

Future Wind Turbines Ltd.

What is the company?

Future Wind Turbines Ltd was founded in September of 2023, after two years of a self-funded, personal development project, of an off grid Vertical Axis Wind Turbine. Call it a 1kW, turbine for now.

What is the product?

The vertical axis wind turbine is a cost effective, autonomous self-starting wind energy generator, with 3 vertical, 2.2m high, aerofoil blades. It is 1.95 m in diameter, and the top is 8m, high if installed in a field. It is compatible with existing solar panel infrastructure, with the common 48-volt output, however it provides complimentary energy, overnight and in winter, which is a much more valuable resource than solar produced summer daytime energy.



Who are the team?

Primarily, Phil Snowden, a 50-year-old, experienced Aeronautical Engineer, CEng, MRAS, BTech (Hons) Loughborough, with a practical background as an ex-RAF Halton Apprentice Technician, along with an involvement of Aeronautical Design, A320 Wing, 777 and 737 auxiliary fuel tanks, and for Pilatus Switzerland the PC-12, wing and the PC-24 Main Undercarriage, the first rough field twin jet.

And....some very experienced electrical engineers, electronics engineers, software engineers, ranging from 9 years old to 89 years old, who contribute for free, *although the 9 year old does take a salary in sweeties.*

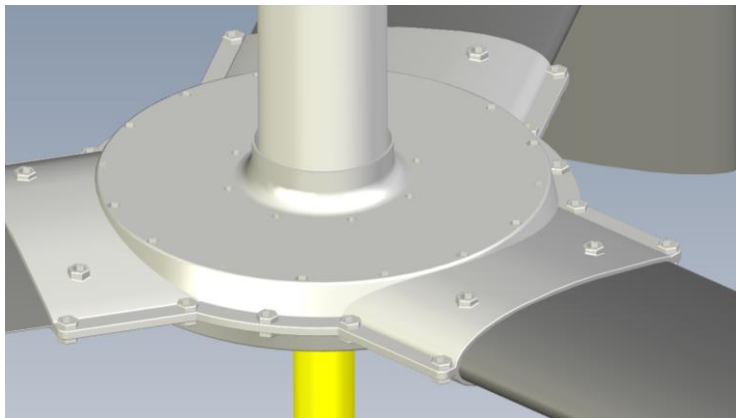
And.....Loughborough University, the team sponsored an undergraduate final year project, which unexpectedly yielded more information on the optimised design than ever expected.

And....lots of manufacturing companies who have contributed to the prototype build, either free of charge, or at cost.

How mature is the design?

Physically the design is complete, and 45 ships sets of aerofoil blades have been produced, using a novel pultrusion section of resin and recycled glass fibre, for the first pre-production, field testing batch. Further development of the autonomous self-starting firmware and solid-state anemometer. Prototype generator magnet discs, coil packs and generator casing, blade to spoke "T" fitting, have been produced for the first test article only.

Two pairs of ABS injection moulded generator hubs each contain 2 bearings 50x90x20 stainless steel sealed for life, and integrate the spokes running to the "T" s



The lower generator housings contain two nickel plated steel rings support the magnets 16 off.



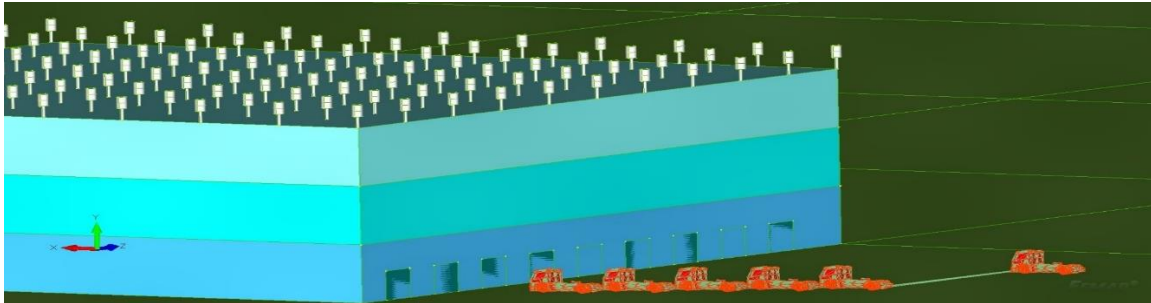
One static Coil Assembly fixed to the 50 mm x 5mm thick, pultruded fiberglass scaffold pole main static shaft.



