



Summer

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Mission Statement

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

FEELING GOOD!

'Neil' is working well at Gebbies Pass. The commissioning stage of the rebuilt prototype is well past and we are able to report on some pleasing statistics for availability as well as some refinements which, though quantifiable in their effect, are best described as simply "feeling good".

I made a quick trip to Germany and back via the USA and Australia. The reason for the trip was to give a paper on our gearbox noise solution, but I managed to fit some other useful meetings in as well. As a result we are starting to progress a project for a demonstration turbine in Hawaii. Another meeting was about our ADR programme, sponsored by the Bank of New York, which went live last week.

The NZ Windfarms Initial Public Offering (IPO) is progressing well and generating considerable interest. By now you should have received your prospectus. Note that the offer closes on Friday December 2nd. For myself I have decided to personally invest about two or three times my family's annual power bill in NZWL shares. Based on the expected cost and output of the Te Rere Hau wind farm, this should pay for generation roughly equivalent to the amount we consume for the next 20 or more years. Thus I see NZWL as a way to take personal responsibility for our family's power consumption. Short of going off-grid and having my own remote area power system, or having solar hot water (which we put in last year), I believe owning NZWL shares is the best way to "own" the environmental consequences of personal power consumption, while remaining low-cost and accessible for urban dwellers. For me therefore it becomes an "environmental hedge", which should also prove to be a financial hedge against future retail price rises, (although the latter depends on structural features of New Zealand's electricity market which are outside our control and ever-changing).

And of course the money invested in NZWL stays in New Zealand, unlike most of the money invested in other wind farms to date! In this issue we touch on the benefits of local wind turbine manufacturing for the NZ economy, as highlighted by an ICN report.

This month we are pleased to welcome a new director onto the Windflow board. Caroline Parlane brings exceptional experience of international energy policy from a government perspective.

Geoff Henderson

CEO and Director



New Director

A Quick World Tour

We are pleased to welcome Caroline Parlane to the Windflow board. Caroline brings a wealth of experience in and knowledge of the energy industry. She was previously Senior Advisor International Relations Energy for the Ministry of Economic Development, being the New Zealand Government's representative on crucial international bodies such as the International Energy Agency (IEA), and the Energy Working Group of APEC, and is knowledgeable of many aspects of the global energy industry.



Caroline Parlane

Industry Capability Network (ICN) report – Manufacturing Opportunities from the NZ Wind Farm Industry

The benefits of buying NZ made are numerous. This August 2004 report for the ICN, which is an independent government body, gives prominence to Windflow's potential role, for example in the following quote on page 4: "The most pessimistic scenario envisages the creation of 41 new jobs, and the most optimistic scenario the creation of 325 new jobs. The more credible scenario - that all new turbines have locally manufactured towers and Windflow installs 25 MW (or 50 units per year) - creates 192 new jobs, based on an import substitution value of \$25 million".

The report's most optimistic scenario included Windflow installing 100 units per year giving an import substitution value of \$48 million.

The Passing of Rod Donald

Rod was always a great supporter of Windflow Technology Ltd, having led the decision that his party's MPs' superannuation fund would invest in the company from the outset. We were honoured to have Rod attend our recent AGM. At a time when he was no doubt tired and disappointed by the coalition negotiations, he brightened up the proceedings exchanging quips about politics with our chairman. A proponent of buy NZ made, he was simply outstanding, in this as in many areas, at "walking the talk". Geoff and Jenny Henderson have known Rod personally for many years, Jenny having worked with him on some environmental education committees. He will be deeply missed.

In October Geoff Henderson travelled to Berlin for the 1st Wind Turbine Noise conference (October 17-18). The title of his paper was "Development of noise reduction technology for a 500 kW prototype wind turbine". It explained how Windflow researched and developed technology (patents pending) that eliminated the troublesome planetary gearbox vibration and consequently reduced the assessed sound level from 36 dBA to 24 dBA at the critical location for the Resource Consent. This attracted a good amount of interest, especially as it was the only paper which dealt with planetary gearbox noise. This problem has still not been fully resolved by at least one of the major Danish manufacturers (based on personal discussions at the conference).

Other meetings on this trip included:

- a meeting in Berlin with a prospective agent for Windflow in Europe. This person is knowledgeable about wind turbine gearboxes and very keen on our design
- a meeting in New York with the Bank of New York who are sponsoring our ADR programme, which went live last week
- meetings in Hawaii with the main power company there and with a prospective partner interested in a demonstration turbine on Hawaii. This is a good potential market for the Windflow turbine because it has high wind speed sites and some serious concerns about grid integration issues which are overcome by the synchronous generator.

