IN THE MATTER	of the Resource Management Act 1991
AND	
IN THE MATTER	of applications to the **WAIKATO DISTRICT COUNCIL** and **WAIKATO REGIONAL COUNCIL** by **WEL NETWORKS LTD** for resource consents to authorise the establishment, operation and maintenance of 28 wind turbines for the generation of electricity and associated activities on the Wharauroa Plateau near Te Uku

STATEMENT OF EVIDENCE OF PAUL CALLOW

1. INTRODUCTION

Qualifications and experience

1.1 My name is Paul Callow. I am a partner in the Corporate Finance practice of Deloitte in Wellington. Deloitte is one of the world's largest accounting firms. In New Zealand the firm provides audit, financial advisory services or consulting services to all the country's main electricity generation and distribution companies. Deloitte has recently valued the generation assets of both Contact Energy and Trustpower and has reviewed the valuation of the generation assets of both Meridian and Genesis in our role as auditor.

1.2 I lead the energy and infrastructure sector for Deloitte in New Zealand and have personally led much of the work that the firm has carried out for electricity generation companies over the past ten years.

1.3 I have spent the past 15 years advising on investments in electricity generation capacity in Australasia in renewable capacity, cogeneration and thermal power plant.

1.4 I hold a degree in mechanical engineering from Birmingham University, where I graduated in 1985.

Involvement in WEL Te Uku project

1.5 Deloitte was appointed in October 2007 to assist WEL with the evaluation of the Te Uku project and to advise on its commercial viability. Part of Deloitte's role in this process was to review the financial modelling tools WEL was using in its own economic evaluation of the project.

1.6 I was asked to value the project and assess whether the methods being used by WEL in its own evaluation of the project were robust and reliable and in line with the current best practice in the electricity generation sector. I was also asked to test, develop and improve the analytical tools being used in order that they could be used for the further evaluation and development of the project.

1.7 I was also asked to advise on the assumptions used by WEL in its valuation process and assess whether they were a robust and reliable basis for deciding whether to proceed with the project.

1.8 I was subsequently asked to make my own assessment of the viability of the Te Uku project for the purposes of this hearing process, based on the work carried out previously.

Purpose and scope of evidence

1.9 The Committee has requested further information in relation to project viability. On that regard the purpose of my evidence is to outline the methodology used by Deloitte to assess the economic viability of the Te Uku Wind Park Project and address issues related to the viability of the project.

1.10 Against that background my evidence specifically addresses the following matters:

a) Overview of valuation best practice and project viability analysis (section 3);

b) Methodology used for the analysis of the Te Uku wind park project (section 4);

c) Assessment of the commercial viability of the Te Uku wind park project (section 5); and

d) Analysis and response to the submission by Mr Cox (section 6).

1.11 A summary of my evidence is contained in Section 2.

Expert Witness Code of Conduct

1.12 I have been provided with a copy of the Code of Conduct for Expert Witnesses contained in the Environment Court's Consolidated Practice Note 2006 [2006] NZRMA 357. I have read and agree to comply with that Code. This evidence is within my area of expertise, except where I state that I am relying upon the specified evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

2. SUMMARY OF MY EVIDENCE

2.1 I consider that the Te Uku wind park ("Te Uku", the "project" or the "wind park") is a viable project in its current form from a financial perspective. This opinion is based on analysis we have carried out using an enhanced financial model (the "model") that we have developed from WEL Networks Limited ("WEL") own project assessment model. We have modified the original model so that the valuation methodology used to assess the viability of the project is consistent with industry accepted best practice.

2.2 Our review of the WEL model confirmed that it was a sound basis from which to develop a more detailed analytical tool suitable for the stage the project has now reached.

2.3 The methodology employed in the model is a discounted cash flow ("DCF") analysis, the valuation methodology most commonly used by finance professionals, corporate and private investors globally. The use of this method of assessing investments, based on the present value of the future cash flows they will generate, less the investment capital required, is virtually universal as a basis for assessing investment decisions.

2.4 The DCF measure used for decision making is the net present value ("NPV") of the investment. The decision rule under the NPV measure is relatively simple. If NPV is a positive value when an appropriate discount rate is applied to the cash flow, then the project is considered viable from a financial perspective. If the NPV is negative then the project is not considered viable from a financial perspective unless a means can be found to reduce the size of the investment required, increase the future cash flows, or both.

