

**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 near Te Uku

## **SUPPLEMENTARY STATEMENT OF EVIDENCE OF RUSSELL SHAW**

### **1. INTRODUCTION**

- 1.1 The Committee has raised issues in relation to the WEL Network lines upgrade project, the relationship between that lines upgrade and the wind park project, and the probable location and design of the physical infrastructure, including the substation which will be necessary to alter the voltage of and enable the transmission/distribution of the power generated to WEL's customers (or other recipients of that power).
- 1.2 The purpose of this evidence is to provide further information in relation to those matters in order to assist the committee to understand the nature of infrastructure which would likely be implemented if the wind park proceeds alongside the line project, namely, the wind park substation and relevant lines, so that the committee can assess the effects of that infrastructure.

### **2. LINES INFRASTRUCTURE**

- 2.1 In the evidence I have already given, I produced a lines diagram showing the 110kV line options available to connect the wind park to the WEL network. (See Slide 1). I propose in this evidence to explain those options in some more detail.

#### **Existing network infrastructure**

- 2.2 WEL currently has the following infrastructure in the vicinity of the wind park:

- (a) The Te Uku substation;
- (b) A 33kV overhead line from Te Kowhai to Te Uku;
- (c) An underground 33kV cable (operating in the interim at 11kV) and an 11kV overhead line from the Te Uku substation to Raglan; and
- (d) An 11kV feeder to the Te Uku telecommunications tower from SH23.

- 2.3 This existing infrastructure is shown in Slide 2.
- 2.4 The Te Uku substation is an older style substation on the corner of Ohautira Road and SH23.
- 2.5 The 33kV overhead line route generally follows SH23 from Te Kowhai via Whatawhata to Raglan and is supported by a mixture of concrete and wooden poles. The underground 33kV cable circuit also follows SH23 from Te Uku substation to Raglan.
- 2.6 The 11kV feeder line runs from west of Te Uku, south/south east to the Telecom communications tower and is also supported on by a mixture of concrete and older style wooden poles.
- 2.7 The existing 33kV and 11kV line from Te Kowhai to Te Uku is shown in Slide 3.

#### **Connection of wind park to network**

- 2.8 The lines connection from the wind park to the network would traverse approximately 3km of farmland from SH23 to the substation. As already noted, there are two options available to WEL in that regard, as described below.

##### *Option 1*

- 2.9 One option is to run a 110kV line from the wind park substation to the Te Kowhai point of supply and 33kV line to a new compact switching station to the east of the existing Te Uku substation. This is shown in the schematic diagram on Slide 4.
- 2.10 The new 33kV line would be carried on the same poles as the new 110kV line as far as the new switching station. An example of poles carrying 110kV and 33kV lines is shown in Slide 5.
- 2.11 The line from the switching station to Te Kowhai will be a single circuit 110kV line. An example is shown on Slide 6.

- 2.12 This option has the lowest cost of the options, but provides the least flexibility in terms of management of the network.

### *Option 2*

- 2.13 A second option is shown on Slide 7. That option involves running:
- (e) A 110kV line (single circuit) from the wind park straight to the Te Kowhai point of supply, with no switching station; and
  - (f) A 33kV line either underground or overhead along the same route as the 11kV overhead line (which already serves the Telecom tower).
- 2.14 Photographs of typical existing 110kV single circuit infrastructure (in the Bombay area) is shown on Slide 8.
- 2.15 This option would also involve building a new substation in the Te Uku area and decommissioning the existing Te Uku substation. The existing substation is shown on Slides 9 and 10. A newer style substation that could be expected to be built in this case is shown on Slides 11 and 12.
- 2.16 A photograph of the existing 11kV line to the Telecom tower is shown on Slide 13. Slide 14 shows a typical 33kV and 11kV double circuit upgraded from an 11kV single circuit.
- 2.17 This option is more expensive than Option 1, but is seen as a longer term solution, provides more network flexibility and will improve security and voltage management for the 11kV feeder line into Raglan.

### **Land tenure**

- 2.18 WEL cannot be specific as to the precise location of the route because negotiations with landowners are ongoing. However, WEL is reasonably confident that a commercially and technically feasible route can be secured in order to enable options 1 and/or 2 to proceed.

## **3. WIND PARK SUBSTATION**

- 3.1 For reasons I have described, we were reluctant to seek consent for the wind park substation until we knew the outcome of the wind park application because the final route of the line connections from the substation to the network and the concurrent upgrade of the network cannot be finalised until

that time. For that reason, we propose to address the whole of the lines project, including the substation, as a separate matter under WEL's requiring authority status. However, WEL understands why the committee consider that it is important to consider the potential environmental effects of this aspect of the project.

- 3.2 If consent is granted, the wind park substation will take the electricity generated by the wind park and transform the electricity into voltages suitable for local distribution into WEL's network and via Te Kowhai substation.

### **Location**

- 3.3 The wind park substation is proposed to be located adjacent to the Operations and Maintenance building for the Wind Park, just near to Turbine 14 in the northern third of the wind park. The location of the O&M building and the substation was shown on the BBO Drawing 135250/SK2 which is contained in the AEE and shown on Slide 15.

### **Substation design**

- 3.4 While the location of the substation is known, the substation itself is subject to final design. However, a typical substation of this type would contain a transformer and high voltage switch gear. The substation is proposed to be an open substation enclosed by a secure fence.
- 3.5 The proposed layout shown on Slide 16 shows the substation occupying a 15m x 15m space. It is likely that the substation equipment would occupy that amount of space. However, for safety clearance, it may be necessary to extend security fencing and access beyond that area and WEL expects that the total space required would be more like 30m x 30m.

**Russell Shaw**

**November 2007**