As is often the case with such trips, Geoff came back to New Zealand energised about the potential for our design. The wind industry is still grappling with fundamental gearbox design problems which the TLG solved over a decade ago. The latest Windpower Monthly (a Danish magazine), November 2005, features these problems in a cover story. Superior torque limiting is but one of the outstanding features in our gearbox design. The following table (which we prepared recently for another publication) summarises the advantages of the Windflow gearbox and the synchronised, synchronous generator which it enables.

	WINDFLOW TLG	CONVENTIONAL WIND TURBINE GEARBOXES
Configuration	4 stage (2 planetary + 1 parallel + 1 epicyclic)	3 or 4 stage (2 or 3 planetary stages + 1 parallel)
VS System	Hydrostatic torque limiting	Electronic
Generator	Synchronous (eliminates inertial torque on gearbox)	Asynchronous (significant inertial torque in gusts)
Reactive Power	110% of rated power (even with no wind) for no extra cost	Requires additional capital cost and only above cut-in wind
Planetary Design	Hicks flexible spindle (excellent load sharing, no limit on planets)	Rigid spindle (poor load sharing, maximum 4 planets)
Planetary Gear Noise Issues	Eliminated by new technology (patents pending)	Ongoing issues

Technical News is All Good

On the basis that a picture tells a thousand words, we have prepared some graphs to convey the good technical news. The captions below summarise each graph at left.

High Availability

The prototype was reinstated in late August and by mid-October the prototype was ready for prolonged unattended running. The graph shows a log of the availability for the last five weeks with availability greater than 95%, which is excellent for a prototype. The only unplanned shut-downs have been due to teething issues with the new prototype which we have been able to resolve quickly in each case. We have just passed another milestone of a 10-day reliability run, having had no unplanned shut-downs for the last 12 days.

Low Sound Levels

The development last year of a new approach to reducing planetary gearbox noise achieved a remarkable reduction in sound levels, bringing the turbine well into compliance with its resource consent. We have since applied for patents for this technology, which was the subject of a paper presented at the 1st Wind Turbine Noise conference in Berlin last month.

Improved Speed Control

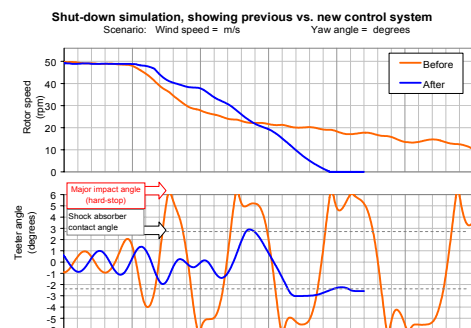
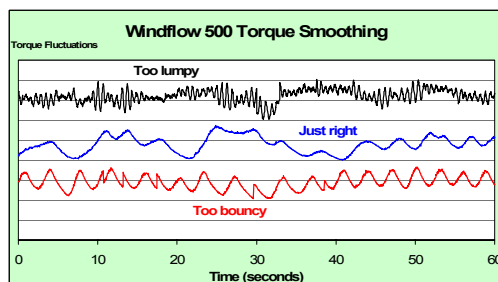
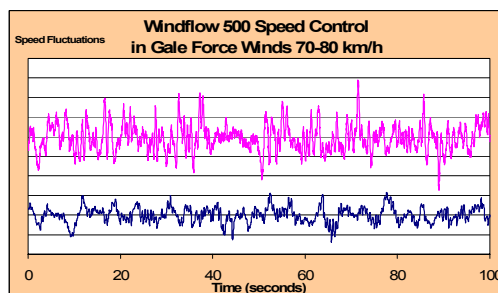
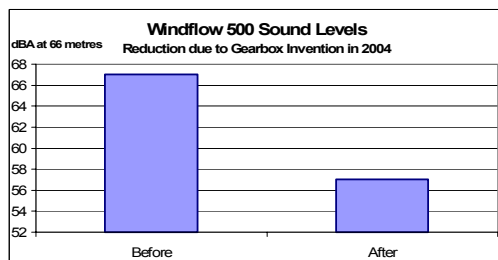
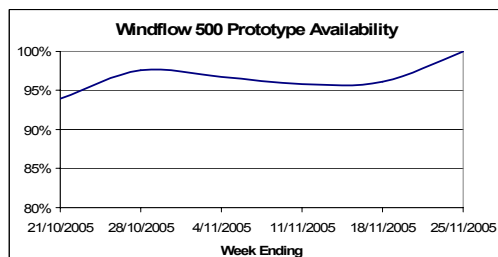
A new approach to speed sensing has now been implemented. This provides a remarkable improvement in the quality of speed control. (Both this graph and the following show comparable time series to the same scale on the y-axis.) While the previous speed control was satisfactory, we are very pleased to have been able to achieve this improvement. It will enable us to push the boundaries of the turbine's high wind capabilities and facilitate some of the advanced grid integration capabilities (for example frequency control) of the TLG and synchronous generator.