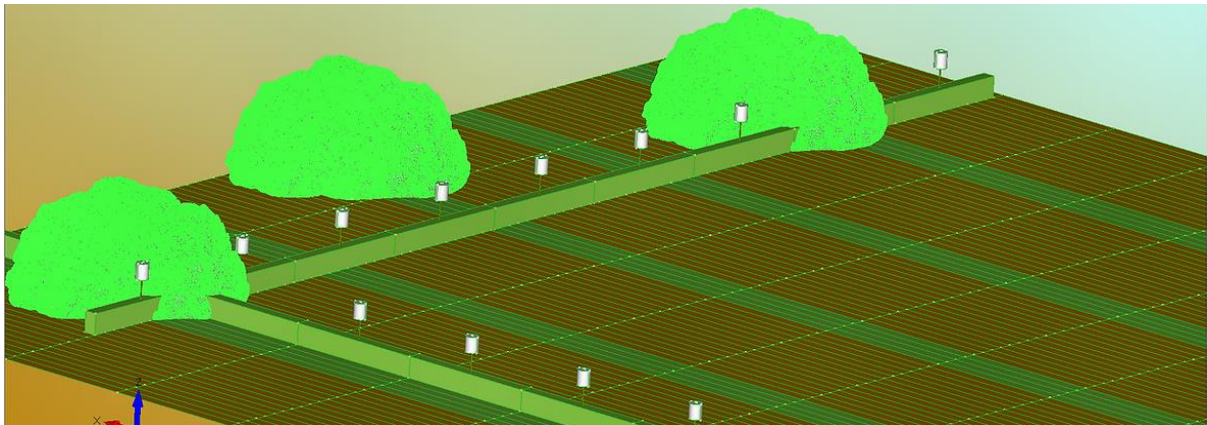
Who is the target market?

Firstly, remote off grid residential consumers who require power for heat and light, in winter and on a night without expensive energy storage systems.

Secondly, there is a requirement that all new warehouses have a sustainable green energy capability, to date this is usually by means of solar panels, unless it is a refrigeration warehouse, the energy produced is of no value to them and is exported to the grid in summer daytime, and the grid already has over capacity of summer daytime energy.

