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Energy Generation Using Maglev Wind Turbine

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Abstract -*This paper describes the implementation of maglev windmill for the purpose of power generation. A vertical axis wind turbine with the use of magnetic levitation technology for optimal performance of wind turbine has been discussed. Magnetic levitation may be a methodology by that an object is suspended while not support other than magnetic field. The advantages of maglev windmill starting at low wind speed, increase efficiency, reduce noise over the conventional VAMT. The major drawback of conventional wind turbine is loss energy during rotation. By using the magnetic levitation as a perfect replacement for ball bearing reducing energy losses while rotation. Maglev wind turbines are able to rotate at low speed as well as high speed.*

Keywords- ***Magnetic Levitation, Wind Turbine, Power Generation, Blade design.***

I. INTRODUCTION

Energy is important for development of human civilization. As conventional energy exhausts the development of clean and renewable energy such as wind and solar become ever important to peoples live. The wind generation power has been harnessed by mankind for long time and the associated technology is more advanced than different clean energies. This new model of wind turbine uses magnetic levitation to reduce the internal friction of the rotor which is consider as revaluation in the field of wine technology, producing 20% more energy than conventional turbine at the same time decreases operational cost by 80% over traditional wind turbine .Many studies have been done on maglev wind turbine to generate electricity. Its main advantage is that it uses frictionless bearing and a magnetic levitation design and it does not need vast space. It also required little maintenances if needed. Using the effect of magnetic repulsion wind turbine blades will be fitted on a road for stability during rotation and suspended on magnet. After implementing whole setup, voltage at different wind speed in controlled by controller and utilized for working of load. By mankind for long time and the associated technology is more advanced than different clean energies. This paper focuses on the utilization of wind energy as a renewable source. The aim of this major qualifying project is to design and implement a magnetically levitated vertical axis wind turbine system that has ability to operate in both high and low speed condition.

Table 1- Worldwide Annual Electricity Generation From Wind

Country	**Installed Capacity(MW)**	**% Share of Total Wind Power**
Germany	44,947	10.4%
India	25,088	5.8%
USA	74,471	17.2%
China	145,362	33.6%
Spain	23025	5.37%
United Kingdom	13603	3.1%
Canada	11205	2.6%

II- TYPES OF WINDMILL

There are basically two types of windmill available for use which is horizontal wind turbine and vertical wind turbine. The horizontal wind turbine consists of two of three blades and work only from one direction but in vertical axial wind turbine, the wind power from any direction is utilized for electricity generation.

Horizontal Axis Wind Turbine -

In horizontal axis wind turbine all components are mounted on top of a tall tower the shaft is horizontal to ground and the blades of horizontal wind turbine face into the wind tall tower allows to strong wind in site.

Vertical Axis Wind Turbine-

In vertical axis wind turbine all components are closed to ground. There are two types lift based and drag based design. Vertical axis wind turbine are easy to maintain. It is most effective at hilltops ridgelines.

III. Major components of Maglev Vertical Axis Wind Turbine

A .Rotor

It is rotating part that rotates in line with wind speed. The rotor horizontal disk place upward and downward is in between that blades area unit placed. The rotor is supported by rod at center of assembly inside of rotor disk neodymium magnets are attached blades are in prototype are not of conventional type.

B .Magnet Placement

Neodymium magnets are arranged at middle on wooden disc of shaft by which necessary suspension between stationary and rotating part is obtain. Magnet having length 3cm and height 0.5 cm and thickness 1cm are placed as one north pole and one south pole one after the other. This provide necessary magnetic levitation for power generation

Fig – Magnet Arrangement.

C .Blade

The blade is formed of metal sheet and desired form was obtained because of the versatile nature of the metal sheet. Aluminum is a metal like steel and it's a very light-weighed because of this rotation makes freely. It provides chemical compound coating to shield from corrosion. Heights of the blade were 380mm.

D .Generator

The basic understanding of a generator is that it converts mechanical energy into electrical energy. Permanent magnet direct current (DC) machine can used as a motor or DC wind turbine generator. The PMDC generator consists of permanent magnets. It used where small power ratings are required. PMDC generator is more efficient ad compare to other as they no need of electric supply for field excitation

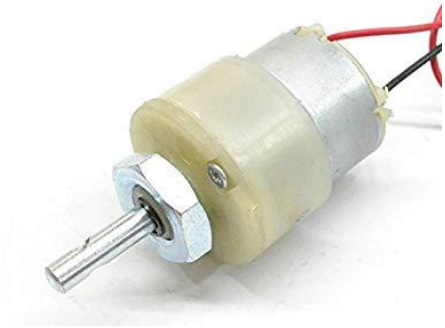

Fig- Generator.

E .Neodymium magnet

NdFe-B is the most recent addition to this commercial list of materials and at room temperature exhibits the highest properties of all the magnetic materials.NdFe-B has very attractive magnetic characteristic, which offer high flux density operation and the ability to resist demagnetization.TheNdFe-B ring shaped permanent magnets that are nickel plated to strengthen and protect the magnet itself.

III -SYSTEM DIAGRAM

When air strike the blades of the turbine kinetic energy of air get converted into mechanical energy Due to action of repulsive force of magnet the rotation of the turbine shaft increases .Blade give frictionless performance due to repulsive force of magnet mounted on disc of the shaft. Shaft is connected to the generator and produce electricity. Generator can convert this mechanical power into

electricity.

