

Blizzard winds to power Australian Antarctic station

THE FURY OF ANTARCTICA'S COASTAL WINDS IS TO BE harnessed to power an Australian Antarctic station. Australian Antarctic Division projects totalling \$6.35 million and involving German and Australian technology will result in Antarctica's first large-scale wind turbine installation, providing nearly a megawatt of power to Australia's Mawson station.

The turbines are to be provided by the German company Enercon and installed by the company's Australian agents, Powercorp Pty Ltd, of Darwin. A contract for the work, which will begin next summer, was signed in Darwin in August 2001.

The wind turbines are the first serious attempt by any country to obtain a significant electricity supply from the world's most powerful winds - the gravity-induced katabatic winds that howl down to the coast of Antarctica from the inland icecap, reaching speeds over 250 km/h.

The Mawson system will generate almost 50 times the power of existing Antarctic wind-power systems while having a much lower environmental impact than the current option of burning diesel fuel, now used throughout Antarctica. When the system is fully developed, an Antarctic station will for the first time be able to use a renewable source to meet virtually all its energy needs.

The use of diesel fuel to power Australia's Antarctic activities is from an environmental perspective far from ideal. The fuel must be transported from ship to shore and stored at stations before being used. While the risk of spillage has been minimised it remains a possibility.

The Mawson wind turbine system will rank among the world's most innovative, including the installations at Windy Hill, Queensland, and Denham in Western



Photomontage view from the Red Shed at Mawson following installation of the first turbine.

Australia. It will feature three 300 kW wind turbine generators with associated power house control equipment. The turbines will be three-bladed, variable speed machines of 30 m diameter, mounted on a 34 m tapered steel tower.

The powerhouse control equipment, manufactured by Powercorp, was originally designed for small, isolated Australian and South East Asian communities. Powercorp will modify the system to integrate the wind turbine generators into Mawson's power grid to provide completely clean, renewable heat and electrical energy for up to 80 percent of the year.

Equipment will be delivered and foundations built in the 2001-2002 summer, with the powerhouse control systems and wind turbine generators installed the following summer.

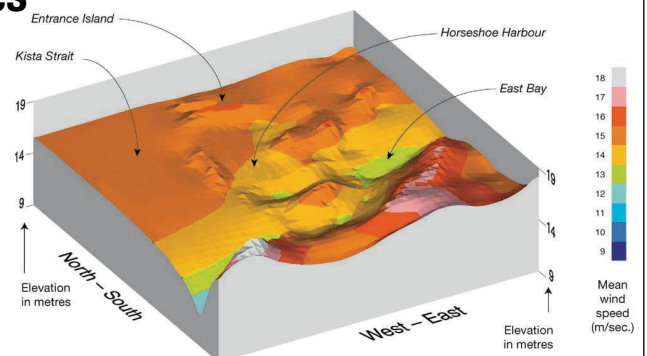
Wind modelling finds best turbine sites

Australian Antarctic Division engineers have been studying the potential of the Antarctic katabatic winds as a source of energy. Working remotely from the Division's Kingston offices and using anemometer data from Mawson station, the location and size of future wind turbines has been optimised, and their potential yield has been calculated.

The proprietary package 'Windfarm' is usually used for wind farm sizing. It has been used on the Mawson Alternative Energy Project to refine the project scope from an initial estimate of four turbines to a present estimate of three.

Using topographical and wind data, a three dimensional image of the wind speed at Mawson has been produced (see diagram). From this, the best turbine locations can be selected. A knowledge of the station load profile and the power curves for the turbines has allowed the yield for several combinations of turbine quantity and size to be calculated and these variables to be optimised.

Having selected a turbine and a site, modelling can also be used to calculate the noise and visual impact of the turbines. 'Windfarm' can also relate the topographical information to photographs to create images of the turbines as they will look (see photograph in story above).



Three dimensional model of wind speed at Mawson station