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Solar Panel With Wind Turbine Power Generation System

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Abstract: ***In this project we generate an electric power through the fabrication of horizontal axis wind mill and pyramid shaped solar panel. A wind turbine system is a machine that converts the kinetic energy in wind into mechanical energy. The mechanical energy is used directly by machinery, and it is used to cool down the heat of solar panel. Solar cell has been used increasingly in recent years to convert solar energy to electrical energy. The solar energy system can be used either as a stand-alone system or as a large solar system that is connected to the electricity grids .The earth receives 84 Terawatts of power and our world consumes about 12 Terawatts of power per day. We are trying to consume more energy from the sun using solar panel.***

Keywords: fabrication, solar panel, electrical energy, electricity grids.

I. INTRODUCTION

Energy is the needed part to perform work. Fortunately there are many means of harnessing energy which have less damaging impacts. A vertical windmill is made-up of mild steel. It is a machine that is powered by the energy of the wind. It is designed to convert the energy of the wind into more useful forms using rotating blades or sails. Windmills served originally to grind grain, though later applications included pumping water and, more recently, generation of electricity. Recent electricity-generating versions are referred to as wind turbines. The recent modern generations of windmills are properly called wind turbines, or wind generators, and are primarily used to generate electricity. The latest windmills are designed to convert the energy of the wind into electricity. A windmill is an engine powered by the wind to produce energy, often contained in a large building as in traditional post mills, smock mills and tower mills.

II. SOLAR PANEL

Solar cell or panel called as a panel designed to absorb the sun's rays as a source of energy for generating electricity or heating. A photovoltaic (PV) module is a packaged, connect assembly of typically 6×10 photovoltaic solar cells. Photovoltaic modules constitute the photovoltaic array of a photovoltaic system that generates and supplies solar electricity in commercial and residential applications. Each module is rated by its DC output power under standard test conditions (STC), and typically ranges from 100 to 365 watts. The efficiency of a module determines the area of a module given the same rated output – an 8% efficient 230 watt module will have twice the area of a 16% efficient 230 watt module. A single solar module can produce only a limited amount of power; most installations contain multiple modules. A photovoltaic system typically includes an array of photovoltaic modules, an inverter, and a battery pack for storage, interconnection wiring, and optionally a solar tracking mechanism.

III. DYNAMO

Dynamo is an electrical generator. This dynamo produces direct current with the use of a commentator. A dynamo machine consists of a stationary structure, called the stator, which provides a constant magnetic field, and a set of rotating windings called the armature which turn within that field. On small machines the constant magnetic field may be provided by one or more permanent magnets; larger machines have the constant magnetic field provided by one or more electromagnets, which are usually called field coils. In the olden days of electric experimentation, alternating current generally had no known use. The few uses for electricity, such as electroplating, used direct current provided by messy liquid batteries. Dynamos were invented as a replacement for batteries. The commentator is a set of contacts mounted on the machine's shaft, which reverses the connection of the windings to the external circuit when the potential reverses, so instead of alternating current, a pulsing direct current is produced.

IV. BATTERY

Battery is use for storing the energy produced from the solar power. The battery used is a lead-acid type and has a capacity of 12v; 2.5A.the most inexpensive secondary cell is the lead acid cell and is widely used for commercial purposes. A lead acid cell when ready for use contains two plates immersed in a dilute sulphuric acid (H2SO4) of specific gravity about 1.28.the positive plate (anode) is of Lead –peroxide (PbO2) which has chocolate brown color and the negative plate (cathode) is lead (Pb) which is of grey color. When the cell supplies current to a load (discharging), the chemical action that takes place forms lead sulphate (PbSO4) on both the plates with water being formed in the electrolyte. After a certain amount of energy has been withdrawn from the cell, both plates are transformed into the same material and the specific gravity of the electrolyte (H2so4) is lowered. The cell is then said to be discharged. There are several methods to ascertain whether the cell is discharged or not. To charge the cell, direct current is passed through the cell in the reverse direction to that in which the cell provided current. This reverses the chemical process and again forms a lead peroxide (PbO2) positive plate and a pure lead (Pb) negative plate.

V. BEARING

It is a device to permit constrained relative motion with two parts, typically rotation or linear movement. Bearings are classified broadly according to the motions they allow and according to their principle of operation. Rolling-element bearings such as ball bearings and roller bearings. Jewel bearings, in which the load is carried by rolling the axle slightly off-center. Flexure bearings, in which the motion is supported by a load element which bends. Bearings vary greatly over the forces and speeds that they can support. Forces can be radial, axial (thrust bearings) or moments perpendicular to the main axis. Bearings very typically involve some degree of relative movement between surfaces, and different types have limits as to the maximum relative surface speeds they can handle, and this can be specified as a speed in ft/s or m/s.

The moving parts there is considerable overlap between capabilities, but plain bearings can generally handle the lowest speeds while rolling element bearings are faster, hydrostatic bearings faster still, followed by gas bearings and finally magnetic bearings which have no known upper speed limit.

A. Linear Bearing

A linear-motion bearing or linear slide is a bearing designed to provide free motion in one dimension. There are many different types of linear motion bearings and this family of products is generally broken down into two sub-categories: rolling-element and plane. Motorized linear slides such as machine slides, XY tables, roller tables and some dovetail slides are bearings moved by drive mechanisms. Not all linear slides are motorized, and non-motorized dovetail slides, ball bearing slides and roller slides provide low-friction linear movement for equipment powered by inertia or by hand. All linear slides provide linear motion based on bearings, whether they are ball bearings, dovetail bearings or linear roller bearings. XY Tables, linear stages, machine slides and other advanced slides use linear motion bearings to provide movement along both X and Y multiple axis.