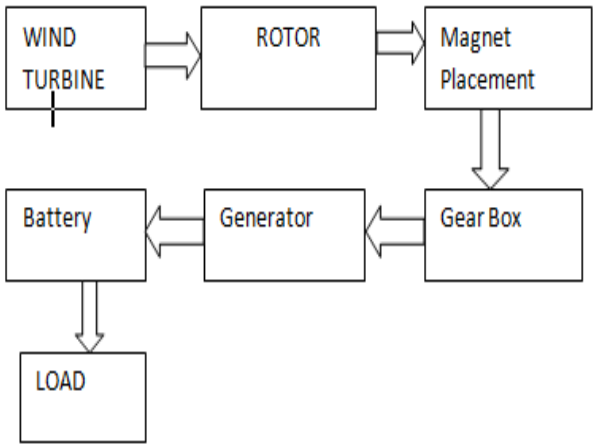

Fig- Block Diagram.

IV - BASIC PRINCIPAL OF MAGNET

Basic properties of magnet are of three types

1. Attractive property.
2. Repulsive property.
3. Directive property

Attraction is that the basic property of magnet. In repulsion like pole attracts one another and produces attractive force .Neodymium magnets are the strongest type of permanent magnet. Neodymium magnet is also known as NdFeB, NIB or modern neo magnet. Magnetic levitation is a phenomenon operates on repulsive characteristics of magnet. Magnetic levitation is a technology which an object is suspended with no support other than magnetic field. It produces strongest magnetic force.

V - CONCLUSION

The concept of utilizing the magnetic levitation in wind technology introduce during this paper. The VAWT increase the efficiency and reduces the vibration. The construction of vertical axis wind turbine using magnetic levitation successfully worked. Comparing with traditional horizontal wind turbines, single Maglev turbine having large capacity to gives more output. The turbine efficiency is improved by utilization of magnets helping to spin with fast speed with negligible friction as it cancels out the stress on the shaft of the turbine. This modern design of turbine gives more power output with higher efficiency compared to conventional wind turbine. For avoiding the vibration of the rotor, shaft was used. The standard windmills having set of 1000 windmills powers 5 lakh homes while single maglev wind turbine is capable supplying power to 7.5 lakh homes. The area required for single maglev windmill is less than 100 acres. For field of 1000 windmills require more than 64,000 acres. From this observation we can say that a single maglev wind turbine is economical compared to Conventional wind turbine.

REFERENCE

[1] *Aravind CV, Rajparthiban R, RajprasadR,Wongyv ," A Novel Magnetic Levitation Assisted Vertical Axis Wind Turbine," Institution of Electronics And Electrical Engineers (IEEE) 978-1-4673-0961 2012 IEEE.*

[2] *Minu John ,Rohit John , Syamily P.S , Vyshak P.A ,"Maglev Windmill," International Journal of Research in Engineering and Technology (IJRET),Volume:03 Issue:05/ May-2014.*

[3] *Harshal Vaidya, Pooja Chandodkar , Bobby Khobragade , R.K.Kharat ," Power Generation Using Maglev Windmill," International Journal of Research in Engineering and Technology (IJRET),Volume:05 Issue:06/ JUN-2016.*

[4] *Chinnu Sara Thomas, Dhanya Varghese, Jayaiakshmi S, SonuSavy,Thomas George, Rini Varghese ," Magnetically Levitated Wind Turbine for Power Generation", International Journal of Advanced Research in Electircal ,Electronics and Instrumentation Engineering,ISSN:2320-3765, Vol.5, Special issue3,March 2016.*

[5] *Amit D Patil, Amit W Chake, Manoj J Helonde, Pravin M Gupta, "Vertical Wind Turbine With Technology" International journal for scientific research and development VOL-2, ISSUE-12,2015.*

[6] *Mayur Patel, Aditya Thakur, Angad SingthThukral, Rahul Yadav , Prof .Vijay Patil, ,"Design , Analysis And Fabrication of Maglev Vertical Axis Wind Turbine", International Journal Of Innovative Research in Science, Engineering And Technology Volume:7,Issue:4 / April 2018.*

[7] *Pravesh k. Sahare, Tanveer A.Hussain, Sangita N.Kakde, Sugata R. Ingle, Ambikaprasad O. Chaubey, " Review Pper on vertical Axis Maglev Wind Turbine", International Journal of Research In Mechanical Engineering And Technology (IJRMET) Volume:06,Issue :1, Nov 2015-April 2016.*

[8] *Arvind CV , Kamalinni, Tay SC, Jagadeeswaran A, RN Firdaus, " Design Analysis of MAGLEV-VMAT With Modified Circuit Generator", Institution of Electronics And Electrical Engineers (IEEE) 978-1-4789-3799 2014 IEEE.*

[9] *Vishal D. Dhareppagol, Maheshwari M Konagutti, "Regenerdyne maglev wind power generation", International journal of Electrical Electronics And Data Communication, ISSN :2320-2084*

[10] *Dinesh N Nagarkar, And Dr. Z.J. Khan ,"Wind Power Plant Using Magnetic wind turbine", International journal of Engineering and innovative technology (IJEIT) VOL-3, ISSUE-1, July 2013.*