Under Water Turbine with Strobe Light Protection

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Abstract- *The generation of renewable energy is a source to tackle the demand of fossil fuels and continuing global warming. Here tidal energy is used to generate electricity in an innovative way. The design of wind mill setup is being used as an alternative way into the sea where the force of water is used to rotate the tetra rotor thereby generating electricity. A caution setup is also made in the turbine blades to balance the water ecosystem by introducing graphene. Thus, it paves way for new technology to replace the present science.*

Keywords- Graphene, Induction Generator, Marine current turbine, Mini Strobe light, Tidal energy.

I. INTRODUCTION

The demand of energy is increasing day by day. One of the alternative ways to overcome the energy demand is the renewable energy. In particular, Tidal and wind energy are two good renewable energies that they individually produce electricity to a greater extent. In this research paper, there is a combined usage of both tidal and wind energy [1]. Here, the major source of energy generator is the tidal energy and the tetra rotor technology with two blades on each rotor which is similar to wind mill blades is installed into the seawater. The mini strobe light [2] is attached to the graphene blade to conserve the aqua ecosystem. The combined effect drastically increases the power production and will overcome the present demands of non-renewable energy.

II. EXPERIMENTAL METHOD AND DISCUSSION

Tidal energy is one of the important energy sources in the earth. There are certain places under the sea where the flow of water is high. This hotspot areas are the main concern in installing the tetra rotor technology into the sea water. The area where there is a major change in higher tide to lower tide is considered. The vertical axis turbine is used for the research and instead of using two rotors there are four rotors with two blades on each rotor. The two pairs of blades are inserted in two rotors on one side and the same setup on the other side. The blades are made to resist the flow of water in the hotspot areas. It creates a torque and starts to rotate by which gearbox rotates the induction generator and electricity is produced. The blade is made of graphene to electrify the strobe light to divert the water bodies away from the blades to avoid death.

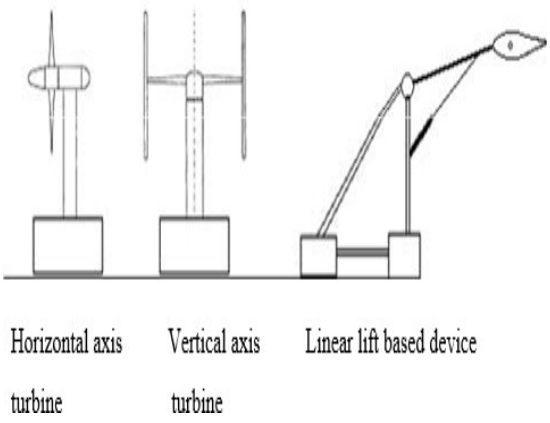

Fig:1 Tidal Turbine Fundamental Types

The vertical axis turbine with a similar setup shown in Fig 1 is used but with a design shown in Fig 2.

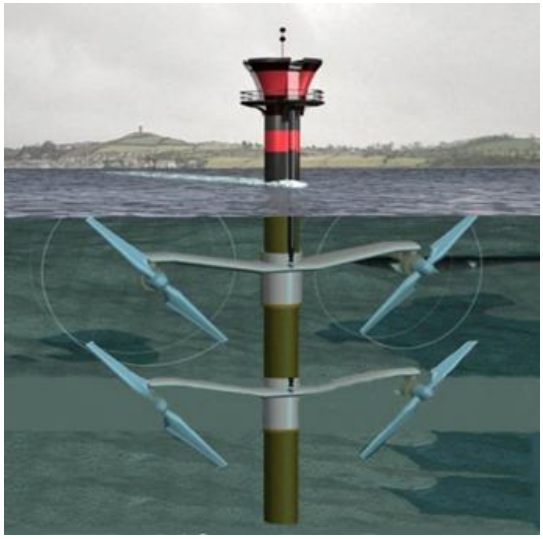

Fig:2 Vertical Axis Turbine with Tetra Rotors

The number of rotors is proportional to the power produced and it is one of the ways to expand the generation of power.

Graphene is an allotrope of carbon and it has a single layer of carbon atoms arranged in a hexagonal lattice as shown in Fig3. It is the strongest material, Conducts heat and electricity efficiently. The useful property of graphene is that

it is a zero-overlap semimetal (with both holes and electrons as charge carriers) with higher electrical conductivity. The superconductivity is observed in graphene [3] is used in our research. The rotor blade is made of thin monolayer of graphene. Since it is light in weight, it can rotate with much less tidal wave force.

