

OVERVIEW OF A  
CONCEPTUAL IDEA

ON

**HORIZONTAL AXIS  
SAVONIUS  
WIND TURBINES**

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# INTRODUCTION

HORIZONTAL AXIS



VERTICAL AXIS



# HORIZONTAL AXIS WIND TURBINES

Many developments have taken place since its inception and today we have an ultra modern design to exploit the wind energy.

The three rotor design that we see today is :

- Most widely Used
- Most Efficient
- The Only turbine that comes in our minds when we hear the word “Wind Turbine”

The biggest horizontal axis turbine installed is of 8MW – named **Vestas V164**



Length of a Blade can be considered equivalent to 9 buses parked in series.

The rotor diameter for this is about 164 meters (Even larger than a cricket ground)

The Height of installation is about 220 meters (Even longer than 2 football grounds)

# WHY SUCH A BIG TURBINE?

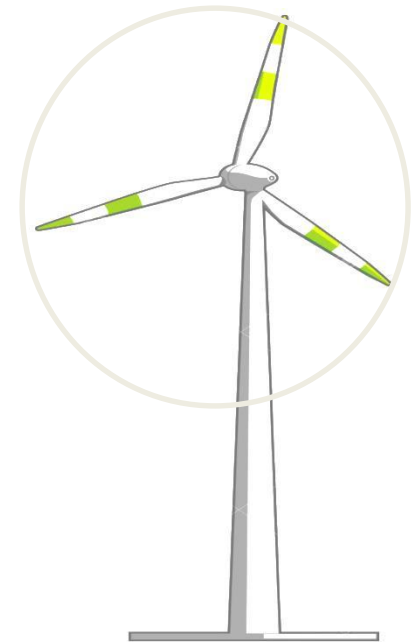
- 1) Larger turbine means higher torque and hence, higher electrical output.
- 2) Bigger the rotor diameter, then larger the swept area, i.e. more utilization of available wind.
- 3) It is always better to keep one **1 MW** generator than ten different **100 KW** generators, considering the cost of installation, maintenance etc.

Even after employing large wind turbines we can not utilize the complete block of wind that flows through a particular area.

We can only make use of the wind flowing through the area swept by the rotor.

Rest of the wind is generally wasted, or some other turbine is installed to make use of it.

Therefore summing up, it is not that easy to exploit the wind energy if horizontal axis wind turbines are employed.

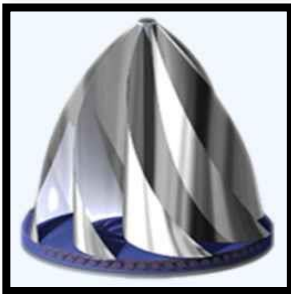


# VERTICAL AXIS WIND TURBINES

These turbines are on its development stage.

The only difference is, in VAWT, the rotor blades are manipulated in such a way that rotary motion can be developed by the wind passing through it.

The designers and innovators are making new conceptual and feasible designs that are worth a watch.

