

**GLOBAL JOURNAL OF ENGINEERING SCIENCE AND RESEARCHES**  
**THE POWER GENERATION USING SOLAR SPINNING CELL AND WIND TURBINE****Mr.Shankar Purushottam Awarkar<sup>1</sup> & Mr.Yogeshwar Prakash Chavhan<sup>2</sup>**<sup>1,2</sup>Student, Department Of Electrical Engineering, MGI-COET, Shegaon-444203, India

---

**ABSTRACT**

An increasing power demand provokes the young minds to find the alternative solution to generate power using various modes among the various method of conventional energy generation, Solar is a prominent energy source for generating power. The Indian renewable energy sector has grown exponentially, with India soon to become third largest international solar market after china and the USA. But the availability of the same is possible only during the solar peak hours that is in India it is about 8:30AM to 5:30PM that is about approximately nine hours. Also the requirement of area for the solar panel installation is greater than same rated solar spinning cell. An alternative efforts to solve this problem is proposed in this paper using solar spinning cell. Due to the self-rotating solar spinning cell's helps to cooling the system which leads to increase its efficiency. This work analyzes the efficiency and generating capacity of spinning cell used for power generation. This paper also focuses on the alternatives to self-driven spinning cells.

*Keywords: Solar spinning cells, DC gear generator, Wind Turbine, Flat Plate Solar.*

---

**I. INTRODUCTION**

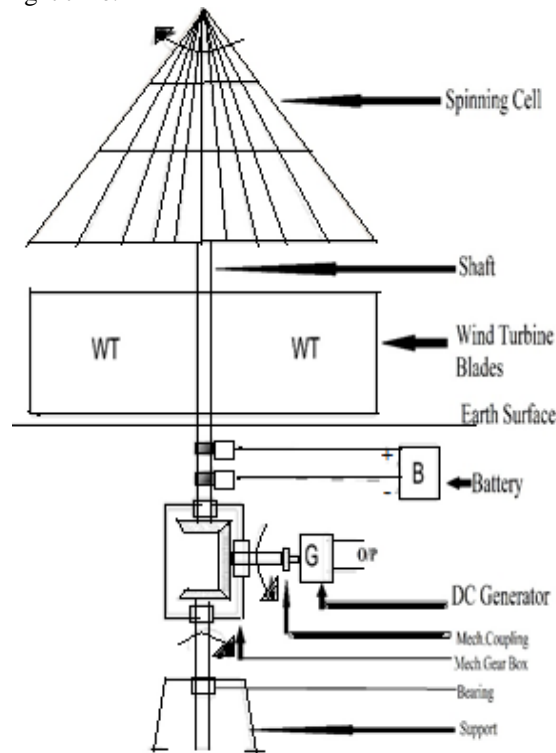
Now a days the population is increasing day by day and demand of energy is also increasing, thus power demand has increased due to power failure happens many times a day. To fulfill the demand we have to increase the production of energy, but due to environmental bad effects we have to shift the demand of electricity on renewable energy rather than conventional energy source. Solar, wind, ocean, hydropower, geothermal resources, biomass and bio-fuels are the available renewable energies on earth. The paper, "Sizing and Analysis of Renewable Energy and Battery Systems in Residential Micro Grids"<sup>1</sup>, aims at designing an integrated model that accounts for the different aspects and characteristics of energy consumption in modern power system [1]. The paper, "Design and Implementation of Automatic Street Light control Using Sensors and Solar Panel"<sup>2</sup>, proposes a new model which will reduce the power consumption of the street lighting system about 20-35% compared to conventional design [2]. The paper, "Analysis of Solar Water Heater with Parabolic Dish Concentrator and Conical Absorber"<sup>3</sup>, aims a novel conical heat absorber will be able to absorb heat from multi directions, and hence enhance the heat transfer rate, it is expected that rate of heat exchange would be 20% higher than the flat plate solar water heater [3].

In this paper we are using the wind turbine driven solar spinning cell system to provides best alignment of solar cell with sun to get maximum intensity the position of sun's highest intensity with respect to a given spot changes with time of the day it is therefore necessary to automatically rotate the position of solar cells to always align with highest intensity of sun. The solar cells efficiency depends on mainly on angle of incidence of photons. Thus the cells are built to trap the photon instead of bouncing them back of and this required the proper angle of incidence to be accomplish this, each cells has the optimal angle calculated for it to be installed to maximize efficiency.