Decision Rule for NPV	
DCF Output	Investment decision
NPV is greater than 0	Proceed with the project
NPV is less than 0	Reject the project

2.5 Our modelling has used assumptions from a number of qualified and reliable sources including WEL and its other professional advisors for the Te Uku wind park. Based on these assumptions we have calculated the NPV for the project. The calculation resulted in a positive value of $4.5m for the project in its current configuration, with 28 turbines, showing the project to be viable and justifying proceeding with its further development.

2.6 As part of our analysis, we also tested the viability of the project when removing selected wind turbines from proposed sites. The table below represents the effect of removing the highest yield sites from the Te Uku project has on NPV.

Removal of Sites and NPV		
Site Removed	NPV value NZ$000s	Impact on NPV NZ$000s
All sites included	4,543	
Site 29	1,118	(3,424)
Site 15	(2,306)	(3,424)
Site 11	(5,409)	(3,103)
Site 12	(8,513)	(3,103)

Figures in brackets are negative numbers

2.7 From the table above, it is clear that removing certain sites has a significant impact on the viability of the project from a financial stand-point.

2.8 The economics of the project are relatively marginal but, given the slightly positive NPV in its current configuration, in my view proceeding with the project is justified. The removal of turbine 29 would leave the project with very questionable economics and, given the early stage of its development and the uncertainty remaining around many of the costs still to be incurred, may make it difficult for WEL to justify continuing with the project. Removal of further turbines would render the project uneconomic to proceed with.

3. OVERVIEW OF VALUATION BEST PRACTICE

3.1 In this section I outline the methods which are used for the analysis of investment decisions by corporate investors when considering substantial capital investments.

Primary methodology

3.2 Discounted cash flow analysis (“DCF”) is the primary methodology used in the valuation of electricity generation assets and is the preferred methodology used by electricity generation companies, sector analysts and finance professionals for investment decision making. Deloitte and other advisory firms use this methodology in assessing investments in electricity generation plants and in the valuation of other generation plants throughout New Zealand.

3.3 The two most widely utilised DCF measures for decision making are net present value (“NPV”) and the internal rate of return (“IRR”).

3.4 The NPV of a project is the sum of the present values of each of the project cash flows, regardless of whether or not cash flows are positive or negative, that occur over the life of the project.

3.5 The NPV of a sequence of cash flows is the discounted value of a future cash flow. The future cash flows are discounted at a discount rate which reflects the risk associated with the cash flow so that they represent value of the cash flows in today’s terms – a necessity if we are to effectively analyse the viability of the project from the current point in time. The cash flows are discounted by a factor known as the discount rate. In evaluating investment opportunities this is generally referred to as the “hurdle rate”. The hurdle rate is the rate of return that the investor requires from the project to justify making the investment given the risk associated with the project.

3.6 The method used to discount the cash flows is mid-year discounting; this is consistent with accepted valuation best practice. Mid-year discounting assumes that the cash flows are received evenly throughout any given forecast year. Mid-year discounting is used as opposed to just applying the discount rate directly to each year’s cash flows (i.e. “end-of-year discounting”) – using end-of-year discounting implicitly assumes that all cash flows are received on the last day of the financial year.

3.7 The hurdle rate that is commonly used is based on a calculation of the weighted average cost of capital (“WACC”). WACC is essentially the required returns of the investor in the project based on the assessed cost and mix of the debt and equity capital they intend to invest.

3.8 We have calculated a WACC for the funds which WEL will invest in Te Uku and applied it to the expected future cash flows the project will generate. Our calculation of WACC is based on the Brennan-Lally formula which is generally accepted as the most applicable method for the New Zealand environment. The Brennan-Lally WACC formula relies upon a number of inputs which we have verified through independent industry analysis; these inputs include:

(a) the company's target debt ratio;

(b) the New Zealand corporate tax rate;

(c) the risk-free investment rate (assumed to be the New Zealand 10 year Government bond rate);

(d) the rate at which the company can secure debt funding;

(e) the post tax market risk premium being the observed premium from equity markets which investors require to compensate for the risk of equity investment; and

(f) the company's "asset beta" ("Ba") being a measure of the company or sector specific risk when compared to the average risk across the whole equity market.