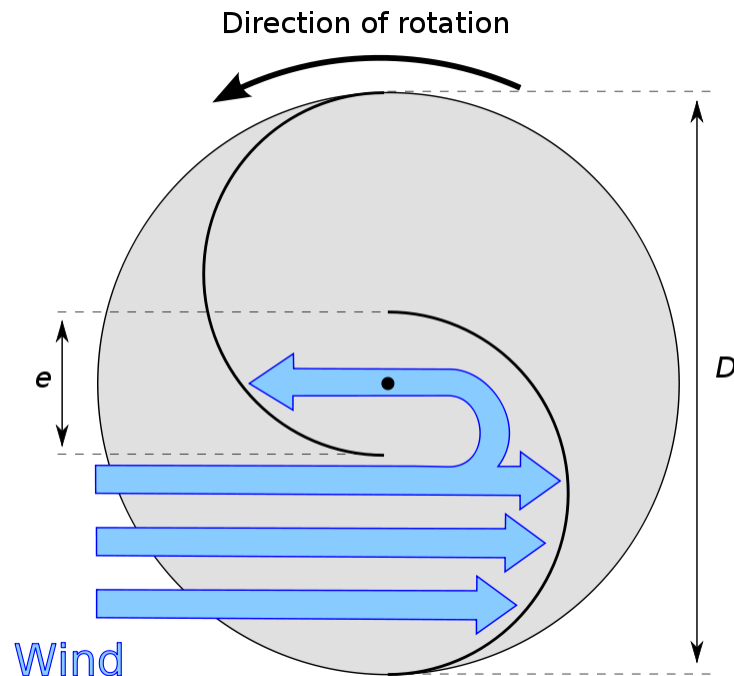
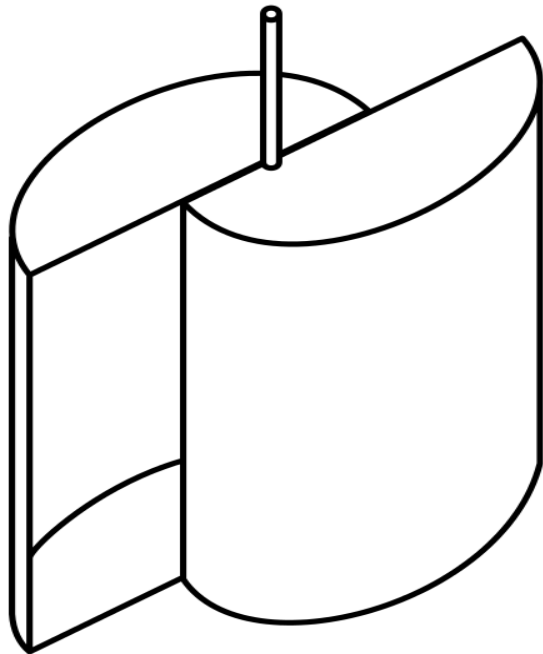


# SAVONIUS WIND TURBINE

A very basic fundamental type of structure that can work as a wind turbine is a Savonius wind turbine.

Its construction is very simple and so is the working principle.

When and why it was made is not important, let us understand its design.



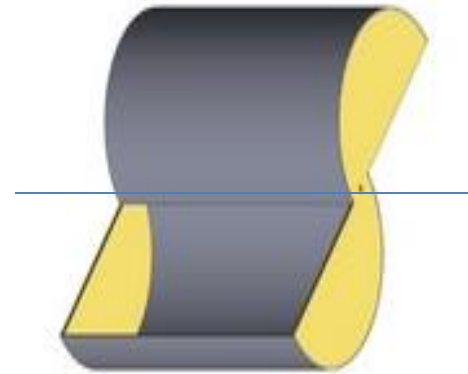
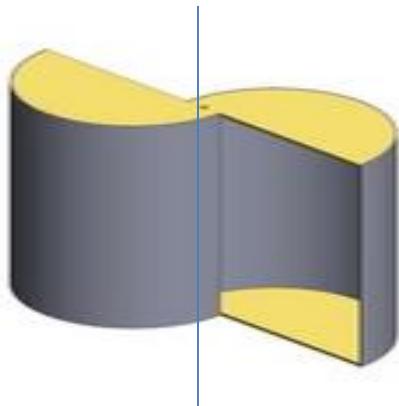
# LET US EXPERIMENT IT ON HORIZONTAL AXIS

All these turbines have been used in different designs with different configurations, but they are always used in vertical axis.

May be because of the literal classification that lies in its name itself.

But what if these VAWT turbines are made to run in a horizontal axis ?

Suppose for example, the device in my hand. The working principle shall remain the same



There are no changes in the principle of operation, but if we think broadly, we get a benefit of connecting multiple such units on a single shaft.

# A LITTLE CHANGE

For Multi rotor connections on single shaft, the rotor blades proposed, shall be like this.