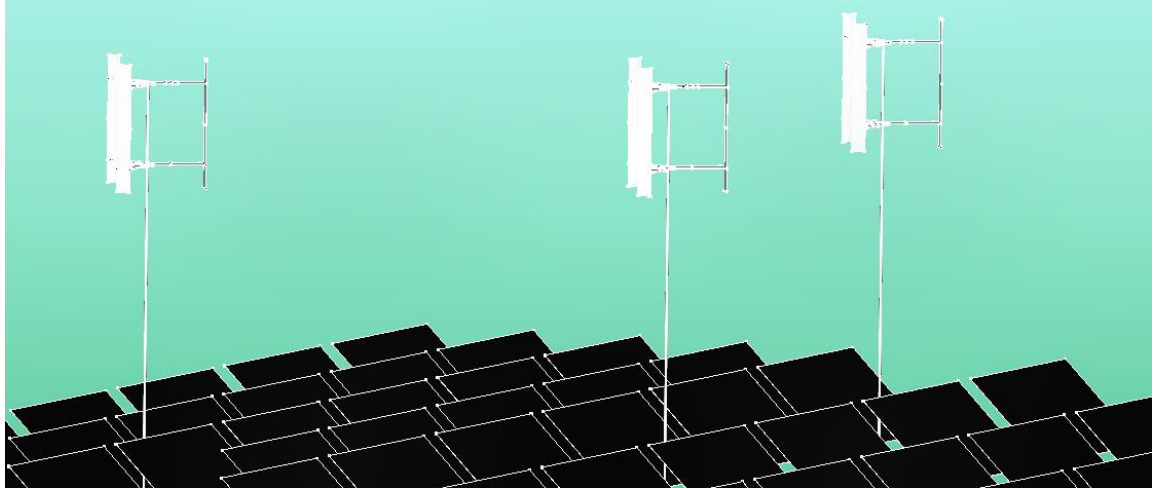


Many farmers have invested usually £1m, in a traditional, say half megawatt, conventional wind turbine if the local objectors allow it. Farmers can progressively invest in this green energy generation system. Either in hedgerows or indeed in productive cropped field, driving machinery, between the turbines. Many people don't understand that the agricultural land beneath solar farms is redundant, sheep graze on the 20% efficient pasture simply to maintain the weed growth. Normal crops can grow in normal conditions in a field studded with small vertical axis wind turbines.



Who is the target market, cont.

Finally, massive intrusive solar farms produce energy during daytime summer periods, and the expensive infra structure lies idle overnight and in winter, inverters, grid tie in transformers and the likes are over 50% of the cost of a solar farm. Studding existing solar farms with small vertical axis wind turbines, means the set-up cost is simply the autonomous turbine itself as the infrastructure is already paid for. and the return on investment is less than 3 years, half that of less cost-effective solar panels.



We intend to produce 1% of the UK power by 2050 and produce 25,000 units per year.

And the worldwide potential is huge Canada, Scandinavia...

What is the commercial and physical efficiency?

There are many novel and peculiar similar designs ...costing five times our design, because of their complexity.

This simple construction is not only cheap in mass production, but highly efficient.

The efficiency is over 33%, that means that 33% of the upwind energy, is extracted.

Commercially the turbine will cost, circa, less than **£1500**, and in England where average annual 24/7/365 rural wind speeds are circa (5 m/s), will produce, 1200kW.Hrs of green energy per year. At premium winter rates that is circa, **£350**.

Future wind turbines do not intend to be involved with inverter, grid tie ins, the market is flooded with existing units which are compatible with solar panels and our wind turbine alike.

Is the product scalable? Do you have a project management team?

From the outset the design has focussed on mass production at low cost with mass production at the forefront of the design, followed but novel cutting-edge technology which only recently has become cheaply available.

We have a robust, mature, and experienced project management team. Phil Snowden project managed the complete project of auxiliary fuel tank production for the 777 and 737, in conjunction with Boeing Seattle, Wichita and Marshall aerospace. Another member of the team, project managed an EV charging company, from startup (when there were only 400 EV cars in the country.....to it being sold out to a multinational, with 500 employees.

What is your USP and IP?

The dominant USP is cost, cost cost, our production method is commercially unrepeatable.

The integrated cutting-edge autonomous control and optimisation firmware is also part of our USP and IP.

There is nothing patentable here and as, yet our IP is only secured by the fact that our product is commercial unrepeatable, should someone wish to steal the IP that would be silly, as I would freely offer them a low-cost production licencing agreement and product support consultancy service.

What are your weaknesses?

There are many challenges ahead to get this to full scale production.

Although self-financed to date, some of the components cannot be produced to structural quality for even the first batch of 45 ship sets, without production tooling for injection moulding, an example is the "T" fitting, we need 6 per ship set, they will cost £1.05 each, the tooling is circa £12k, other tooling cost probably amount to £50k total.

Certification, whilst not a particular risk, the turbines will have to be qualified to a set of standards, there will be a cost involved circa £10k.

