



NEWSLETTER N° 13

APRIL 2005

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## Mission Statement

"To be a global leader in wind turbine technology innovation."



# Autumn

## COMMITTED TO GETTING IT RIGHT

We believe that Windflow is on the verge of achieving the goals we set out in our initial public offer of 2001. NZ Windfarms, our wholly owned subsidiary, has been granted a resource consent for the Te Rere Hau wind farm near Palmerston North (see page 4). The design of our prototype wind turbine at Gebbies Pass has been advanced in response to our testing and operational issues as they have arisen (see page 2).

Over the past 18 months of prototype testing, there have been four events (outside of normal commissioning): the 'noise problem' caused a major and expensive delay in our programme, while the latest event (10th March), resulting in the gearbox and blades falling to the ground, was caused by a wind shift outside the International Standard to which our machine was designed. We describe this further in a special insert with this newsletter.

The Company has learnt and gained from each of these events and will continue with the turbine development and certification programme once we have refurbished the prototype with parts originally manufactured for the Te Rere Hau wind farm. However, as a result of the above events and the inevitable delays in the process of obtaining RMA consents for the Te Rere Hau wind farm, our programme is more than a year behind our original expectations. We are determined to get it right and will continue to walk before we run.

As signalled previously, in order for Windflow to complete the first batch of turbines and build production capacity we will be undertaking a further rights issue in the next two months. More information will be sent to you regarding this, and the process is outlined on page 3 of this newsletter.

It is important at this time to acknowledge that the energy capture performance of the prototype has exceeded its design targets. The advantages of the Torque-Limiting Gearbox system and the use of a synchronous generator continue to be of interest in the industry. Wind energy installations in New Zealand and overseas continue to grow and we are now at the advanced stages of developing the only NZ manufactured utility scale turbine and realising the benefits from investments made over the last four years.

Thank you for your continued support over this time. We will be holding public meetings throughout New Zealand as part of the rights issue promotion and I look forward to meeting with many of you at these events.

Geoff Henderson

**CEO and Director**

# Prototyping Process

We felt that this would be an appropriate time to summarise the performance of “Neil”, the company’s prototype turbine. In particular, to document in one place what we have learnt so far.

The design, construction, testing and certification of Neil was described in our 2001 Prospectus as “Stage 1” of the Company’s development.

## **Four prototyping events**

There have been four prototyping events (outside of normal commissioning) that have prompted improvements to the original design.

### **Noise**

The much publicised ‘noise problem’ produced a major and expensive delay in our programme. Developing a solution proved to be a complex and major challenge that took more than 12 months to achieve.

Gearbox vibration was identified as causing the noise, and initial, low-cost options to dampen its effects were unsuccessful. We then researched ways of reducing the vibration itself, and designed three ‘retrofit’ options for modifying the gearbox. We designed and constructed a rig to test the options.

The result is a turbine amongst the quietest in the world and noise reduction technology for which we are seeking patent protection.



**Gearbox test rig at A.H. Gears**

### **Pitch actuator tube**

Once we had solved the noise problem, we were able to recommence our commissioning and testing programme. In mid-October, 2004 the prototype achieved 120 hours of continuous, fault-free operation (a minor milestone) when the pitch actuator tube broke. The investigation showed that the original design had not been checked. Consequently, all calculations for the mechanical components have been rechecked. This was a minor delay (in terms of time and expense).

### **Gearbox bearing lubrication**

In December, 2004 the smallest bearing in the gearbox failed due to the lack of lubrication. This highlighted the fact that the gearbox had been running cooler than expected; consequently a lighter (and cheaper) grade of oil was required for optimum lubrication. Also the lubrication system was changed to ensure the bearing was adequately oiled.

### **Severe wind shift**

The most recent (and most spectacular) event occurred as we were preparing the machine for international certification and a target of 240 hours fault-free operation.