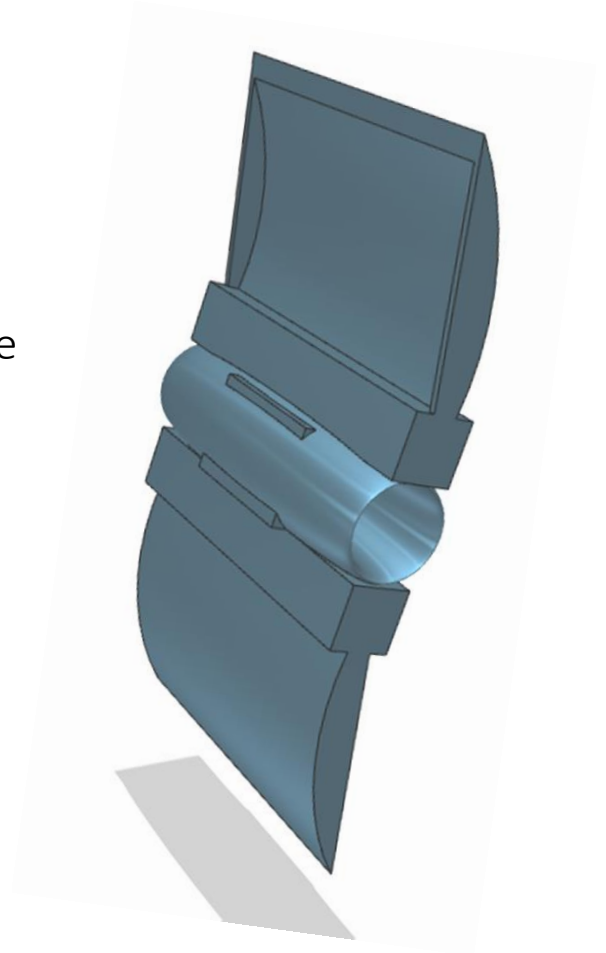
The blades shall be given a suitable curve, two such blades mounted on each others ends in opposite directions, just like the Savonius turbines.

The working for this type of blade shall be similar to that of the contemporary Savonius wind turbines, the only difference shall be the axis.