Existing reputation, there have been and are similar products, not as cost efficient as ours but.....**they have developed a reputation to be RUBBISH, not meeting their performance claims,** it is a stigma which we have to overcome. They also give out confusing performance data such as a 3 kw output, what evolves is that it means 3 kW. hrs per day (1095 kW.hrs per year)

There is a simple formula for performance, which gives 280 kW.hrs per meter square unit of shadow area, (for an efficient turbine in England), it is simple to address the claims of the so-called competitors using this formula.

Google Search them out and add their dimensions to this tool:

<https://www.omnicalculator.com/ecology/wind-turbine>

Not a weakness is the challenge to move to premisses and all the other growth teething problems.....usually involving cost /investment.

What is the growth plan?

2024

Complete the first prototype. *Completed April 2024 see picture below.*

>>>>>

<https://www.youtube.com/shorts/6fQvHcb5ars>

Test the first generator/motor/adverse wind break.

Test the first turbine in the field and on a moving platform.

Complete the design of a solid-state anemometer for low wind speed detection and autonomous starting.

Certification

Start market awareness develop large scale orders.

Consider investment and grant funding.

Completion and delivery of first 45 ship sets for limited uncertified use.

2025

Start of full-scale production.

Find some premises.

What other questions can I ask?

What happens in adverse wind conditions?

What is the component life and maintenance cost /schedule?

What colour is it?

What speed does it turn?

Does it kill birds?

What's in the box how does it arrive?

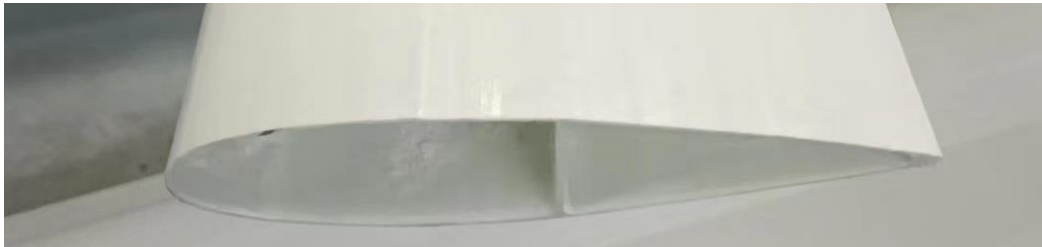
All for another time.



If you think you can help my details are:-

01284 810335, and phil_snowden@hotmail.com

www.futurewindturbines.com but badly out of date

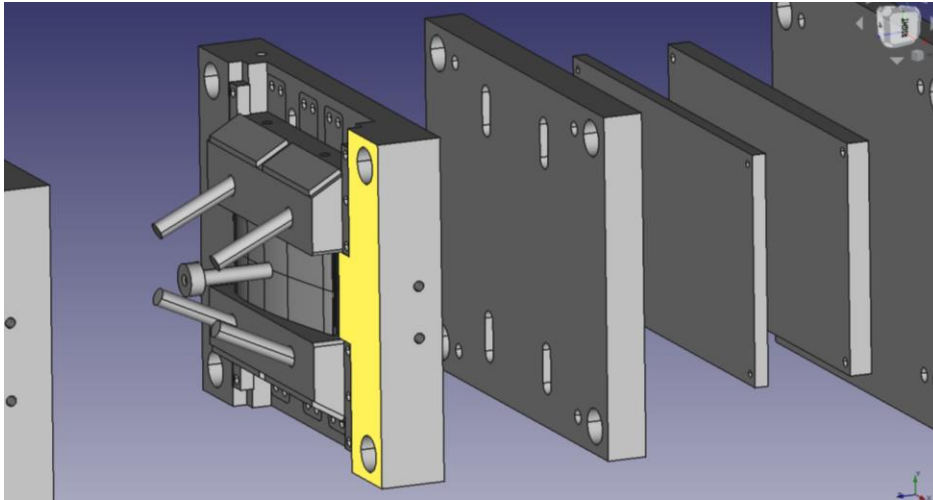


Stator Coil connection. Three phase axial flux generator, working at very low rpm. 100 rpm, 48v rectified. 12 coils 4 per phase sandwiched between two magnet discs in the bespoke generator housing ABS Plastic injection moulding. 16 magnets per magnet disc 32 total, each coil is 150 turns of 1mm enamelled copper wire wound onto a cassette, 12 of which are potted into the coil pack.