On 10th March, the same front that caused devastation at Greymouth hit Gebbies Pass. The extreme wind shift was outside the load cases of the International Standard to which our turbine was designed; a gust caught the turbine side-on in the middle of a shut down. The entire gearbox/hub/blade assembly was ripped from its mounting and fell to the ground.

**More detail is provided in a separate report.** The main improvement to prevent a recurrence will be to modify the control and protection system; also the hold-down bolts that failed under the extreme loads will be strengthened.

The machine will be refurbished using some components already manufactured as part of Stage 2 (the production run of six, now five, turbines), and will incorporate the design improvements made as a result of our prototyping experience to date.

We expect to resume our testing and certification programme in late June.

## **Performance**

Neil’s performance has exceeded our original expectations:

- Its energy capture has been above design at all wind speeds.
- It has operated in wind gusts up to 130 km/h

Network owner Orion has used Neil’s generator to boost its line voltage when there has been no wind. (This is a unique feature of our design, based on our use of a synchronous generator).

## **Stage 2**

Once the ‘refurbished Neil’ is operating, we will be able to complete our testing and certification programme, and finish the (now five) turbines planned for Stage 2 – the first stage of the Te Rere Hau wind farm.

# Events Update

# Rights Issue

## **Future Living Expo – Christchurch January 2005**

The expo was a great opportunity for us to talk to the public about wind energy in general and the merits of the NZ designed Windflow 500.



## **WindBlades /A.H. Gears Open Day – Auckland - March 2005**

A mix of approximately 50 shareholders and members of IPENZ attended the presentations and site tours at the Wind Blades factory in Auckland earlier in the month. Thanks to Peter, Steve and Andy for a very informative evening.

## **UPCOMING EVENTS**

### **NZ Wind Energy Association – networking evening – Wednesday, 13 April 2005**

**Mancan House Conference Centre, Cnr Cambridge Terrace & Manchester St, Chch**  
NZWEA invites members and guests to join them from 5.00 – 7.00 pm for some networking and a presentation (at 5.45 pm) from Rob Jamieson, General Manager Commercial, Orion entitled “Wind Energy, Load Variations and Neil Diamond: An Electricity Distributors Perspective”.

RSVP to [Sharon@nzwea.org.nz](mailto:Sharon@nzwea.org.nz) or  
ph 04 499 5046

### **American Wind Energy Association Conference – Windpower 2005 Colorado, USA 15-18 May 2005**

Windflow's poster paper entitled “Synchronised, Synchronous Wind Power Generation”

We are close to the realisation of our goals:

- Neil will be refurbished using existing funds so that we may complete Stage 1 testing and certification.
- We have developed new noise reduction technology for which we are currently seeking international patent protection.
- We have proven the principles of the torque-limiting gearbox system in conjunction with the synchronous generator and the two-bladed teetering system.
- We have made several improvements to the original design which will benefit subsequent batches.
- We know that our wind turbine is commercially viable and can be manufactured in New Zealand's unsubsidised economy.

We are well advanced in building a batch of five wind turbines for a first wind farm project at Te Rere Hau or elsewhere. The batch size was initially six, but one set of parts will be used to refurbish Neil.

### **What we need**

However, unforeseen costs and delays mean that we need more funds to complete the manufacture and construction of the turbines for Stage 2.

The Directors have resolved that we should ask our existing shareholders for the required funds through a Rights Issue in late April to early May.

### **What will happen**

Basically, Rights Issue 2005 will be similar to the Rights Issue we had in 2003: existing shareholders will be given rights to buy additional shares in the Company. Shareholders may choose to buy the additional shares or to sell their rights; some of us may choose to sell some of our rights and exercise the remainder.

We will send you further details including a Prospectus when we have approval from the Companies Office and the NZ Stock Exchange. We expect that this will be in three weeks' time.

### **Industry growth**

The growth of the wind power industry in New Zealand has been astronomical over the past two years! At the time of our Rights Issue 2003, Windflow was having to promote the use of wind for power generation.

