The Lovegreen rotating ring wind energy transfer concept.

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An updated paper for discussion.

This latest work up dates all the previous discussion papers I have issued. The purpose is to bring you up to date with my latest work and thinking. If you would like the earlier papers or any photographs then please ask.

You will remember that the purpose of the original discussion was to find an alternative to the current use of three bladed wind turbines of up to 90 metres wing span and standing 125 metres tall on towers and in such numbers to constitute a power generation station.

The work began because there is a scheme to build such a station with 125 machines in the Clyde and Muirshiel Regional Park between Lochwinnoch and Kilbirnie with a further 175 machines contemplated in the same park.

You will no doubt recall that I suggested a machine of 600 metres in diameter would not be impossible in the light of present day engineering achievements and that I went on to say we could build a rotating ring of vehicles running on railway lines and that these vehicles could carry sails as on Ellen MacArthurs round the World yacht or wingsails like those designed by John Walker some thirty or so years ago.

The suggested sites for the machines were disused coastal airfields because they are disused but also other sites of no tourist, recreational or scientific interest that just happen to be very windy.

Early on it became clear that utilizing a wind from one side was not efficient and my thinking then moved to bringing the wind into the centre of the ring and causing it to radiate outwards to pass over all of the sails at the same time. Not all of you were aware of this thinking because I needed time to build a test rig and prove the method.

A test rig was built about a fortnight ago. This consisted of a vertical six metre 100 millimetre smooth bore uPVC tube terminating at the top by a nominal 90 degree bend to which was added a transition piece 600 millimetres long terminating in a 250 millimetre square opening to face and collect the wind. The whole was fixed to meet a westerly wind. It was not my intention to do any more than see if the wind would flow to ground level. In the event an easterly wind blew for two days and air flows of up to 6 kilometres per hour were recorded going up the pipe drawn by the suction behind the transition piece.

When a westerly breeze did come on the third day the highest flow I recorded was 21.9 kilometres per hour when the wind speed reached 14 kilometres per hour at eye level.

To take the work further would obviously require a mast head anemometer, a rotatable machine, some staff and possibly planning permission. I considered that all of those things were more properly for a later date.

It is now reasonable to think in terms of a rotating engine driven by wingsails powered by a wind radiating from a centre of action with wind being accelerated above ambient wind speed by the action of suction created by the downwind side air intake now functioning as a vacuum generator.

This speeding up of the wind by bringing the partial vacuum into action is very similar to the method used at NPL in their high speed wind tunnel where the air flow was created by evacuating a large pressure vessel and then opening the vessel to air at atmospheric pressure while causing the incoming air to flow through a high speed wind tunnel at exceedingly high speeds.

I therefore anticipate that by building the wind turbine between two wind pressures zones one positive and one negative it should be possible to get much more power out of the wind than any of the current wind turbines in a normal situations.

It is necessary at this time to think about how to bring the low pressure into the machine.

The machine as I see it at present is to have two rings of standard railway lines at standard spacing. As a starting point I am suggesting that the diameter of the inner ring shall be 600 metres. Running on the twin rails shall be some vehicles using railway style wheel units but spanning both sets of rails. These vehicles will have a top deck on which will be mounted the wingsails. My suggestion for these aerofoils is that they might usefully have a span of 30 metres. Aerodynamicists will be the best people to decide the form of these wings and how they should be spaced and by how much they should overlap. However some things are obvious. Besides having a base upon which to mount the wings and for use as a power transfer structure there will need to be a ceiling to contain the wind over the wings. The set up then lends itself to be a simple structure with rectangular wing forms and possibly more than two wings per vehicle. Ideally one would like to see an even distribution of wings around the ring with no wasted spaces. I would expect each wing to over lap the next so that one wing guides the wind over the upper surface of the following wing.

For bringing the air down to the centre of the operation there will need to be an structure forming an air intake facing four ways wherein the face into the wind is the intake and the face down wind is a replication of the windward structure but this time is the vacuum creator. The two faces at right angles to the first are replications such that from wherever the wind arrives the back face is the vacuum face.

For discussion purposes I am suggesting that in plan the machine forms a square such that there is a wide space outside the ring for the used wind halfway through its journey to pass into and to be fed into the rear vacuum area. This wind will pass into that structure via shutters in the floor. The shutters might usefully open on three sides away from the wind. The floor being the floor to the air intake will be above the turbine ring. The ceiling to the wingsails will form part of the air passage taking the wind to the final exhaust zone.

There will need to be a rotating part spherical shutter to select only the incoming wind quarter of the air intake with the back face of this shutter sealing the reverse opening to make that part of the machine effective.

As a guide I have suggested that all four air intake openings are of the order of 800 metres wide and about 150 metres tall being the equivalent of a row of eight Vestas V90 wind turbines. These openings besides being held up by structural steelwork will also need bracing to resist the incoming wind forces and to cope with the loads of changing the wind through 90 degrees. Much as TV masts are built and braced.