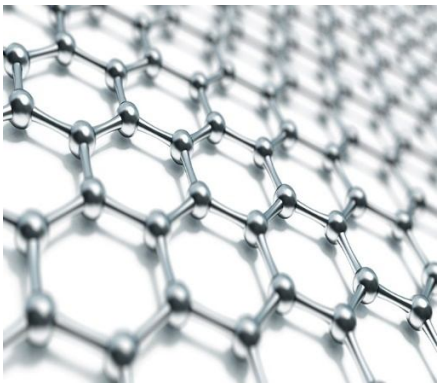

Fig:3 Structure of Graphene (Hexagonal)

It is observed that a voltage of a few millivolts can be produced by moving a droplet of sea water or ionic solution over a strip of monolayer graphene under ambient conditions [4]. This gives rise to electric potential that is proportional to the velocity of flow and number of droplets. It is also dependent on the concentration of sea water and increases with the low number of monolayers of graphene.

Looking into the microstructures during the contact of water droplet with monolayer of graphene, the charge distribution is symmetrical on both sides, when the droplet is static, thereby leaving a net potential difference of zero between them. When the droplet was dragged across the graphene strip, the distribution become unbalanced. The electrons are desorbed from the graphene at one end of the droplet and are absorbed into the graphene at another end, which results in a large potential on one side of the droplet and generates a measurable voltage across its length.

Fig:4 Mini Strobe Lights

This electricity is given to the mini strobe lights. There exists a stroboscopic effect [5] where it is capable of flashing hundred times per second. Naturally the water bodies won't come to the surface of the sea water because they get distracted from the sunlight and swims under the sea. This concept is taken to the blades. Thus, while the blades are rotating, the strobe light will glow which will create a circle of light. This will enable the water bodies to divert from its original path, thus protection for water bodies is assured. The Induction generator is placed above the sea level which is connected with the same shaft of the turbines. By electromagnetic induction, the emf is produced which is proportional to the rpm of the turbine blades and velocity of the flow of sea water.

More and more people have recognized the importance of the renewable energy, the vast coastal and offshore areas contributes one of renewable resources, i.e. the tidal stream energy, to the entire energy consumption. The emphasis has been put on tidal turbine concepts. Indeed, it has been described the strength and the weakness of the major tidal turbine technologies. Moreover, attempts have been made to highlight current trends and alternative issues for generator topologies. Marine current turbine (MCT) believes it is well on track to delivering commercial tidal stream technology with the potential to supply electricity on a large-scale, at low cost and without pollution. It is believed that the concepts under development by MCT will become one of the primary techniques for extracting energy from the seas.

III. CONCLUSION

By this marine current turbine, more electricity charges, fuel wastage, pollution can be controlled. It will be useful renewable energy. The upcoming generation can use the electricity without any demand situations. It avoids the usage of nuclear and thermal power plant. A design change added with new innovation of protecting rare livings in the sea adds a complete way of technological change in the tidal electricity production method.

FUTURE SCOPE

As renewable energy is the future technology, there will be more research studies carried out. Marine current turbine can be further investigated on the design blade parts and the lighting orientations which effectively saves water bodies.

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REFERENCES

[1] Kannabiran S, Dhanabal M, Boobalan B and Kailasam R, A Novel Method for Generation of Electricity using Submerged Windmill, International Journal of Modern Trends in engineering and Science (ISSN: 2348-3121).
[2] Martin, P., Downing, J., Taft, N., & Sullivan, C. (1991). A demonstration of strobe lights to repel fish. United States: American Society of Civil Engineers.
[3] Yuan Cao, Valla Fatemi, Shiang Fang, Kenji Watanabe, Takashi Taniguchi, Efthimios Kaxiras & Pablo Jarillo-Herrero (2018). Unconventional superconductivity in magic-angle graphene superlattices. Nature, 556(7699), 43-50, doi:10.1038/nature26160.
[4] Tang, Qunwei & Yang, Peizhi. (2016). The era of water-enabled electricity generation from graphene. J. Mater. Chem. A. 4. 10.1039/C6TA03107B.
[5] John P. Frier & A. J. Henderson (1973) Stroboscopic Effect of High Intensity Discharge Lamps, Journal of the Illuminating Engineering Society, 3:1, 83-86, DOI: 10.1080/00994480.1973.10732230