3.9 The decision rule for the NPV measure is relatively simple. If NPV is a positive value then the project is viable as the discount rate has already factored in what the company needs to make on the project to break even after compensating all investors, including the company itself, for risk assumed from investing in the project.

3.10 Essentially a positive NPV means that the investment will generate a return on the capital which is invested which, when returns are adjusted for the time value of money, in total over time is greater than the amount of the original invested capital. The investor gets back more than it puts in when the future cash flow returns are adjusted for the time value of money and risk.

Decision Rule for NPV	
DCF Output	Investment decision
NPV is greater than 0	Accept the project
NPV is less than 0	Reject the project

3.11 When modelling cash flows using DCF methodology, it is common practice to model the project over a fixed life assuming it has no residual value at the end of the period. Alternatively, a terminal value is calculated which reflects the value the project might have in being able to operate beyond the specific period modelled. We have assumed a fixed life of 40 years for the Te Uku project based on the best estimate of the expected lives of the key electrical assets. Where assets have a shorter life we have included an allowance for refurbishment.

Key assumptions for arriving at cash flows

3.12 This section details the basis for the inclusion of key assumptions that make up the future cash flow forecasts.

3.13 Cash flows under the DCF methodology are usually calculated using the indirect method. "Indirect" refers to the derivation of cash flows using accounting earnings as a starting point. The indirect method will arrive at the same cash flow value as a direct method when deriving historical cash flow, however, from a forecasting perspective it is more reliable and widely accepted to use the indirect method. The first step in the indirect method is establishing accounting earnings in any given forecast year.

Method for arriving at accounting earnings Profit and Loss Statement ("P&L")	
Start	Revenue
Less	Cost of sales
Equals	Gross profit
Less	Operating Expenses
Equals	Earnings before interest and taxation ("EBIT")
Less	Interest
Equals	Earnings before taxation ("EBT")
Less	Taxation
Equals	**Net profit after taxation ("NPAT")**

3.14 Once accounting earnings have been established the second step is to establish cash flows from these. The following calculation is used to arrive at free cash flows:

Method for arriving at free cash flow	
Start	Net profit after taxation ("NPAT")
Plus	Depreciation
Plus	Interest expense
Less	Movements in working capital
Less	Capital expenditure
Less	Capitalised maintenance cost
Equals	**Free cash flow to the firm ("FCFF")**

3.15 Depreciation is added back to NPAT because it is an accounting measure and is not a cash expense, i.e. you do not have to "pay" depreciation. It does, however, affect the amount of tax paid each year and so has an indirect impact on cash flow and so must be considered in financial analysis.

3.16 The DCF analysis looks at the fundamentals of the project and eliminates the effects of taxation and funding, i.e. whether the investor is using debt or equity to fund the investment. Interest expense is added back to calculate "free cash flow to the firm" ("FCFF"), i.e. cash flows that are used to reimburse all stakeholders in the company – including debt holders.

3.17 Movement in working capital[1] is subtracted from NPAT because these movements are not addressed in the profit and loss statement but impact on cash flows. Any increase in working capital reduces free cash flow whereas a decrease in working capital means that cash is released from the project.

3.18 Capital expenditure and capitalised maintenance costs during the period are cash expenses that are not represented in the accounting earnings. These are deducted from the NPAT value.

Escalation

3.19 The model assumes that revenue and expenses are escalated in each financial year by inflationary factors. Inflation is usually represented by proxy through the inclusion of consumer price index (CPI) and producer price (PPI) assumptions.

[1] Working Capital = Current Assets – Current Liabilities.
Current Assets are those which are expected to be realised or able to be converted into cash within the next accounting period. Current Liabilities are those where an obligation exists that must be acted upon within the next accounting period.

4. COMMENTS ON TE UKU VALUATION MODEL

4.1 Deloitte was initially appointed by WEL to provide commercial advice in relation to the structure to be adopted for the Te Uku project. This advice included a review of the modelling techniques used by WEL, valuing the project and carrying out financial analysis based on the analytical tools being used by WEL at the time. Subsequently Deloitte was engaged to provide advice on developing and improving the analytical tools to support the ongoing analysis of the project in support of WEL's investment decisions. This work was unrelated to the current hearing process.