The method of generation of electricity is best left to experts but there are three methods that come to mind. The first is of course to fit generators to the under carriage axles, then there is the possibility of mounting a continuous gear ring onto the vehicle and using that to drive a number of generators but also one should consider driving oil pumps because that would enable the operator to direct the flow to external generators according to both need and power availability.

However if we move into an untried field then it is worth thinking about Professor Laithewaite and his linear motors. The Japanese have taken magnetic levitation a long way. I believe the Chinese are doing something similar. I suggest we do the very opposite and move the train with the wind and put a linear generator in the tracks to make the electricity.

The electricity is of course what this project is all about and its price is the key to our progress.

It is imperative that the machine is only stopped by the operator and not by lack of wind. In early papers I have suggested that two diametrically opposed engines be used to drive the power train. Equally imperative is that these engines should run on hydrogen and air as the fuel with the hydrogen being manufactured on site and stored. If the chosen engines should be some form of gas turbine the way is open to using the flow of the gases to drive the train as well as using the thrust of the gas turbine

The Vestas V90 wind turbines currently on offer at year 2006 prices cost about £M1.26 each and deliver on average about 1.25 megawatts of power at £70 a megawatt/hour. It is said they pay for themselves in less than four years of a 25 year life.

If for example we take a figure for the new machine equal in performance to 200 V90 turbines. Then a price to aim for of one new machine when all the design and R&D has been met should be close to 200 x £M1.25. That is £M250. But the first one might cost twice that. A sensible contingency sum might be £M150 and the R&D might well be 20% which is a further £M100 making £M750 to get a machine designed, tested, commissioned and made ready to be replicated onto any chosen site.

My understanding of the finances at present is that money is on offer at 15% per annum which is not cheap money and that our Governments put up a lot of money for wind farms.

My own view is that an offer of Treasury Bonds at 8% maturing in say 15 years would be a lot cheaper and return funds to a greater number of people and these would be taken up very quickly.

About the potential market. The Scottish Executive has indicated a desire to have over 6,600 contemporary wind turbines in Scotland. Perhaps a thousand of those are up and running but it leaves a 28 machine opportunity here in Scotland with greater opportunities outstanding in England, Wales and Northern Ireland. The market opening is considerable.

There is a Joint Parliamentary Committee taking evidence about energy with a requirement to report to Parliament in July of this year. I am keeping this committee informed of my thinking.

I sent my first work to Miss Annabel Goldie MSP. At my request Miss Goldie sent the work to Mr. TimYeo at the Westminster Parliament. The work prior today's compilation I sent to Mr. Yeo's secretary in the strictest confidence because of the Patent implications but the intention is to present these papers to the Scottish Executive in an attempt to stop the local windfarm in its tracks. The point I would make is that wind farms as we know them succeed because there is no competing machinery to set against them, but there could be.

Additions at 28th June 2006.

Speaking yesterday the First Minister of the Scottish Executive Mr. Jack McConnell was very upbeat about renewable energy.

All of us respond well to some encouragement so I was pleased to have this message from one of our nuclear scientists who remarked "what a fascinating piece of 'outside the box' thinking- far from mad and quite a thrilling concept, are you building a model?

Believe it or not I am waiting for a decent wind! The idea is to use the west face of my house as the wind transfer plate because we know already that the wind is moving across the wall from a central zone. I have measured the cross flow both ways, the down flow and have in readiness a new tool. This is 2 metre cross member on a four metre post at one metre down from the top. Each arm of the cross carries a small mast about 300 mms tall and from these fly flags. Given a wind the idea is to pass the intersection across the wall face to find the point where the bottom flag flies down and the top flag flies up and where the other two fly apart. Then to mark the spot.

The next stage is to make a stronger four spoke rotor with a centre pivot and mount a wingfoil at the end of each radial arm. The idea at the moment is to make each blade about 300 mms tall and up to 500 mms chord. Then to fix the wheel at the centre of the wind action and observe.

Concurrently there is background work aimed at a model of a full size machine. I have the Hornby catalogue to hand and can think in terms of a transportable model of four 4foot x 4 foot squares on an 8 foot square base to a scale of 1:72. The standard 00 curves are too tight

a radius but flexible rail is available so a ring at about 800 mms i/d and 900 mms o/d radii should fit well and allow room to form the discharge volutes of the system.

To purchase all the wheels necessary at £30 a set to form the rolling ring would cost a fortune so my thinking at this time is to buy all the rail and four long flat bed waggons and four short wheel base waggons and then to join these into ring with a 20mms copper tube carefully formed to a pattern. Such a set up would have one deck fitted with the wingsails. The next step is to design the wing and I now have the software installed but I have not so far run it. It arrived yesterday. I think that a Salter spring balance attached to the copper tube and a fan set up to provide some wind will suffice in the first instance.

But the real problem is how to design the air intake centre shutter. I am thinking about it but this is a job best done by 3D CAD. This is not something I would ever do myself preferring always to engage experts but they will need guidance and it is here that the model should help.

ATL.

Lochwinnoch

28th June 2006