The solar spinning cells creates an environmental that provides longer periods of optimal angle of incidence between the panels and the sun, regardless of if its morning noon or night. The cooling of the cells is a good thinks that helps increases efficiency in its own right. A hotter solar cell is a less efficient one. The natural convection cooling of the cells by spinning them, is an added bonus that immobile flat cells don't get. The electricity produced in the spinning cells is collected into the battery using the brushes and slip rings.

## II. MATERIAL & METHOD

The proposed method is designed to provide the solution for power loss during day as well night time. It is designed with solar cells, solar spinning structure, two brushes, two slip rings, conducting wires, lead acid battery, a gear mount DC generator, wind turbine, bearings, two germanium P-N junction diode and mechanical gear system which is coupled between the shafts. Main objective is to improve the output of solar cells and also provide the power continuously in day as well as night time.

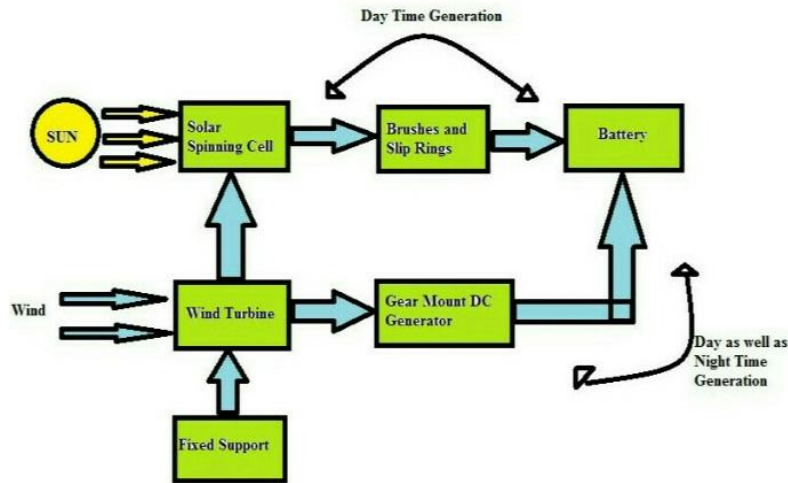


*Figure (a): Actual Working Diagram*

The figure(a). Shows the dual power generation set up. The first power generation is take place through the upper most part solar spinning cells, and second generation get from the mechanical gear box coupled DC generator via forward bias P-N junction diode, to the battery. The spinning cells are cone shaped thus it expose more surface to the sun's irradiation ( $\text{watt/m}^2$ ) at any angle with different time intervals. The solar spinning cells are self-rotating by the wind turbine which is helps to reduce the temperature raises on the surface of spinning cells which leads to improve the efficiency. Also the output of wind turbine is feed to the gear mount dc generator and generate power continuously in day as well as night time that is 24/7. Thus the overall efficiency becomes increased of the system. The wind turbine which is placed on the shaft of rotor just below the spinning cell. The whole system can be placed on the divider of roads in the metro cities,when we installed it on divideris driven by the vehicles moves on the roads. Also we can installed in the coastal regions where wind flows continuously, When we installed it on costal region, it is driven by the continuous flowing of wind. The brushes and slip rings are connected below the wind turbine for collecting the generated current by rotating solar cells and the generated power is supplied to the battery. Also the power generated by the DC generator is directly stored in the battery via forward bias P-N junction diode to limit the reversed current.

**Working Principle:**

The working principle is similar to that of flat plate solar cell or photo voltaic cell, is an electrical device that converts the energy of light directly into electricity by the photovoltaic effect, which is physical and chemical phenomenon.



**Figure (b): Block Diagram**

Due to the cone shape, the surface area for incident irradiation ( $\text{watt/m}^2$ ) at different time intervals is always high due to rotation compare to flat plate solar system, Thus it increase the generated output. Then the DC generated in rotating spinning cell is collected using brushes and slip ring and stored in the battery and the raising temperature of solar spinning cell is cooled by the rotating solar cells by the wind turbine then the efficiency also get increased. The DC generator is also driven by mechanical coupled wind turbine and generate the power output in day as well as night time.

