

**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  
Wharaurua Plateau near Te Uku

## **SECOND FURTHER STATEMENT OF EVIDENCE OF ROGER BURCHETT**

### **1. INTRODUCTION**

- 1.1 My name is Roger Burchett. I am an electricity generation business engineering consultant based in Cambridge. A summary of my qualifications and experience were set out in the evidence which I presented to the Committee on 20<sup>th</sup> November 2007. That statement also confirmed my agreement to comply with the Expert Witness Code of Conduct.

#### **Purpose and scope of evidence**

- 1.2 Mr Gallagher submitted evidence to the Waikato District Council on 13 February 2008 in relation to the benefits of the Te Uku project. The purpose of my evidence is to address specific matters raised by Mr Gallagher in his evidence. I do not address some matters raised by Mr Gallagher that will be addressed in detail in the evidence of Mr Callow. My evidence will address the following matters:

- (a) Economic analysis of the project (section 2); and
- (b) Miscellaneous issues (section 3).

### **2. ECONOMIC ANALYSIS**

- 2.1 In this section of my evidence, I will address the issues raised by Mr Gallagher in relation to the economic analysis undertaken by WEL. I was primarily responsible

for developing WEL's economic analysis model which was subsequently reviewed by Deloitte.

### **Scenario planning**

2.2 In paragraph 2.1 of his evidence, Mr Gallagher notes that he considers that the use of scenario planning as published by Pierre Wack in 1985, is best practice for energy investment decisions and that the NPV technique is oversimplified for such decision making.

2.3 One of the first uses of scenario planning in business was in the 1960s by Royal Dutch/Shell, and was largely driven by Pierre Wack, who was Shell's Head of Group Planning. His view was that:

*"Scenarios help us to understand today better by imagining tomorrow, increasing the breadth of vision and enabling us to spot change earlier... Effective future thinking brings a reduction in the level of crisis management and improves management capability, particularly change management."<sup>1</sup>*

2.4 Shell created a unit, managed by Pierre Wack, to overcome problems of cash-flow management and to forecast future cash requirements. When traditional techniques for forecasting cash-flow ran into problems, Wack's diagnosis was that they were trying to apply statistical techniques to variables that were fundamentally unpredictable.

2.5 The Discounted Cash Flow (DCF) or Capital Asset Pricing (CAP) modelling used by WEL is widely used to price generation assets and is a very appropriate tool for this purpose. To my knowledge, it is used by most energy companies in New Zealand and Australia, by energy business analysts, and financial institutions. From my experience, it is widely used around the world including by the World Bank and the Asian Development Bank. It is a proven and robust methodology that provides for a wide range of variable inputs over the life of a project. It is also a particularly suitable framework on which to overlay modern simulation software to test the sensitivity of inputs, and produce a risk profile for a project.

2.6 In my experience, energy companies in New Zealand use Value at Risk (Var) and Cash Flow at Risk (Cfar) methodologies to analyse and report their market risk exposure on an ongoing basis for governance purposes. Both of these methodologies incorporate scenario planning. This analysis is, however, quite distinct from the pricing of capital assets achieved by DCF modelling.

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<sup>1</sup> "Scenario Planning" (Qais Foundation)

- 2.7 The evidence given by WEL has focused on the fundamental deterministic process employed to identify the most probable value of the project. To analyse the risks associated with this value, WEL also undertakes probabilistic analysis using a simulation software package that enables the effect of each stochastic input to the economic model to be tested. In this process, the boundaries of each potential variable input are established along with relevant frequency distribution or probability functions. The simulation modelling process then randomly chooses a value within these bounds for each variable input and calculates an output for that set of values. It repeats this process until a preset convergence of results is achieved.
- 2.8 In the modelling undertaken for Te Uku, 10,000 to 100,000 iterations are run to produce a reliable output risk profile. This output is in the form of an “S” curve which gives the most probable result based on all the variables which could occur, and the range of results about this to a defined confidence level. This in effect tests all the scenarios which could occur with project economics to ensure fully informed decision-making with regard to risk. It should be noted that the software to achieve this very detailed and sophisticated analysis was not available in 1985 when Pierre Wack was published, but the principles employed include future scenario assessment of what could occur.

#### **Range of electricity prices**

- 2.9 In paragraph 5.1, Mr Gallagher suggests a more robust approach would have been for WEL to undertake the NPV for a range of electricity prices in generation output profiles. He has incorrectly assumed only one price path has been applied. In fact the price path for a number of scenarios are used along with one year and 20 year uncertainty for generation output to establish an NPV profile as described above under simulation modelling.

#### **Use of terminal value**

- 2.10 In paragraph 3.3 of his evidence, Mr Gallagher concludes that because no terminal value is provided in the WEL economic analysis then WEL has made no financial provision for decommissioning. He further states that the WEL consent application says that if the Wind Park ceases operation for a continuous period of 18 months, the Wind Park shall be decommissioned. But in any event, WEL considers that either at the end of life or at any time prior to this, the salvage or scrap value of plant would be more than the cost of decommissioning. It needs to be noted that land agreements and the consent application provide for roads and buried foundations to remain after decommissioning and that these have no ongoing environmental

effects. The reason that terminal value is not included in the modelling is that end of life scrap value was estimated to be equal to the cost of decommissioning. It follows that upon earlier decommissioning, where plant may have remaining life (i.e for a second hand market), salvage value will exceed the cost of decommissioning.

#### **Other costs**

- 2.11 In section 6 of his evidence, Mr Gallagher refers to a number of costs and issues that he assumes that WEL has not taken into account in its economic modelling. WEL has engaged qualified consultants with relevant expertise for its verification of viability process and, as a result, WEL is very familiar with the issues raised by Mr Gallagher and has taken proper account of them.

### **3. OTHER MATTERS**

- 3.1 In this section of my evidence, I will address miscellaneous other matters raised by Mr Gallagher.

#### **Recent grid emergencies**

- 3.2 In paragraph 7.3 of his evidence, Mr Gallagher asserts that a hydro drought and no wind caused grid emergencies in February 2008. This is incorrect. Whilst there have been supply constraints and high prices this month they are mainly due to transmission capacity constraints on the Cook Strait cable, cooling water constraints at Huntly Power Station, maintenance outages at the Stratford Power Station and the early closure of New Plymouth Power Station. As installed wind capacity in New Zealand is only about 3.5 % of total capacity it is not logical that a lack of wind would cause a grid emergency.

#### **Alternative generation sources**

- 3.3 In section 9 of his evidence Mr Gallagher overlooks the critical issue for solar power which is that the sunshine availability in the Waikato area is not conducive to photovoltaic generation.

**Roger Burchett  
February 2008**