4.2 Deloitte was subsequently appointed to assist WEL with the evaluation of the Te Uku project and to develop its own view on the projects commercial viability.

4.3 We have extensive experience in undertaking similar tasks for some of New Zealand's largest corporate and Crown entities, including entities that operate wind generation and other electricity generation assets.

4.4 Our analysis included:

(a) An extensive review of the WEL financial model;

(b) Making modifications to the model to conform with best current project assessment and valuation practice;

(c) Adding increased functionality to the model in order to carry out more extensive analysis of the project and assess its viability under a range of scenarios; and

(d) Assessing the assumptions used in the model and testing their robustness and reliability based on our own understanding of the electricity generation sector in New Zealand.

4.5 The analytical tools and models being used by WEL were suitable for the purpose of analysing the project and determining whether to invest more development capital in the project. It is normal practice to develop, refine and improve the models as the project progresses, funding is sought and the final investment decision approaches. Deloitte was appointed to assist with this process.

4.6 We are confident that the viability analysis for the project is robust and reliable and the values for the project presented in this brief of evidence have been calculated using sound assessment techniques and valuation best practice principles.

5. METHODOLOGY USED IN THE TE UKU MODEL

Primary Methodology

5.1 Discounted cash flows ("DCF") is the primary methodology used in the Te Uku model and is the preferred methodology used by companies in the electricity generation sector, analysts and finance professionals for investment decision making.

5.2 The viability of the Te Uku project is measured by NPV. The model uses mid-year discounting, reflecting the fact that the cash flows will be generated relatively evenly throughout the year, which is appropriate for this project. We have also reviewed the construction capital cost cash flows and applied suitable discounting.

5.3 The hurdle rate that has been used in the analysis of the Te Uku project has been based on our calculation of the weighted average cost of capital ("WACC") for WEL reflecting the rate of return which the owners of WEL require for an investment of this type.

5.4 For the Te Uku project we calculated the hurdle rate to be 10.1% based on the Brennan-Lally formula. The formula used incorporated all the WACC assumptions outlined in section 2 of this submission.

5.5 This discount rate was applied consistently across the entire life of the project, consistent with valuation best practice.

5.6 We have assessed the project over a fixed life of 40 years reflecting the expected useful lives of the major electrical assets. The wind turbines themselves have a shorter expected life of approximately 20 years for the Vestas V90 turbines currently under consideration. This 20 year period includes a minor mid-life refurbishment at approximately year 10 of the assessment period. We have assumed that once the initial 20 year life has elapsed, that WEL will implement a major refurbishment of the wind park assets. This major refurbishment/rebuild assumption is based on the fact that it is likely that the Te Uku site will continue to be a desirable wind generation site and renewable energy sources will still be a viable means of electricity generation. We have not included any terminal value assumption in our analysis of the project's viability.

Key assumptions for arriving at cash flows

5.7 This section details the basis for the inclusion of key assumptions that make up the future cash flow forecasts.

Revenue

5.8 Generation revenue is driven by a number of factors within the Te Uku model. The most important of these factors being:

(a) Future electricity wholesale prices;

(b) Expected generation output from the turbines;

(c) Assumptions regarding the availability of generation and the amount of generated electricity which will eventually be sold; and

(d) Market based factors such as peaking and location factors which influence the price which will be received for the plants output.

5.9 These are the assumptions we would expect to see drive revenue levels in any electricity generation project.

5.10 Generation revenue is calculated in a given year by multiplying the expected prevailing electricity wholesale price ($/MWh[2]) by annual generation output (GWh[3]) and loss ratios. Generation Revenue = Price path x Generation output x Loss ratios x Peaking factors.

