

# Blizzard winds now harnessed at Mawson

This season saw the culmination of many years' work within the renewable energy program with the erection and commissioning of two 300 kW wind turbine generators at Mawson station.

The turbines are presently generating up to 90% of Mawson's instantaneous electrical power, resulting in fuel savings and lower greenhouse gas emissions. The average for the three months to the end of June was 53%. This is beyond what was predicted as being initially achievable by the system modelling.

To complement the two turbines, a new powerhouse control system was installed and commissioned, along with new electric boilers. The original diesel generators are still in use, augmenting the wind power, and through their co-generating heat exchangers are still providing some 'free' waste heat. However, with the reduced load on the diesel generators, there is a corresponding reduction in the production of waste heat, hence the need for the electric boilers.

The initial results are very encouraging, resulting in fuel savings of between 30 and 40%. The planned commissioning of an additional electric boiler in the water services building will provide additional fuel savings by replacing the fuel fired boiler which is presently used to melt ice for the station's water supply.

The project has involved monitoring of wind conditions at all Australian Antarctic stations since 1993, with a detailed feasibility study in 1999 indicating that the installation of wind turbines at Mawson would be possible. Site work has spanned two summer seasons with initial work on the first foundation commencing in the 2001–02 summer. The besetment of the *Polar Bird* in 2001–02 delayed the delivery of steelwork and personnel, and the first foundation was not completed until after the 2002 winter. The new switchboards for the powerhouse upgrade were also delivered to Mawson on the 2001–02 resupply on the *Polar Bird*, along with the 100-tonne crane needed to erect the 34 metre turbine towers.

A very busy 2002–03 summer saw two foundations completed, and the complete replacement of the main powerhouse control system with the new system which had been delivered on the previous season's



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resupply. The new system allows the integration of the energy produced by the wind turbines with that produced by the diesel generators, and adjusts the diesel generators to make up the difference between what is produced by the wind and what is required by the station.

The 2002–03 resupply saw the delivery of the wind turbines themselves, again on *Polar Bird*. A tight five week window between ship visits saw the turbines erected and commissioned. Over the winter, they will be tested further, and fine-tuned to produce the maximum energy (and hence greatest fuel savings) possible.

There are a number of aspects of the project which epitomise the teamwork and ingenuity of our expeditioners which are worthy of mention.

Firstly, the foundations themselves were mass concrete structures, poured in situ, and possibly the largest single pour of concrete ever attempted by any nation in Antarctica. Each foundation contains over 70 cubic metres of concrete, and each pour took over eight hours from start to finish, and required the continuous use of three concrete agitator trucks. Most Antarctic concrete pours are undertaken with a single small truck in a much shorter time.

Another example was the movement of the steel tower sections from the wharf area at Mawson to the erection sites. The sections had been delivered on 40-foot steel



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*From top: The new Mawson skyline; towing the bottom tower section to the turbine site; lifting the hub and blade assembly onto the turbine nacelle.*

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# Casey-Thala Valley cleanup project

Preparation for the Thala Valley clean-up project at Casey station continued this summer with the delivery of the water treatment plant, barriers, a 30-tonne excavator and additional waste containers to Casey on Voyage 3.

The six-person summer project team consisted of staff from the Australian Antarctic Division's Human Impact Section, Environmental Management Section and Operations Branch in conjunction with the University of Melbourne's Department of Chemical Engineering. In addition, the Human Impacts dive team was busy deploying and retrieving equipment associated with the pre-removal monitoring.

The water treatment plant was designed by Melbourne University and built in Hobart under the supervision of AAD's Engineering Section. The plant will remove suspended and dissolved solids from the potentially contaminated melt water collected during the excavation of rubbish from the old tip site.

Preliminary testing of the plant was completed at Kingston prior to deployment. This summer, final commissioning and performance testing was completed at Casey with water collected from the tip face.

In addition, soil samples were taken and analysed during the summer to establish the level of contamination at the site and to determine the boundaries of the material to be removed.

Planning has now commenced for a team of up to twelve people from the project group to spend the 2003–04 summer at Casey removing the rubbish, monitoring the environment, undertaking further soil testing and treating the melt water that collects in the tip while the excavation is in progress.

All this happened during a busy Casey summer amidst many high priority projects all requiring the support of the lim-



TIM PRICE



NICK EDGERTON

Top: Collecting soil samples.

Below: Operating the Water Treatment Plant.

ited station resources. Our thanks go to all those involved.

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beds to allow shipping from Germany, and a conventional trailer had been purchased for the task of moving the sections from the wharf to the site. The trailer was unstable on the rough Mawson terrain when moving the lowest, largest and heaviest of the tower

sections. As a result, expeditioners manufactured steel skids which were welded to the 40-foot tray, and then using the available 950 loaders, log skidders, and the excavator, dragged the tower section into place.

The success of the project is attribut-

able to a number of people, including the Mawson expeditioners from the 2001–02 and 2002–03 summers, and the 2002 and 2003 winters.

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