Improved Torque Smoothing below rated

The TLG system has always been able to limit torque at rated wind speed. But like all wind turbine drive-trains the performance in below-rated winds (which occur most of the time) was characterised by significant torque fluctuations at blade-passing frequency. We have recently been able to fine-tune this aspect of the TLG system by adjusting a valve on the hydraulic circuit to eliminate blade-passing frequency fluctuations. The graphs at left show the effect of adjusting the valve. A bit like having adjustable suspension on a car, it can change the feel of the ride inside the wind turbine from "too lumpy" to "too bouncy" to "just right". Such adjustments have a positive impact on the long-term durability of the main components, but also on the reliability of ancillary equipment. Everything in the nacelle benefits from a smoother ride that simply "feels good".

Sophisticated Shut-down Software

Ongoing refinement of the new shut-down software shows significant improvement. By using a combination of calliper-disc braking and blade pitching to control the deceleration rate, the turbine's teeter stability can be maintained to a far greater extent than previously thought possible. This will greatly reduce the loading on the wind turbine, even during a very adverse side-wind shut-down case. The lower time-series graph at left shows the dramatic improvement. Where the previous shut-down software would not have prevented teeter excursions outside the permitted range ($\pm 6^\circ$), the new software will keep teeter excursions well inside that range.



ADR's Go Live

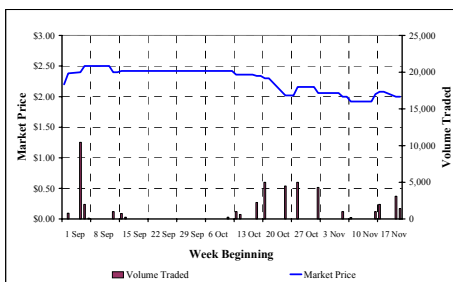
NZ Windfarms IPO Generates Interest

Windflow's Level 1 American Depositary Receipts (ADR) program was activated on 15 November with receipts now tradable in the over-the-counter (OTC) market under the code WFLWY. This allows US private and institutional investors to invest directly in Windflow Technology, giving increased liquidity to Windflow shareholders for trading their shares, and giving Windflow increased access to investment capital.

Trading can be viewed at <http://www.adrbny.com/> (Search symbol WFLWY).

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.)

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

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If the number of offer documents sent out is any guide, the NZ Windfarms Initial Public Offering will meet its target. There has been more interest in this IPO than for any of the previous Windflow offers, and additional prospectuses had to be printed in order to keep up with demand.

Please ensure that your application (with cheque) is **received** by BK Registries by Friday 2nd December.

The public meetings around the country were well supported by Windflow shareholders and non- shareholders alike. It's encouraging to see such large numbers of people showing an interest in wind energy as an investment.

The share offer comes at a time when increasing demand for electricity combined with the shortfall in generation has seen the average spot market price increase by more than 50% in the past eight years.

Buy New Zealand

Over 90% of the estimated \$80m spent on building Te Rere Hau will be spent in New Zealand. Based on a recent study on the benefits of substituting New Zealand manufactured products for imports (<http://www.icn.govt.nz/news.asp>) Te Rere Hau will generate more than 600 "person years of employment (direct and indirect)", increase tax revenue by more than \$5.5 million, save over \$7 million on government welfare payments and add more than \$8 million of purchasing power in our economy.

Joint Venture

The Babcock and Brown/NP Power consortium is close to completing its feasibility study (due 31 December). The consortium has expressed confidence in Te Rere Hau and the turbine. "We want to get the latest performance data and complete an independent evaluation of the turbine design before confirming," said Tim Flato of NP Power.

www.nzwindfarms.co.nz



Mark and Stella at the base of the 30 m high Windflow 500 which will be used on Te Rere Hau



NZ Windfarms CEO Chris Freear with Stella at the top of the turbine

Stella Dunning and Mark Smith experienced the ride of a lifetime last week as they climbed the 30 metre high tower of the NZ made Windflow 500 turbine at Gebbies Pass near Christchurch.

Stella, a British bridge engineer currently working at Connell Wagner in Auckland, won the prize draw from the NZ Windfarms display at the NZ Sustainable Business Conference and Expo last month.