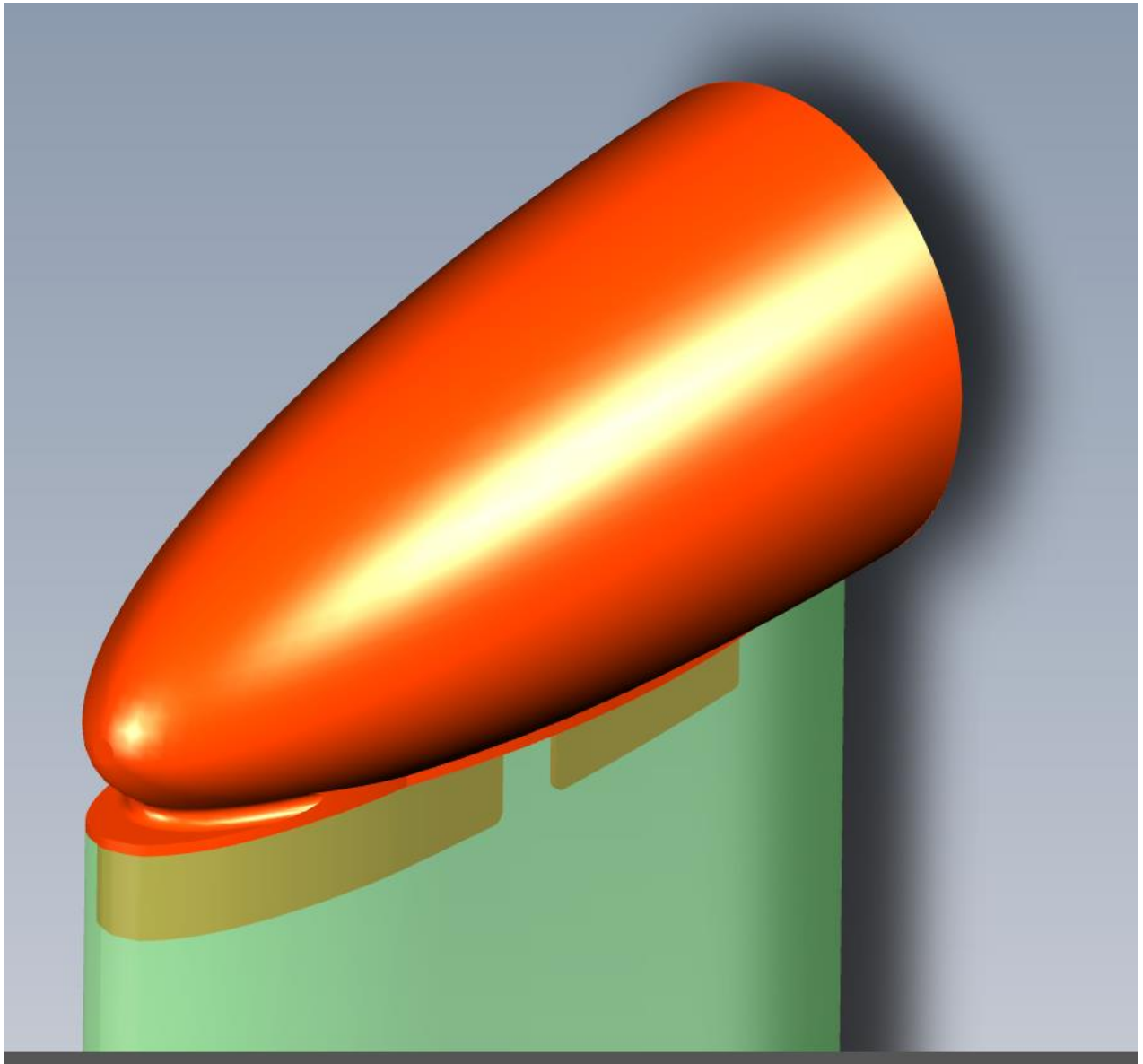
Common centre rail wiring



Complex “T” investment, ABS plastic injection moulding tool.



