Variable Pitch, Vertical Axis

Wind Turbines

(VAWT, Cyclone)

Presented by:
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Vertogen have developed the mechanism to create a *Unique VAWT* that not only has *Variable Pitch* but includes *adaptable and adjustable pitch control* system with a fully mechanical integrated governor.

This equates to a Turbine that can be tuned to Start easily, operate at a Given RPM without any external Control Automatically.
Why did we get involved with Wind Turbines?

- We wanted a Renewable Source to produce Electricity for an existing geo thermal heating system

Why choose VAWT?

- Silent and Compact.
Types of VAWT

- Fixed Blade Units are known as Vertical Axis Wind Turbine and Variable Pitch Units are known as Cyclo-turbines
- *Savonius*
  - Drag Type
  - RPM will NOT Exceed Wind Speed
  - Not suitable for electricity Generation
- *Darrius*
  - Lift type like an aeroplane wing / Helicopter blade
  - RPM can Exceed Wind Speed
  - Suitable for Electricity generation

**KNOWN PROBLEMs WITH VAWT**

- Starting
- Efficiency
- Control
- Reliability
- Flexibility
- Safety
- Narrow operating conditions
Innovation Gap

• There is no current design that directly addresses the failures of the Fixed Pitch VAWT that includes fully mechanical integrated Governor.

What are these key weaknesses of current designs?

• Unable to start in low wind Conditions.
• Operate in High Wind conditions.
• Control for Constant RPM.
• Regulate the RPM.
• It’s also has adjustable RPM and Torque for Various Applications.
What can we resolve with the Vertogen design?

We can resolve all the issues highlighted in last slide!

How?

• Although many efforts have improved the VAWT by New Materials, Blade Design and some minor design changes NONE have addressed all of the above.

• The key is to develop a Pitch system that takes full advantage of aerodynamic lift and drag properties coupled to an Integrated Governor.

• Create a mechanism that creates lift from Multiple Blades and reduce drag from the remaining ones in the acceleration mode and to reduce RPM create drag from multiple blades.

• Integrated with our Governor the VAWT operates Autonomously. The VAWT is fully mechanical and needs no external electric or mechanical devices. Keeping the unit Simple to install and safe in operation.
Starting

• Our Variable pitch allows easier starting at low wind speeds.

Efficiency

• Because our VAWT produces energy when other turbines most are stationary due to LOW or HIGH wind condition and it produces more torque. Most Designs normally get lift from one blade and drag from other blades. Our design takes lift from multiple blades and minimises drag from the none performing blades. When the operating RPM has been reached all blades have minimal movement. The governor constantly monitors the RPM and will apply the changes, positive or negative pitch when the VAWT is operating outside its predetermined RPM.

Control

• The VAWT can be tuned to operate within a chosen operation environment
• When to start, operate at a pre-determined RPM, Reduce RPM Automatically.
Reliability
• Pitching the Blades correctly at the appropriate position within the Rotation Cycle and limiting RPM reduce stress and vibration through all components. 5 Blades also reduce pulsing like 2,3 or 4 bladed Units. The Generator will output a more stable Voltage to the Charge Controller.

Flexibility
• Pitch and RPM Control can be adjusted to allows the Turbine produce more torque. Operating RPM can be adjusted to work with different devices like Permanent Magnet Generators (Electric Generation) and Mechanical devices like Pumps, machinery, compressors etc.

Safety
• High Wind Conditions. The Integrated Governor will control the RPM. As the RPM exceeds the operating chosen limits. Using the Advantages of the lift technology to increase RPM we reverse the pitch mechanism which deaccelerates the VAWT.

Narrow operating conditions
• Our VAWT can operate in Low and High Wind Conditions. I.E operate when others at Stationary.
Use the Completed Centre Core and append arms and blades. This will be connected to an On or Off Grid Solution which will be a completed into a working prototype, it will also include Solar Energy.

The completed Unit will connect directly to the household consumer unit where the homeowner / business can use the energy generated. It will work seamlessly and connect to the Grid to export excess electricity. All components have been sourced and design is completed.

We are looking for Companies that want a Long-Term Business Relationship, have the will to continue development and want to make a difference. Funding will be required; Related business field would help and have International experience in business.

Sales can be generated globally through licencing the design, Patent is being submitted through the express channel for Green Energy.

Other Sales could be direct or through a Dealer network. We would assemble the Units and most components with be manufactured through our existing suppliers, our expertise in the unique design will be sustained as a continual product is developed.
There is no product currently in the Market place that includes these features.

The Turbine can operate in Urban turbulent conditions and normal open environments.

It has low noise emission, more compact and its appearance less intrusive.

The design is scalable and would function in a wind farm type environment using much less space as its Footprint is smaller and they can operate closer together than Normal HAWT.
Exploitation Route

- Can fulfil a wide market with designs from Micro Medium and Large. Initial sales would be Micro to Small and then larger Units for Wind Farms. First sales would be Rural, Communities, Small Commercial business, Emergency situations, Charging Stations. Licensing IP Sales would be Global and could be very effective way in promoting design and profit.
THANK YOU FROM OUR TEAM

For your interest

We really appreciate it!