



Renewable Energy Projects for Universities Build a Wind Turbine with V3 Power



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Renewable Energy Projects for Universities: Build a Wind Turbine with V3 Power

Many engineering students spend years at University without ever getting their hands dirty. We're here to change that! Our courses take engineering out of the abstract. We teach all the skills necessary to construct a wind turbine without assuming any prior practical experience, while the project has challenges that engage and stretch students at all levels of practical ability.

What Happens?

Over a number of sessions we work with students to build a complete axial flux wind turbine from scratch. Practical sessions are interspersed with workshops exploring the theory behind the design of the turbine and its application.

Students, working in small groups, rotate through three manufacturing bases focusing on the turbine mounting, alternator and blades. As the project evolves students have the opportunity to explain to the rest of the group the challenges they've overcome and progress they've made.

Our engineers are always on hand to teach practical skills, guide students through the design and discuss in-depth questions students come up with. This enables the students to build and assemble every part of the turbine themselves. Having had the unique experience of completing, mounting and testing the turbine, the course can be extended to a full install, including a whole extra phase of tower and electrical system construction.

Some of the Things Students Learn are:

- How to carve wood with spokeshaves, draw knives, mallets and chisels to create blades with an accurate aerofoil
- How to construct an alternator of a specific voltage output, which includes soldering, coil winding, working with strong permanent magnets and casting in resin
- How to use an angle grinder, arc welder, drill and tap and die set to build the steel turbine mounting
- A practical knowledge of the material properties of various media
- Teamworking and creative problem solving
- A better sense of where their interests lie within the field of engineering
- To engage with real world engineering issues



Reasons to book one of our courses

-  The Build a Wind Turbine project can uniquely enhance existing university modules
-  The opportunity to take part in a Build a Wind Turbine project stands out to prospective students
-  The project offers the potential to partner with local community groups
-  The project offers great opportunities for university and departmental publicity
-  The project can be adapted to a range of timescales, budgets and degree levels



Some Student Feedback:

I really enjoyed it and felt that I learnt a lot.

Emma Gerrard, *University of Exeter course, 2014*

The best four days of the whole year. The turbine looks magnificent. Amazing teachers.

Camilla Maria Chlebna, *Oxford Brookes University, Global Power Shift course, 2014*

It was really satisfying to produce something with your own hands.

Cai Anwyl, *University of South Wales course 2014*



The Nuts and Bolts

We can tailor a course to fit the time and budget available. Installation of the turbine including an electrical system (grid tied or off-grid) generally doubles the length of the course. The larger the machine, the greater the material costs.

We have a maximum student:teacher ratio of 5:1.

Course prices range from £2500 to £11000.

Sample Course Lengths

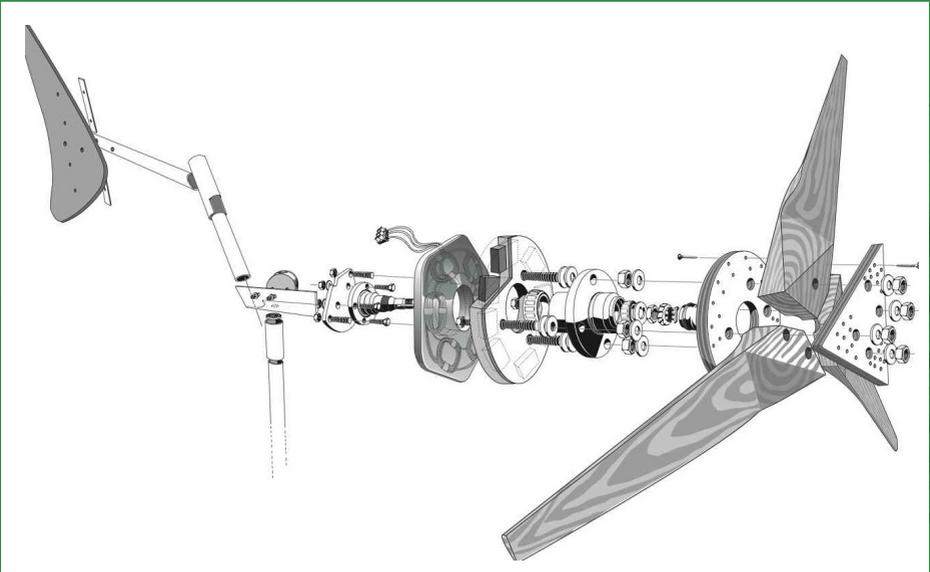
 1.2m turbine build - 3 days/24 hrs - up to 12 students

 3.6m turbine build and install - 10 days/80 hrs - up to 18 students



The Design

The turbine we make is based on a design by Hugh Piggott who has been building small wind turbines for over 25 years. It is a robust design that can be easily repaired, maintained and serviced and is an excellent example of appropriate technology. It is used in rural electrification and development projects across the world.