Here, it shall be mounted on a horizontal axis.

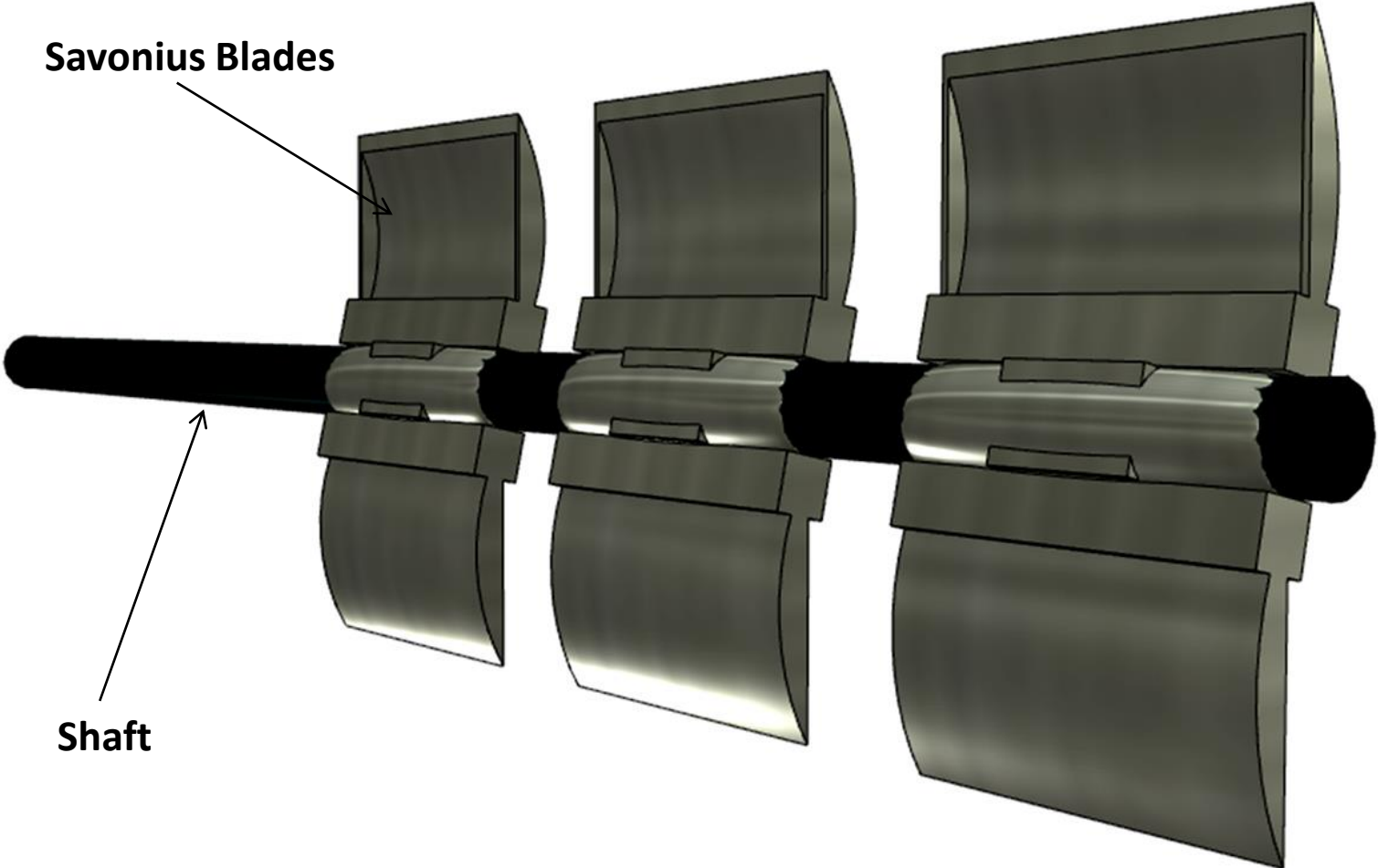
Further more, a shaft shall be taken considering multiple blades of such construction and together they shall provide necessary rotary motion to the shaft.