5.11 The future wholesale electricity price path is a forecast of wholesale electricity prices over the life of the project. In the Te Uku model, the price path was provided to WEL by EnergyLink, which is an organisation with extensive experience of the New Zealand electricity market and with access to sophisticated computer models of the market for the assessment of future trends in electricity prices. The comprehensive assumptions used by EnergyLink in devising its price paths include:

(i) The node on the national electricity grid at which the power will be injected and priced;

(ii) The effect on wholesale prices of a cap-and-trade carbon emissions scheme;

(iii) The availability of gas supplies in New Zealand and the effect this may have on wholesale electricity prices; and

(iv) The expected timing and nature of major new installed capacity introduced into the New Zealand generation fleet.

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[2] Dollars per megawatt hour
[3] Gigawatt hours

5.12 The generation output profile and loss ratios were provided by Hydro Tasmania Consulting Ltd based on its analysis of wind conditions at the site and the performance of the turbines under consideration for the project. Annual generation output in gigawatt hours was provided for each separate proposed turbine site. In addition the following four loss ratios were provided by Watershed Solutions:

(a) Availability ratio: the availability of plant to distribute power into the grid in the absence of line faults etc.

(b) Hysteresis ratio: the allowance for the practical behaviour of turbines compared with the theoretical behaviour when turbines are shut down due to high wind speeds.

(c) Site electrical ratio: the availability of plant to generate electricity when not shut down due to electrical maintenance.

(d) Loss incurred between the injection point at the onsite substation and final retail meters.

5.13 The peaking factor is a revenue multiplier based on when the plant generates and distributes electricity relative to demand for electricity in the market. If the wind park generates electricity during peak demand periods (generally the morning and evening periods) it will receive wholesale prices that are higher than the average prevailing price in the wholesale market over time. Conversely, if the wind park generates electricity in periods of low demand (during the middle of the day and the middle of the night) then it will receive wholesale prices that are, on average, below the average wholesale price.

5.14 A location factor was applied to the output from the Te Uku wind park. A location factor is used to incorporate the effects of the cost of transporting electricity to the region across the national grid and overall demand in the region. In establishing this Alternating Current Loss Factor ("ACLF") assumption, Watershed Solutions advised that it had considered the effect that local generation will have on electricity demand in the region and hence the location factor at the injection node.

5.15 Additional revenue has been included within the model in assessing the projects viability to take account of additional income that the project will receive for avoided transmission revenue.

5.16 Avoided transmission revenue is received by the electricity distribution company as a result of having electricity generation embedded within its network. Generation from the embedded plant reduces the amount of electricity imported from the national grid system and consequently the charges made by Transpower for transmission services. These savings are shared by the distribution company with the embedded generator.

Cost of sales

5.17 Cost of sales includes expense that is incurred directly as a result of electricity generation from the project. This expense includes:

(a) Land owner payments (rights/royalties etc);

(b) Grid service charge;

(c) Plant maintenance and warranty agreement costs; and

(d) Payment to the transmission works owner.

5.18 The land owner payment is a cost for occupation of the land, paid by the wind park owner, that is directly linked to a proportion of revenue.

5.19 The grid service charge is in effect the opposite of the avoided transmission revenue. Above a certain threshold of generation the Te Uku wind park will have excess supply for the local network. This excess electricity is distributed into the national grid – the cost charged by Transpower for distribution of this electricity is the grid service charge.

5.20 Plant maintenance and warranty agreement costs incurred each year are essentially a maintenance cost for services provided by the turbine supplier which are required to comply with warranty conditions and which are spread across the term of the warranty agreement. The Vestas V90 has an expected warranty period of 9 years.

5.21 Payment to the transmission works owner is a cost that reimburses the network owner for investment in the distribution assets required to be provided to transmit electricity from the turbine generators to the electricity network. The cost reflects an arms length transaction with the owner and supplier of the connected network assets.

Operating costs

5.22 Operating costs are those costs incurred that are not directly related to the generation of electricity. These costs include:

(a) Management and administrative expenses;

(b) Recurrent operating costs; and

(c) Depreciation.

5.23 Management and administrative expenses include amongst other items:

(a) Management salaries;

(b) Office expenses;

(c) Insurance; and

(d) Audit, etc.

5.24 Two sets of assumptions were made for recurring operating costs, firstly those that occurred whilst the plant was still under warranty and secondly those that occurred after the warranty period expired. This item includes expenses such as site electrical response and faults response.