Wing tips decrease tip losses and increase efficiency. For the kits without sophisticated, motor start, these cups allow self-starting.



Two generator /bearing housings each with two sealed for life stainless steel bearings, 90 x 50 x 20 mm. the top spoke assembly is empty, the bottom spoke assembly, integrates the 2 magnet packs and the coil stator pack



The whole assembly, ready to be remounted on a standard 50mm fibreglass scaffold pole with wire braces.

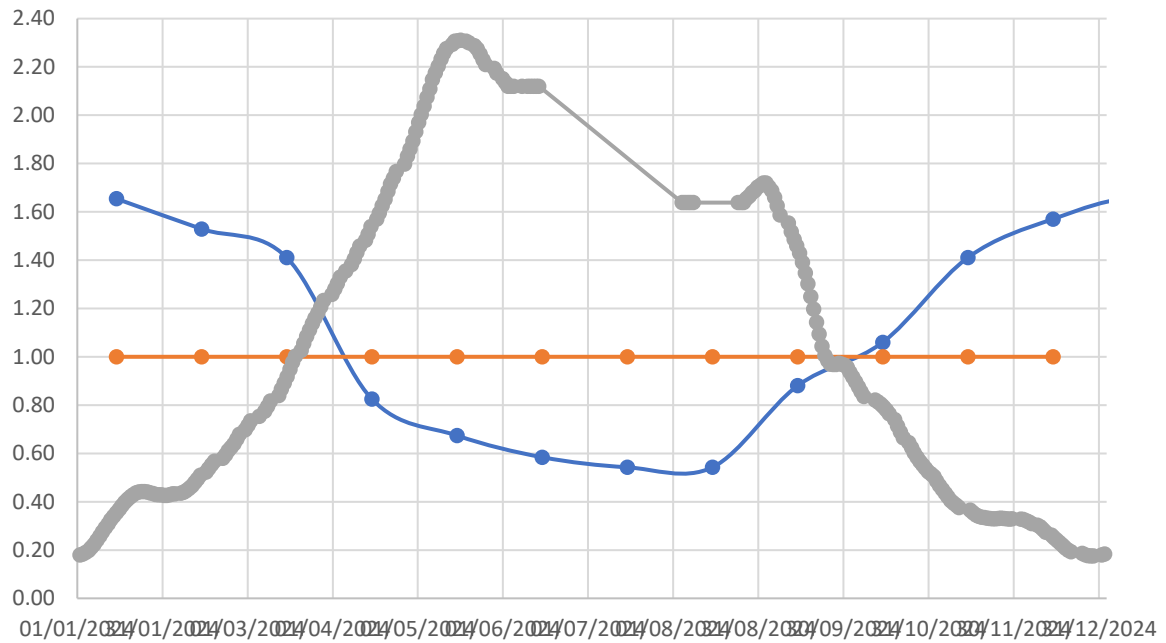


Solid state anemometer

Needed to detect low wind speeds and decide if the wind energy is sufficient to pre rotate the turbine using the generator as a motor. Totally autonomous reaping energy from winds as low as 5 mph.

Ultra sonic instantaneous anemometer cost circa £300, this solid-state novel strain gauge invention costs less than a fiver and has a 25-year life unlike rotating cup anemometer.

Annual distribution of wind POWER factor (blue) and Solar (gray)



Annual Output Distribution kw.Hrs./Day and Daily revenue (£)orange

