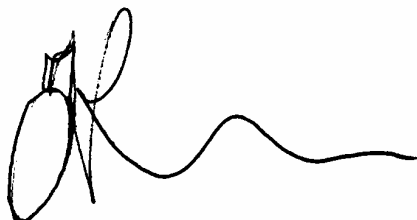
5.7 Ancillary Services – Frequency Keeping

- 5.7.1 NZWEA suggests that the link between frequency keeping costs and energy market prices should be further explored and the reasons for this link better understood. It has been suggested that increased wind energy penetration will increase frequency keeping requirements but it will be important to identify any such impact separately from that related to other trends and influences.
- 5.7.2 NZWEA understands that concerns have been raised about the capabilities of the existing frequency keeping service due to the limited number of providers, technical limitations of the equipment, lack of transparency in terms of how the frequency is being provided and the inability to provide the service across the HVDC link.
- 5.7.3 With all of this in mind NZWEA believes that a more detailed examination of the frequency keeping market should have a relatively high priority in the on-going Review.
- 5.7.4 Work within the WGIP on the identification of any change in frequency keeping requirements to accommodate an increase in wind energy generation should receive a similarly high priority.

6. Ongoing discussions and future consultation

- 6.1 The NZWEA would be happy to discuss the contents of this submission directly with the Commission and is also interested and willing to participate in any future consultations, forums or other related work.

Yours faithfully



Fraser Clark
Chief Executive, NZWEA

Address for service of submitter

New Zealand Wind Energy Association
PO Box 553
Wellington 6140

Phone: (04) 499 5048
Fax: (04) 499 5047
Email: ceo@nzwea.org.nz
Contact Person: Fraser Clark
Chief Executive