5.25 Depreciation is based on the diminishing value method. This method was chosen to to maximise the benefit available under current tax legislation and assumes a greater depreciation expense in the earlier years with associated cash flow benefits.

Free cash flow calculation

5.26 We have carried out the calculation of the free cash flow from the Te Uku project in accordance with the methods described in section 3 of this statement of evidence.

Escalation

5.27 The model assumes that revenue and expenses are escalated in each financial year by the estimate of future inflation. In the Te Uku model inflation is included through the application of the consumer price index ("CPI") and producer price index ("PPI") assumptions.

6. ASSESSMENT OF PROJECT VIABILITY

6.1 We have populated the model with a base case set of assumptions which we consider are robust and reliable. These have been developed based on our own experience or sourced from WEL and its professional advisors for the Te Uku wind park project. We have calculated an NPV value equal to $4,543,000. We consider this to be sufficiently positive to justify WEL continuing to develop the project in its current form.

6.2 Our analysis also involved scenario analysis to test the viability of the project under different circumstances. A summary of these results is provided below and supports our conclusion that the project is viable in its current form and justifies further development.

Removal of certain turbines

6.3 As part of our analysis, we also tested the viability of the project when turbines from particular proposed sites are removed. We conducted three different sensitivity tests involving the removal of turbines from the project including:

(a) Removal of Te Uku's highest yield sites;

(b) Removal of sites based on the "average" yield of all proposed sites; and

(c) Removal of Te Uku's lowest yield sites.

Removal of Te Uku's highest yield sites

6.4 The table below represents the effect of removing the highest yield sites from the Te Uku project has on NPV:

Removal of Sites and NPV		
Site Removed	NPV value NZ$000s	Impact on NPV NZ$000s
All sites included	4,543	
Site 29	1,118	(3,424)
Site 15	(2,306)	(3,424)
Site 11	(5,409)	(3,103)
Site 12	(8,513)	(3,103)

Figures in brackets are negative numbers

6.5 From the table above it is clear that removing certain high yield sites has a significant impact on the viability of the project from a financial stand-point.

6.6 The economics of the project overall are somewhat marginal but given the slightly positive NPV in its current configuration proceeding with the project is justified. The removal of Turbine 29 would leave, the project with very questionable economics and, given the early stage of its development and the uncertainty remaining around many of the costs still to be incurred, may make it difficult for WEL to justify continuing with the project. Removal of further turbines renders the project uneconomic to proceed with.

Removal of sites based on average yield

6.7 We have selected two sites which represent the average turbine yield for the wind park. The table below represents the effect that removing these sites based on average yield from the Te Uku project has on NPV:

Removal of Sites and NPV		
Site Removed	NPV value NZ$000s	Impact on NPV NZ$000s
All sites included	4,543	
1	2,081	(2,462)
2	(381)	(2,462)
3	(2843)	(2,462)
4	(5,304)	(2,462)

Figures in brackets are negative numbers

6.8 Whilst the effect is not as marked as removing the two highest yielding sites the project is however rendered non-viable upon the removal of these two average yielding sites and questionable with the removal of one.

Removal of Te Uku's lowest yield sites

6.9 In order to fully assess the effect on the project's viability of reducing its size, we have carried out further analysis progressively removing the lowest yielding sites. The table below represents the effect of removing these sites from the Te Uku project has on NPV:

Removal of Sites and NPV		
Site Removed	NPV value NZ$000s	Impact on NPV NZ$000s
All sites included	4,543	
Site 23	2,915	(1,628)
Site 16	1,095	(1,820)
Site 1	(725)	(1,820)
Site 25	(2,674)	(1,948)

Figures in brackets are negative numbers

6.10 The table above illustrates that if we remove the three lowest yielding sites, the project would no longer be viable to pursue and is very questionable with the removal of two sites.

6.11 In summary, the viability of the project is heavily dependent upon retaining its existing configuration. Removal of any single turbine seriously compromises the viability of the project and, in the case of one of the high yielding turbines, would make it difficult for WEL to justify pursuing the project. Removal of any two turbines renders the project unviable based on current investment analysis parameters.