Turbine Technical Information

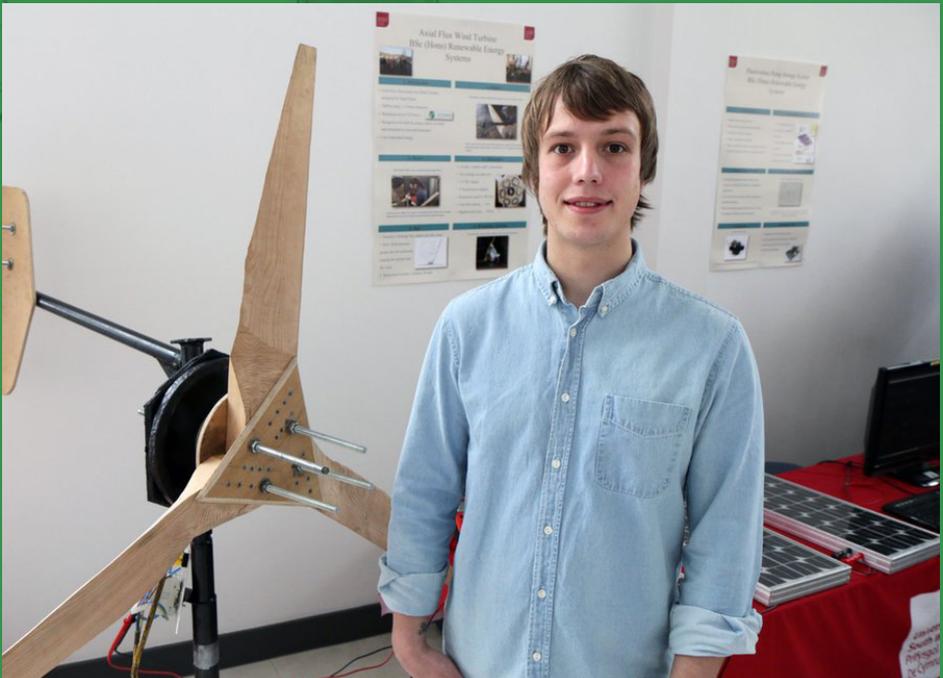
Rotor Diameter	1200mm	1800mm	2400mm	3000mm	3600mm	4200mm
Related Output	200W	350W	500W	700W	1000W	1000W
Monthly Energy Production	33 kWh	74 kWh	131 kWh	205 kWh	296 kWh	402kWh

About V3 Power

V3 Power is a workers' cooperative set up in 2006 and based in Nottingham, UK. We are in the interesting position of being both an engineering company installing, maintaining and servicing small renewable energy systems as well as an education provider running courses in schools, universities and for members of the public.

Previous Partners

University of Warwick, University of Bath, University of Nottingham, University of Exeter, University of Sheffield, University of Strathclyde, University of South Wales, Coventry University, University of Kassel, University of Oldenburg. Many groups in the UK and Ireland as well as in Germany, Pakistan, India and Ethiopia.



Testimonials

A professional and thoroughly interesting hands-on practical workshop. The team were flexible enough to tailor the course to the skills and abilities of the course participants. The course has been an inspiration and we have invited them to run another course next year.

Dr Justin Hinshelwood, Lecturer, MEng Energy Engineering, University of Exeter, UK

Their expertise and familiarity with the design and process of manufacture enabled us to achieve the project painlessly... I would highly recommend that all young engineers experience this activity.

David Trujillo, Senior Lecturer, BSc Structural Engineering with Architecture, Coventry University, UK

I would highly recommend V3 Power to anyone looking to build a Hugh Piggott wind turbine.

Adam Perrin, University of Warwick, EWB, UK



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