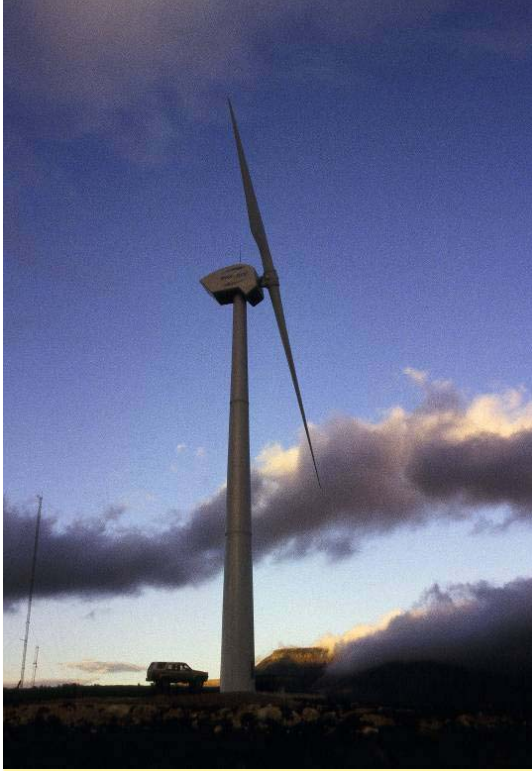
How times have changed! And the enquiries we receive about our turbine show the market is becoming stronger each month.

### **Information**

We are planning a series of public meetings around the Country to discuss Windflow Technology (our progress and plans) with existing and prospective investors. We are looking forward to meeting with you through these meetings. Invitations will be sent out closer to the time.

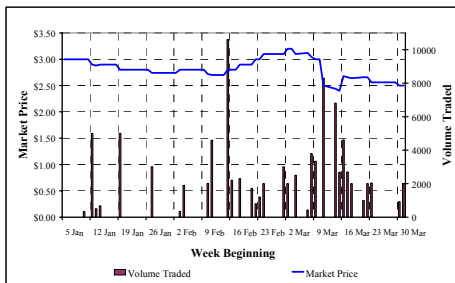


# NZ Windfarms Ltd



## NZAX – Share Trading History

The line graph shows the market price while the columns show the volume of shares being traded.



To view this graph daily go to:

<http://www.nzx.com/nzxmarket/nzax>

and search for stock code WTL

(There is also a link on our website.)

This Newsletter is produced by Windflow Technology Limited for the information of its shareholders and other interested persons. It will be posted on our web-site. Not on e-mail but would like to view the colour version and more photos? Your local library has internet access. Just type [www.windflow.co.nz](http://www.windflow.co.nz) and follow the links.

Have we got your correct address details, including current e-mail address? If not, please let us know.

WINDFLOW TECHNOLOGY LTD  
PO Box 13 952  
Christchurch  
Phone: 03 365 8960  
Fax: 03 365 1402  
email: [info@windflow.co.nz](mailto:info@windflow.co.nz)  
website: [www.windflow.co.nz](http://www.windflow.co.nz)

The resource consent process for the Te Rere Hau wind farm has been the focus for NZ Windfarms Ltd in the past quarter.

Palmerston North City Council commissioner Alistair Aburn visited the site in late January and granted resource consent for the 52 MW wind farm on February 11th. The eight year consent allows 104 Windflow 500 turbines on the 240 ha Tararua ranges site.

The appeal period closed three weeks later with three parties filing appeals, (one of these being NZWL's own appeal, this was done in order to remove ambiguity from the wording of some of the conditions).

The Directors are confident that a workable solution will be agreed on and that the decision will be upheld.



**NZ Windfarms Ltd From rear left clockwise: Chris Freear (CEO), Keith McConnell, Barrie Leay, Vicki Buck, Derek Walker (Chair), Juliet McKee**

Depending on the outcome of the appeal process, it is possible that the first batch of turbines could be installed in the coming summer 2005/06.

Updates on NZ Windfarms Ltd will soon be available on their new website

[www.nzwindfarms.co.nz](http://www.nzwindfarms.co.nz)