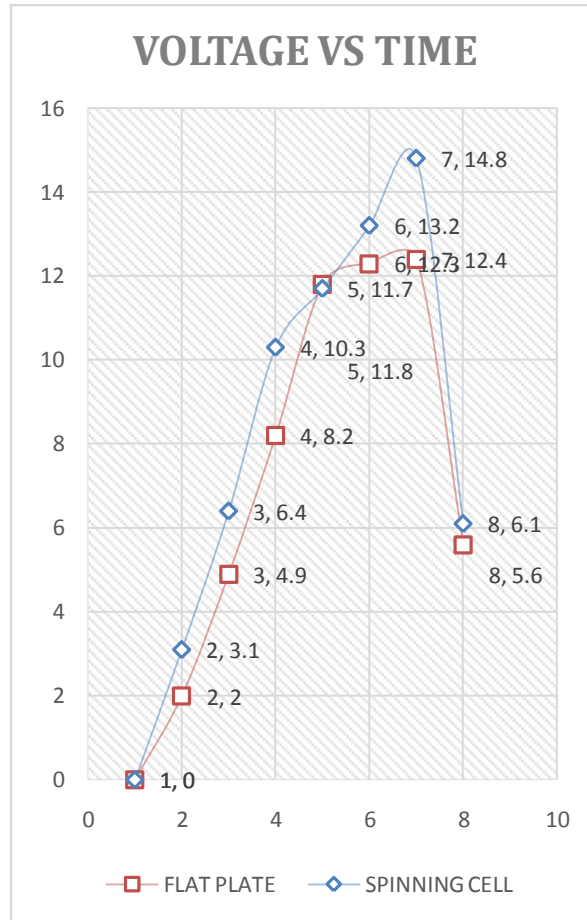


Figure (c): Graph of solar spinning cell and flat plate.

This figure shows the voltage generation at different interval of time, also in this graph we compared the voltage generated by spinning cell and the voltage generated by flat plate. In this graph we can see the voltage generated of solar spinning cells, in an interval 6AM to 11AM as well as in interval 3PM to 6PM, is always greater than that of same rating flat solar cells.

**Tables:**

Table 1. Comparison of power generation using solar spinning cells and wind power generation.

Type of generation	Day time	Night time
Spinning cells	14.8V	0V
Wind power generation	8.4V	5.3V

Table 2. Comparison table for Solar Spinning Cells Vs Flat Plate Solar

SN	Parameters	Flat Plat	Spinning Cell
1.	Voltage Generation	13.2	14.8
2.	Volume Req.	$V=(1/2)*1$	V

	For Installation	$\frac{1}{2} * 7.1 * 7.7 * 10 = 252.05 \text{ cm}^3$	$= \left(\frac{1}{3}\right) * 3.14 * r^2 * h = \left(\frac{1}{3}\right) * 3.14 * 5^2 * 9.1 = 238.11 \text{ cm}^3$
3.	Temp. Raising	High temp.	Low temp.
4.	Efficiency	19.8 %	22.5 %

#### IV. CONCLUSION

It is inferred and concluded that solar spinning cell conserved power effectively during the day time, but also wind power DC generator conserved power effectively in day as well as night time. Also in metro city's we can use the kinetic energy of moving vehicles to rotate the wind turbine to generate the power output, and to rotate spinning cells to increase its efficiency. Also the spinning cell does not require any tracking system to increase its output, because the angle of incidence of sun is always perpendicular to solar spinning cells.

#### V. ACKNOWLEDGEMENTS

We are great full to the management and principal Mauli Group of Institution, Collage of Engineering and Technology, Shegaon for providing excellent computing facilities and encouragement.

#### REFERENCES

1. *Raji Atia and Noboru Yamada. Sizing and analysis of Renewable Energy and Battery Systems in Residential Micro grids. IEEE Transactions on Smart Grid. 2016; 7(3)*
2. *Sharath Patil. G, Rudresh. S, Kallendrascari. K, M. Kiran Kumar. CC. Design and Implementation of Automatic Street Light Control Using Sensors and Solar Pane. International Journal of Engineering research and applications. 2015; 5(6):97-100.*
3. *G Rajamohan. P Kumar, M Anwar and T Mohanraj. Analysis of Solar Water Heater with Parabolic Dish Concentrator and conical Absorber. IOP Conference Series : Materials Science and Engineering 206(2017) 012030.*
4. *Solar Energy Centre, Ministry of New and Renewable Energy, Government of India, India Solar Resource Maps.*
5. *Siddharth Arora. Offshore Wind Power in India Opportunities and Challenges. Renewable Energy Akshay Urja June Vol. 4, issue 6(2011).*