Producing Renewable Energy in an Alternate Way

Saptarshi Neogi[1],Sayantan Pal[1] and Kakoli Dutta[1]*

[1]Institute of Engineering & Management, Salt Lake, Sector V, Kolkata-91, India

Email: saptarshineogi123@gmail.com

Abstract

In the present work we have discussed and highlighted a special kind of eco-friendly turbine which will produce energy and at the same time will have no negative impact on nature. A turbine is a machine that transforms rotational energy from a fluid that is picked up by the rotor system into usable energy. But in case of water it requires high water current as well as an artificial dam or a reservoir so that it can work efficiently which have large scale impact on nature. We have shown a new turbine system which requires none of this. Moreover it can be readily installed in slightly inclined areas beside any canal, drainage system or a river.

Similarly like the hydro-turbine the wind turbines are also had to be installed in empty areas such as sea-shores or mountain tops. But if we can install a turbine in the upper atmosphere then it will work more efficiently due to higher air current. If this turbine is installed with the help of hydrogen or helium system in upper atmosphere it can be operated according to our will.

Keywords: *Turbine without any dam; Wind mill without any perfect geographical conditions.*

1. Introduction

Human Population is increasing day by day. In such a condition scarcity of food and energy is rising by leaps and bound. Every country in the world is facing the impact of this scarcity of energy. The way Humans are producing energy from earth resources is not a good idea. The Natural resources are not going to last long. We have to find an alternative source of energy which is cheap and efficient and will not depend on the earthly resources for their generation. At the present stage the world needs more energy day by day which should be clean and pollution free. In this world of crisis humans are getting leaned towards nuclear energy which if used in a wrong way may lead to unbelievable disasters. So we have to figure out other forms of energy. We have to gather energy from the stuffs which are plenty in nature such as the wind power, solar power and like that. Designing of low cost alternatives to fossil fuels is a much needed requirement in the present world. Traditional renewable energy methods are costly and also not that efficient. So we are trying to introduce some sort of plans which could collect energy using the traditional way but in a different approach. In the present topic we are demonstrating two ideas, one related to hydro power and the other being wind. The model on hydro power gathers energy from the turbulence of the water, whereas the model on wind power gathers energy from the higher altitude wind.

2. Methodology

This special turbine is based on the vortex of water. It can be placed beside a river or a canal with a difference of certain height (1.5-3.5 m) and with a flow greater than $1m^3/s$ for at least 9 months in the year. The construction of the whole system is so easy and time efficient at the same time. It requires only few civil works. First a space for the basin is excavated next to the water. Then prefabricated parts are installed. After that the turbine is placed at the lower core of the basin. When water enters into the basin it creates a natural vortex or whirlpool. For this vortex the blades rotate and energy is generated. The low pressure in the vortex does not harm fishes. The turbine is the only rotating part which results in low cost of maintenance. Up to 55% of efficiency can be achieved by this system. This decentralized power plant can supply up to 60 houses. Usually the basin is made up of reinforced concrete. The turbine is slow turning one with huge spacing between the blades. The turbine is also designed to be debris tolerant.

For usual hydro power plants, dams are required. But there is a high risk of flood in the rainy season. For TURBULENT HYDRO dam is not required. Secondly, it can be installed not only on hills but also in the plains where there is a specific height difference. It takes less space and high efficiency. At the same time it is also fish friendly. The turbine can produce 15 KW for 24/7. So the cost per KW is reduced.

The next model we are using is kind of a airborne wind turbine. This model is based on the principles of a typical wind turbine. Wind turbines are needed to be working in sea shores or some particular places where the wind power is massive. But this is a device which is air borne. The air current in the upper atmosphere is much greater than that on the surface of the earth. Our main objective is to capture that power. We can employ a wind turbine in the upper atmosphere with the help of some helium system. Upper air current is very powerful and flow nearly all round the earth with fierce velocity. So this system can be installed in any part of the earth.

A similar effort was first made by Altaeros which was founded by Ben Glass '08, SM '10 and Adam Rein MBA '10.[ref.]. They manufactured world's first airborne turbine commercially in which they used shells filled with helium gas which is capable of flying at the altitude of a skyscraper.

FIG 1. Air Turbine

FIG 2. Gravitational Vortex

3. Conclusion

If we can successfully install such devices in our world then we will surely be able to eradicate energy crisis from the earth. Imagine that day when there will be no pollution and clean energy will be produced on every part of the earth. From that day we will certainly enter the future of human civilization. Besides

these take small areas for installation as well as reduce the additional expenses. For that hydro turbine we don't have to build a water reservoir or a dam. Similarly for the wind turbine making of a wind mill is not necessary. There are certain limitations regarding these models also. The expansion of the hydro turbine is not possible and during the summer months the flow is less and the efficiency is very low. Besides high manufacturing price the wind turbines will not be able to withstand extreme weather conditions. If the supporting cables are broken by some reason the maintenance will be tougher. Summing all it can be said that these models are a great source of efficient clean energy. The future prospects are quite high for these models.

4. Acknowledgements

The authors would like to express their gratitude to the respected teacher-in-charge for her guidance and support in due course of the work. In addition the authors would also like to express sincere thanks to Institute of Engineering & Management for giving us this opportunity.

REFERENCES

[1] Tarang Agarwal. 2012. Review of Pump as Turbine (PAT) for Micro-Hydropower. International Journal of Emerging Technology and Advanced Engineering. 2(11): November–163.

[2] Cherubini A. Kite dynamics and wind energy harvesting [M.Sc. thesis]. Politecnicodi Milano; 2012.

[3] M. Zanon, S. Gros, J. Andersson, M. DiehlAirborne wind energy based on dual airfoils IEEE Trans Control Syst Technol, 21 (4) (2013)

[4] Diehl M, Horn G, Zanon M. Multiple wing systems – an alternative to upscaling?. Abstract submitted to the airborne wind energy conference. TU Delft; 2015.

[5] Brandt D, Busch M, Bormann A, Ranneberg M. Adapting wind resource estimation for airborne wind energy converters. Abstract submitted to the airborne wind energy conference. TU Delft; 2015.

[6] Schneiderheinze T, Heinze T, Michael M. High performance ropes and drums in airborne wind energy systems. Abstract submitted to the airborne wind energy conference. TU Delft; 2015.