Ref. Next Figure





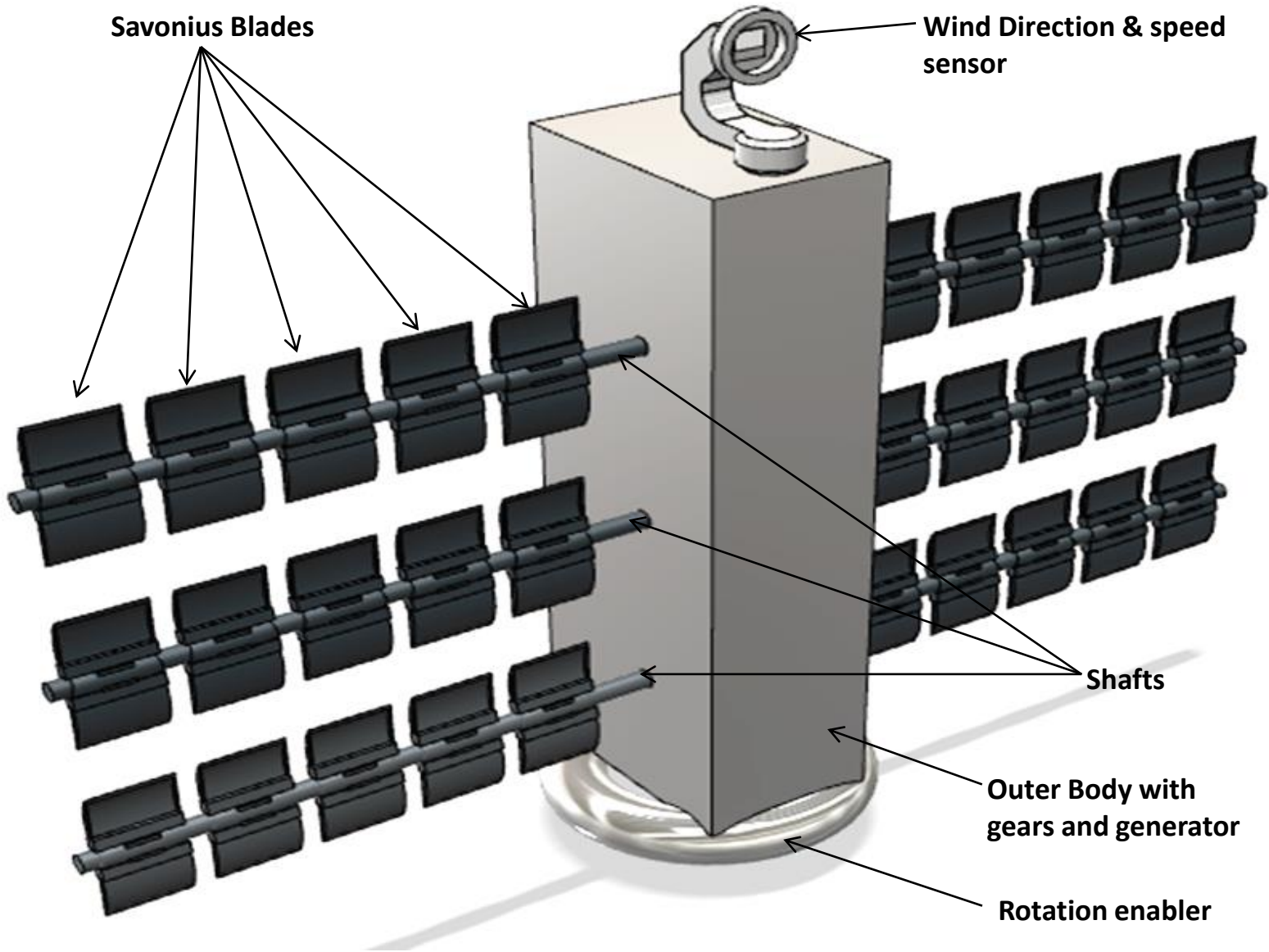
# MULTIPLE ROTOR BLADES ON SINGLE SHAFT



Savonius Blades

Shaft

# A COMPLETE UNIT



# ADVANTAGES

Yes, Any development idea shall remain incomplete without the mention of the benefits.

- 1) More amount of wind can be utilized.
- 2) The Generator set shall be structured on the floor level, and so maintaining shall become quite easy.
- 3) Quite easy to replace the blades incase of breakage.
- 4) Even gravitation force may act on the horizontal axis rotors and we may get more eased motion.
- 5) The construction is quite simple, than the aerodynamic blades or air foils that are used in Dutch wind turbines.

# FUTURE VISION

I understand the design proposed by me is in a very raw stage I need to make actual working calculations.

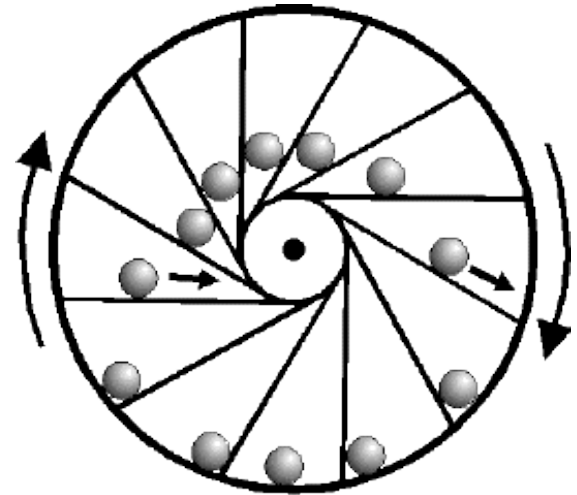
Only research is not enough, I need to find its implications if employed practically.

But keeping the design as it is shall never be an option.

The foresight for the design shall turn out something more complicated yet very simple.

The aim shall be to make a machine which employs the working of an ideal perpetual wheel, and shall sense the need of power by simple mechanism.

A future of designer shafts, aerodynamically perfect blades and perpetually confined wheels attached shall make the design of a wind mill complete (which in fact would take a long time).



THANK

You!