"Power Generation Using Neodymium Magnets"

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1. ABSTRACT

Now a day's electricity is most important to lead the life, day by day the demand for power generation is increasing. Power can be generated using conventional and non-conventional energy resources, such as hydro, wind, geothermal, nuclear, diesel, coal &solar, etc. But by using these sources we are not able to meet our daily demand with available generation. We are also able to generate the power using magnets; permanent magnets are most commonly used for power generation. There are typically four categories of permanent magnets: neodymium iron boron (NdFeB), samarium cobalt (SmCo), alnico, and ceramic or ferrite magnets. The selection of magnets for power generation is major task. It is important to select appropriate magnet for power generation. Neodymium magnet is the most widely used type of rare earth magnet; they are strongest type of permanent magnets when compared with other types of magnets. Comparing with power generation using conventional source, these sources depend on climatic conditions, such as solar power is available only in day time only for 6 to 8 hrs. But the neodymium power decrease 1% each decade, by using this we can generate power 24hrs for 365 days without any fault. The rotor and stator are designed by using 3d printer; by this core loss can be fully minimized and weight also reduces. Bifilar windings are used which has capable of producing high magnetic field. By using this type of technology the power generation is easy. The life span depends on the magnet strength. The expected power generation is about 1kw.

2. INTRODUCTION

In modern world, energy is needed for almost everything. It's almost impossible to imagine life without electric lights, television, cell phones and laptop etc. Energy is consumed by almost every device that makes our life easier and more comfortable. The cost of power generation is more; there are so many technologies for generating energy. The nonconventional sources are available at free of cost, population-free and inexhaustible. Today we primarily use fossil fuels to power our homes. It's convenient to use coal, oil, natural gas for meeting our energy needs. We're using them rapidly. Eventually, they will run out. The concept of generating magnetic field from permanent, magnet became practical only after introducing "**Neodymium Magnets**" which are much powerful than previously used Ferrite magnets. The main advantage is that it does not require continuous electric supply. Neodymium magnets only lose 1% of their power in 10 years. These magnetic energy devices provide pollution free energy and they will not deplete our natural resources.

The stator and rotor are designed by using 3d printer, by this the size, weight and loses can be minimized.

A bifilar coil is an electromagnetic coil that contains two closely spaced parallel windings and a series connection counter coil. In order to properly increase the coil power, its turns are wound in such a way to provide the greatest potential difference between adjacent turns or spirals. The energy stored in the coil is proportional to the square of the potential difference between adjacent turns. Due to the special material of the coil's core (transformer steel), capacity for a set value of the potential difference between turns has been significantly enhanced.

A neodymium magnet is the strongest type of permanent magnet commercially available today. Crystal structure of the neodymium magnet is composed of microcrystalline grains that are aligned in a powerful magnetic field during manufacture so their magnetic axes all point in the same direction. The crystal lattice of the magnet resists to turning its direction of magnetization which makes this compound highly coercive to demagnetize.

3. BLOCK DIAGRAM

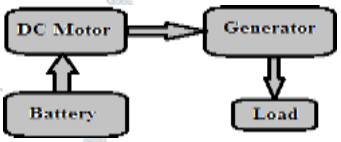

Fig 3.1 Block Diagram of
Power Generation Using Neodymium Magnets

It consists of a battery, dc motor, generator, and a load. 12volt battery is used to power the dc motor and the dc motor. DC Motor used is 12volts dc motor, which is coupled to the generator through pneumatic coupler, the dc is motor is powered by a 12volts battery which kick the generator to some rated speed. Once the generator starts to generator power it is supplied to the load through inverter/converter, sometime power is directly supplied to the load. In some cases when the generator reaches its rated speed we can remove the battery supply and directly connect it to the generator through some voltage regulator.

Working Principle: The generator is powered by permanent magnets and coils of copper wire using the Lorentz force. When a magnet approaches a coil of copper wire, it induces a like polarity in the coil (north induces north and north repels north). This repulsive force causes the generator rotor to spin and create electricity. For Example: A magnets North Pole will induce a North polarity in the coil and north repels north and that creates the motive force for the generator. This is known as the Lorentz Force.

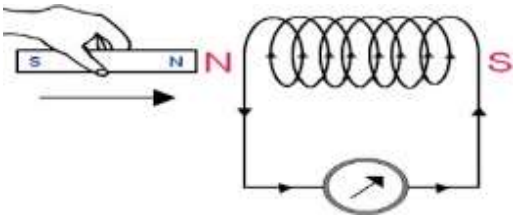

Fig 3.2 Working principle

4. RESULTS & DISCUSSIONS

The experiment was carried out to test the performance of magnetic generator system, here the Neodymium magnets are used because of small in size and powerful in nature.

The magnetic motor which uses electromagnetic shielding to achieve continues rotation .The device can able to generate a power up-to 1KW,This connected directly to grid , by connecting them in parallel/series.

5. CONCLUSION

Off-grid power generation is an effective solution to curtailing business downtime that unreliable power grid has introduced. Free energy generator offers great advantages of cost-effectiveness and availability for the underserved population of India to meet their energy needs.

6. REFERENCES

1. Sustainable Energy for All Initiatives.
2. International Energy Agency, “Africa Energy Outlook”, 2014. Available at: United Nations, “Sustainable Development Goal 7”.
3. S. O. Oyedepo, “Towards achieving energy for sustainable development in Nigeria”, Renewable and Sustainable Energy Reviews, Volume 34, June 2014.
4. S. O. Oyedepo, “On energy for sustainable development in Nigeria”, Renewable and Sustainable Energy Reviews, Volume 16, Issue 5, June 2012.
5. V. O. Matthews, A. A. Atayero, and S. I. Popoola, "Development of a Solar Photovoltaic Vulcanizing Machine towards Extreme Poverty Eradication in Africa," Lecture Notes in Engineering and Computer Science: Proceedings of The World Congress on Engineering and Computer Science 2016, 19-21 October, 2016, San Francisco, USA.
6. M. E. Emtere and M. L. Akinyemi, “Weather Effect on Photovoltaic Module Adaptation in Coastal Areas”, International Journal of Renewable Energy Resources 5 (3), 2015.
7. E. Elizalde and A. Romeo, “Essentials of the Casimir Effects and its Computation”, American Journal of Physics, 59, 1991.
8. G. Plunien, B. Muller, and W. Greiner, “The Casimir Efect”, Phys. Rep. 134, 1986.
9. M. E. Emetere, U. Okoro, B. Etete, G. Okunbor, “Free Energy Option and its Relevance to Improve Domestic Energy Demands in Southern Nigeria”, Energy Reports 2 (2016).
10. "Charge Controllers for Stand-Alone Systems" (Web page), part of A Consumer's Guide to Energy Efficiency and Renewable Energy, U.S. Department of Energy. Retrieved on 2007-08-20.