7. ANALYSIS OF MR COX'S SUBMISSION

7.1 This section of my evidence covers financial aspects of the evidence presented to the hearing by Mr Sean Cox.

7.2 In his submission, Mr Cox makes the assertion that the project is not commercially viable; however his submission contains no form of recognisable financial analysis of the project from which such a conclusion could be reached.

7.3 His very limited financial analysis is flawed in every respect and his assertion that an electricity company would knowingly spend almost $200m on a project it knew to be "bad" reflects a fundamental lack of appreciation of the decision making processes a large corporate, particularly one ultimately responsible to a community-owned trust, follows before committing to a major investment decisions.

7.4 His analysis of how the output from Te Uku will be offered into the New Zealand wholesale electricity market makes reference to two output models from wind turbines; with and without "cogeneration", without attempting to explain what this means. In the absence of an explanation one can only assume that it has its normal meaning. In my experience, cogeneration generally refers to the generation of a second form of energy, usually heat in the form of steam, from an electricity generation station powered by thermal fuel. The concept is thus entirely irrelevant to the economics of a wind turbine installation, which generates no secondary form of energy in any useful form.

7.5 Mr Cox then goes on to talk about "bidding" the output of the plant. This is presumably a reference to the process of offering the output from an electricity plant into the wholesale electricity market. In this respect, assuming the two concepts of "cogeneration" and bidding are somehow meant to be linked (which is far from clear from Mr Cox's evidence), there is one aspect that cogeneration plants and wind plants have in common. Both tend to be operated as "must run" plants, i.e. in the case of wind whenever the wind is blowing, electricity is being generated. This electricity will be injected into the grid as long as the wholesale price is higher than the marginal cost of generation.

7.6 For wind plants, the marginal cost of generation is very low and essentially as long as the wholesale price is above zero the owner will generate and sell the output at the prevailing price. In this respect, wind projects have a significant advantage over other generation technologies which offer their output into the wholesale market at their much higher marginal cost of generation (usually reflecting the value of the fuel or water they must use to generate electricity) and are only instructed to run by the grid operator when demand is sufficient to justify their operation. In essence, wind plants are always at the front of the queue to generate. This aspect will be addressed further in the evidence of Mr Truesdale.

7.7 Mr Cox refers to data that indicates wind generation plant utilisation will be only 18% based on levels achieved in Europe. Whilst this data is reasonably correct, although slightly low, for Europe, most New Zealand wind projects currently operating have achieved around 40% utilisation factors. Wind data from Europe is completely irrelevant to a New Zealand project.

7.8 Mr Cox's "financial analysis" shows a complete lack of understanding of the basis on which investment decisions are made and project viability is assessed. It provides absolutely no basis for Mr Cox's assertion that this is a "bad" project and has a number of major and fundamental flaws including the following:

(a) The analysis confuses capital costs and operating costs, adding them up to get a "project cost". This is an extremely basic error. The difference between the initial investment capital and ongoing operating costs and the importance of how they are treated in investment analysis is highlighted in the discussion of investment methodologies earlier in this statement of evidence.

(b) It ignores any timing aspects in relation to when the costs are incurred. Again a very basic error which fails to recognise that a dollar today is worth more than a dollar next year due to the investment opportunity forgone by waiting a year.

(c) It does not factor in revenues at all. It is difficult to understand how a view could be reached on the viability of a project when the analyst has failed to take into account what the project will earn.

(d) It makes assumptions about how the project will be funded, (with debt) and adds the interest cost to the original capital cost. This is incorrect on two counts:

(i) First, it treats interest cost as if it was somehow part of the initial capital cost – it is not, it is an operating cost.

(ii) Second, the viability of the project is independent of the funding decision and the mix of debt or equity capital which may be used.

(e) The analysis of alternative technologies is done on a completely different, and much more favourable, basis than wind particularly insofar as it appears to exclude any operating costs and financing costs for the alternative technologies and therefore gives skewed results and cannot be considered a comparative or indeed complete analysis.

7.9 In summary, Mr Cox's financial analysis bears no resemblance to any form of recognised investment assessment. In my view it should not form a basis for assessing the viability of the Te Uku project or for comparing it with other potential projects or investment technologies because it is simply incorrect.

Paul Callow

Partner

Deloitte Corporate Finance

January 2008