

VERTICAL AXIS WIND TURBINE

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ABSTRACT

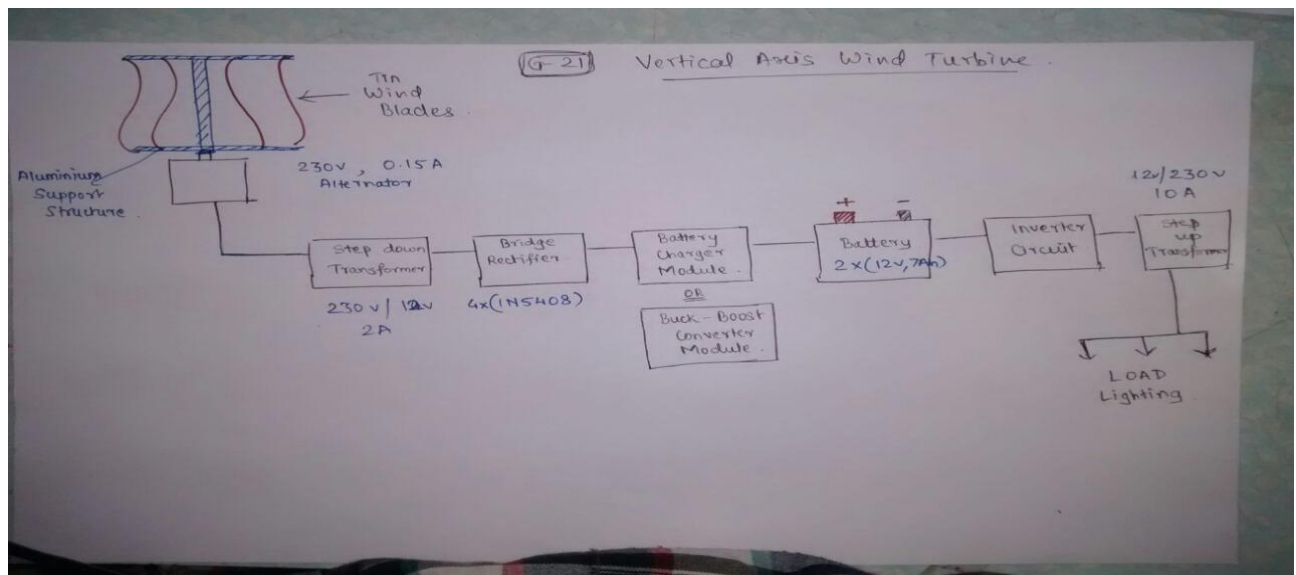
The vertical axis wind turbine is the type of wind turbine. by using the wind turbine the wind energy is converted into electrical energy instead of using horizontal turbine we use the vertical axis wind turbine to overcome the problem like big support structure, birds obstruction more area etc. we generate the wattage to 150 watt.

I. INTRODUCTION

As we know that the horizontal axis wind turbine is more popular. But there is several problems of a HAWT. this problems are overcome by using vertical axis wind turbine. The cost of install is less, required less support structure, also require less space. as we use the savonius type wind turbine.

The savonius wind turbine were invented by finnish Enginner sigurd j. savonius in 1922, but johann erust elias bessler was the first to attempt to build a horizontal windmill of savonius type in the town of furstenburg in Germany in 1745. The savonius type wind turbine is used for household purpose. In pumping water or in grinding grain. Its best qualities are the simplicity, the very low noise production.

Block diagram of vertical axis wind turbine



The vertical axis wind turbine consist of following types:

1. Step down transformer: the step down transformer is used to down the voltage from 230v to 12 v.
2. Bridge rectifier: the IN5408 bridge rectifier is used to convert ac voltage into dc voltage.
3. Buck-boost converter module: the buck boost converter is used to boost the current or voltage or to buck the current and voltage.

4. Battery: the 12v, 7A battery is used in it. The two batteries of 12v, 7A is used in this project.
5. Inverter: the inverter is used to convert dc voltage into ac voltage.
6. Step up transformer: it is used to step up the voltage, and then given to load.

II. IDENTATIONS AND EQUATION

In vertical axis wind turbine the 230v step down transformer used to down the voltage to 12vAC

Then it is rectified to 12 volt dc. By using buck boost converter 12 volt battery is charged .the time required to charge the battery is 2 hours.

$$2(t)*(12(v)*7(A))=168 \text{ watt}$$

By calculating we get the output of 168 watt or due to losses we get 150 watt.

Where,

T=time required to charge the battery

V=voltage

I=current

Then voltage is given to inverter it convert 12v into 230v ac. And then given to load

The equipment and material used for the vertical axis wind turbine

| M a t e r i a l | s p e c i f i c a t i o n |
|-------------------------------------|-----------------------------------|
| G e n e r a t o r | 2 3 0 v 0 . 1 5 A |
| T r a n s f o r m e r | S t e p d o w n 2 3 0 v t o 1 2 v |
| R e c t i f i e r | I N 5 4 0 8 |
| B u c k b o o s t c o n v e r t e r | - |
| B a t t e r y | 1 2 v , 7 a m p (2) |
| I n v e r t e r | - |
| L o a d | 1 6 0 w a t t |
| B l a d e s | 3 f e e t |

III. CONCLUSION

Wind turbines are going to be in high demand as the switch to renewable energy is in progress. The blades made out of composite materials have greatly reduced the weight of the entire assembly. The composite blades also allow the structure of the support be manufactured out of lighter, and more cost effective materials.

REFERENCE

- [1] M. Islam, D. S. K. Ting, and A.Fartaj, "Aerodynamic models for Darrieus-type straight-bladed vertical axis wind turbines," *Renewable and Sustainable Energy Reviews*, vol12, no4pp.1087–1109, 2008.
- [2] Renewable energy sources