

## 5. WIND ENERGY

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The purpose of this report is to inform the Council of an opportunity to purchase wind generated electricity.

### BACKGROUND

The Council's Energy Manager has received a proposal from "Windflow Engineering Limited (WEL)" of Christchurch to enter into a "hedging" contract for the sale-purchase of a limited quantity of electricity generated by windmill.

Mr Geoffrey Henderson, Director of WEL, suggests in his proposal that the intended wind generator will be situated in the Orion network area (probably on Banks Peninsula) and that generation should commence on 1 January 2002 and would be a first for the region.

The wind turbine supply and installation, as well as the purchase or lease of land, will be funded by equity investors. Local manufacturers are intended to be significant sub-contractors in the venture.

Mr Henderson advises that WEL will have a 10-year network connection contract with Orion that includes the buy back of power by Orion during peak demand periods. This will assist to substantially reduce the price per unit of generated electricity.

WEL seeks a long-term contract with the Council for the purchase of electricity as the combination of the two arrangements (with Orion and the Council) would give the venture the long-term certainty that it needs to raise the funds.

Mr Henderson is a professional engineer with 20 years experience in research, design and operation of wind power generators in Europe and USA.

### PROPOSAL

The wind turbine will be a 500 kW machine that would produce approximately 1.8 GWh of electricity per year. This will represent around 3.3% of the annual electricity consumption by the Council's operations. The quantity is not fixed as it depends on wind speed.

The proposed hedging contract is for purchasing the electricity at a price of 4.4 cents per kWh. The price would be fixed for the term of the contract.

The term of the contract is proposed to be 5 years.

### DISCUSSION

The proposed price of 4.4 cents per kWh is higher than what the Council pays under the current electricity supply contract (line charges are separate and additional to the energy price and are not considered here).

Based on information gathered from recent tenders for the supply of electricity, one can draw a conclusion that prices are likely to rise in the next two years. However, it is likely that in 2002 the Council would still pay less than 4 cents per kWh of energy.

Some longer term forecasts available at present (e.g. by Infrastructure & Utilities NZ Ltd) suggest an increase in wholesale market prices to 4.4 cents/kWh in 2005 and to above 5 cents by 2007.

If, in the future, the retail price rises to above 4.4 cents then the hedging contract would benefit the Council. If the Council decides to enter into the proposed contract at all, it would seem prudent to have a longer-term contract (ten years rather than the proposed five).

It has to be noted that it is unlikely that the Council can purchase wind energy directly from the wind generator. The wind generator will have to sell the energy to an electricity retailer (for example, Meridian Energy), which then would sell it to the Council. This is because the wind generator capacity is variable depending on wind speed and there is no such an electricity consumer that would have a consumption pattern matching the uncertain generation pattern of the wind generator. Therefore, the contract for the purchase of wind power would have to be incorporated into the main electricity supply contract for 2001/2002, and a difference between the proposed 4.4 cents and a *wholesale* energy price should be taken into consideration in all calculations.

If the Council enters into the purchase agreement with WEL, the likely additional costs of the green energy to the Council would be:

2001/02	\$12,000
2002/03	\$22,000
2003/04	\$20,000

However, the main electricity supplier (currently Meridian Energy Limited) may be interested in absorbing these additional costs of green energy (part or whole). This would be negotiated at the time of re-negotiating the contract for the supply of electricity in April 2001. There is a precedent under the current contract: Meridian Energy buys from the Council a relatively large quantity of green electricity generated from biogas at the Wastewater Treatment Plant, at a price equal to what the Council pays Meridian for energy. A condition that the main electricity supplier should convey the wind energy to the Council at no markup would become part of the re-negotiation package. If this condition were accepted, it would substantially reduce the conservative estimates of the likely additional costs indicated above.

Wind generation is a renewable and pollution-free source of energy. Currently, electricity that is produced and consumed in New Zealand is not "green and clean" as some 30% of it comes from thermal and geothermal power stations (non-renewable sources of energy) that are associated with burning fossil fuels, emitting harmful substances and CO<sub>2</sub>.

In an arrangement with WEL, the Council would effectively be paying a green pricing premium and should receive any associated green pricing certificates.

## **RELEVANT COUNCIL'S POLICY**

The following policy has been adopted by the Council on 26 November 1997:

*"The Council will follow energy strategies which minimise energy consumption, select sustainable energy supplies and minimise impacts on the environment."*

The use of the clean and renewable energy source would demonstrate the Council's ongoing commitment to lead the Christchurch community by example towards the sustainable future.

## **BENEFITS TO LOCAL ECONOMY**

Windflow Engineering Ltd is planning, after commissioning its first wind generator by December 2001, to implement Stage 2 of its business plan - build another 6 to 10 generators for Christchurch power supply. Mostly local manufacturers would be engaged at these stages in order to develop into Stage 3 of the project – manufacturing wind generators for New Zealand.

The following is an example of overseas developments in this area: Vestas, a Danish company of Ringkøbing City, started commercial manufacturing of wind generators in 1980 and in 1999 it was employing 2,800 people in Denmark only and had a turnover of NZ\$1.3 billion.

The Brooklyn wind turbine, over its five years of operation, has been a success as a tourist attraction in the Wellington region (it is in the top five visited sites).

## **OTHER CONSIDERATIONS**

Mr G. Henderson is currently a part-time employee of the Council. He works limited hours as an Energy Adviser at the Energy Efficiency Show Home. Mr Henderson's current fixed-term contract with the Council is due to expire on 1 December 2000, and he indicated his readiness and willingness to resign from his part-time position with the Council in case of any possible conflict of interest.

**Recommendation:** That the Council adopt the following recommendations:

1. That the Corporate Services Manager be authorised to enter into a 10-year hedging contract for the purchase of wind energy in quantities outlined in the report.
2. That the purchase of wind energy be made a condition of the Council's future electricity supply contracts from 2001.
3. That the recommendations 1 and 2 be referred to the Annual Plan Working Party.

## **Chairman's**

**Recommendation:** That the above recommendation be adopted.