VI. RESULTS AND DISCUSSIONS

The rotor is connected to the main shaft, which spins a generator to create electricity. Click on the image to see an animation of wind at work. Wind is a form of solar energy and is a result of the uneven heating of the atmosphere by the sun, the irregularities of the earth's surface, and the rotation of the earth, The terms wind energy or wind power describe the process by which the wind is used to generate mechanical power or electricity. Wind turbines modifies the kinetic energy in the wind into mechanical power. This mechanical power can be used for specific tasks (such as grinding grain or pumping water) or a generator can convert this mechanical power into electricity.

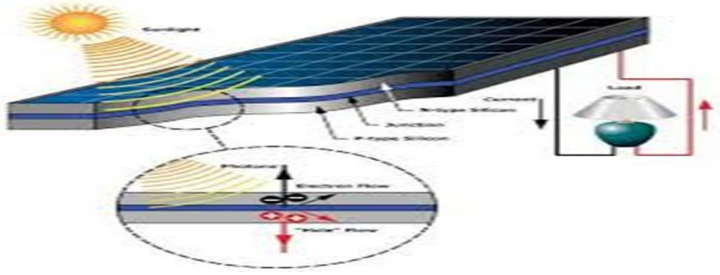

Figure 1 Solar cell

Photovoltaic modules, commonly called solar modules, are the key components used to convert sunlight into electricity. Solar modules are made of semiconductors that are very similar to those used to create integrated circuits for electronic equipment. The most common type of semiconductor currently in use is made of silicon crystal. Silicon crystals are laminated into n-type and p-type layers, stacked on top of each other. Light striking the crystals induces the "photovoltaic effect," which generates electricity. The electricity produced is called direct current (DC) and can be used immediately or stored in a battery. For systems installed on homes served by a utility grid, a device called an inverter changes the electricity into alternating current (AC), the standard power used in residential homes.

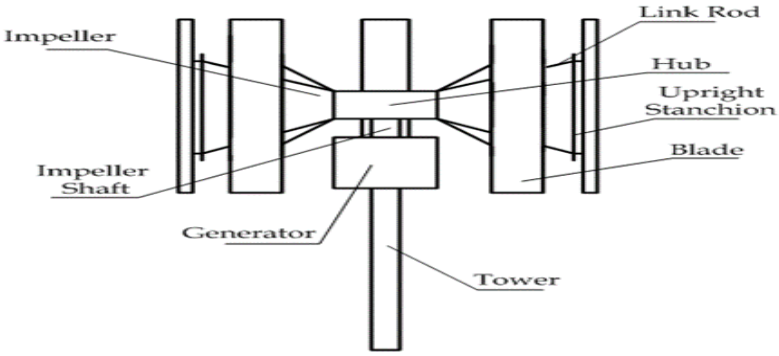

Figure 2 Vertical windmill

The wind mill is placed in the vertical axis and rotated in the anticlockwise directions. The windmill produce power according to the rotating speed of the windmill the windmill produces 120V per hour.

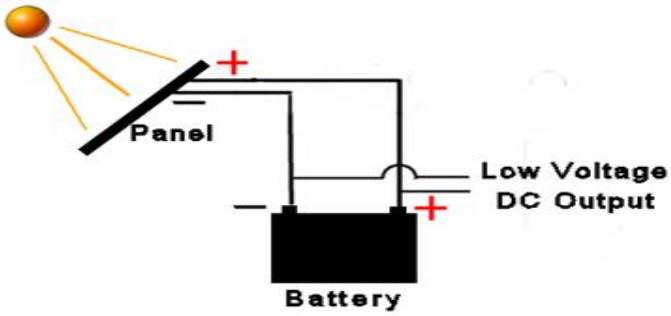

Figure 3 Solar cell connected with battery

The pyramid shaped solar panel is placed on top of the shaft. Here sunlight is the main source of the solar panel. The solar panel produce power from morning to evening .The solar panel produces power 120V.The size of the solar panel is 16*8 cm and it is connected to the 12v battery for saving the power to give output. The solar panel placed on top of the shaft and the windmill is placed in the center of the shaft in vertical axis rotating in clockwise direction. When the windmill rotates the air is produced which enters the base of the pyramid shaped solar panel and cool downs the panel. Where more power is produced when the cooling process is done.

The project is fully environmental based with the solar panel and the windmill where the balance fabrication layer used to hold both the solar panel and the windmill and the shaft is placed on middle of the fabrication layer to hold the windmill in the center of the shaft and the solar panel is placed in top of the shaft which is hold by the bearing material. Here the windmill and the solar panel is connected to the 12V battery and even the solar panel power is connected to battery. Thus the windmill is rotated by the source of wind energy and the bearing is fitted in the base of the windmill to rotate the windmill with the power of wind. The bearing is connected below the solar panel to hold it tightly. When the windmill is rotated with the source of the natural wind and the direction of the wind enter the base of the solar panel. And the entered wind will made the solar panel to cool down. Thus the solar panel can produce more power efficiency with the help of cooling down process.

Figure 4 Real time output

. VII. CONCLUSION

Most of the renewable energy project are less economical viable, because of high investment and risk associated with the project. But still most of the government interested to increase the share of renewable energy. Overall Cost Benefit analysis of renewable energy shows that they are acceptable. Main benefit of energy is that it is clean form of energy and also socially acceptable and help government to make a dream true to provide electricity to village.

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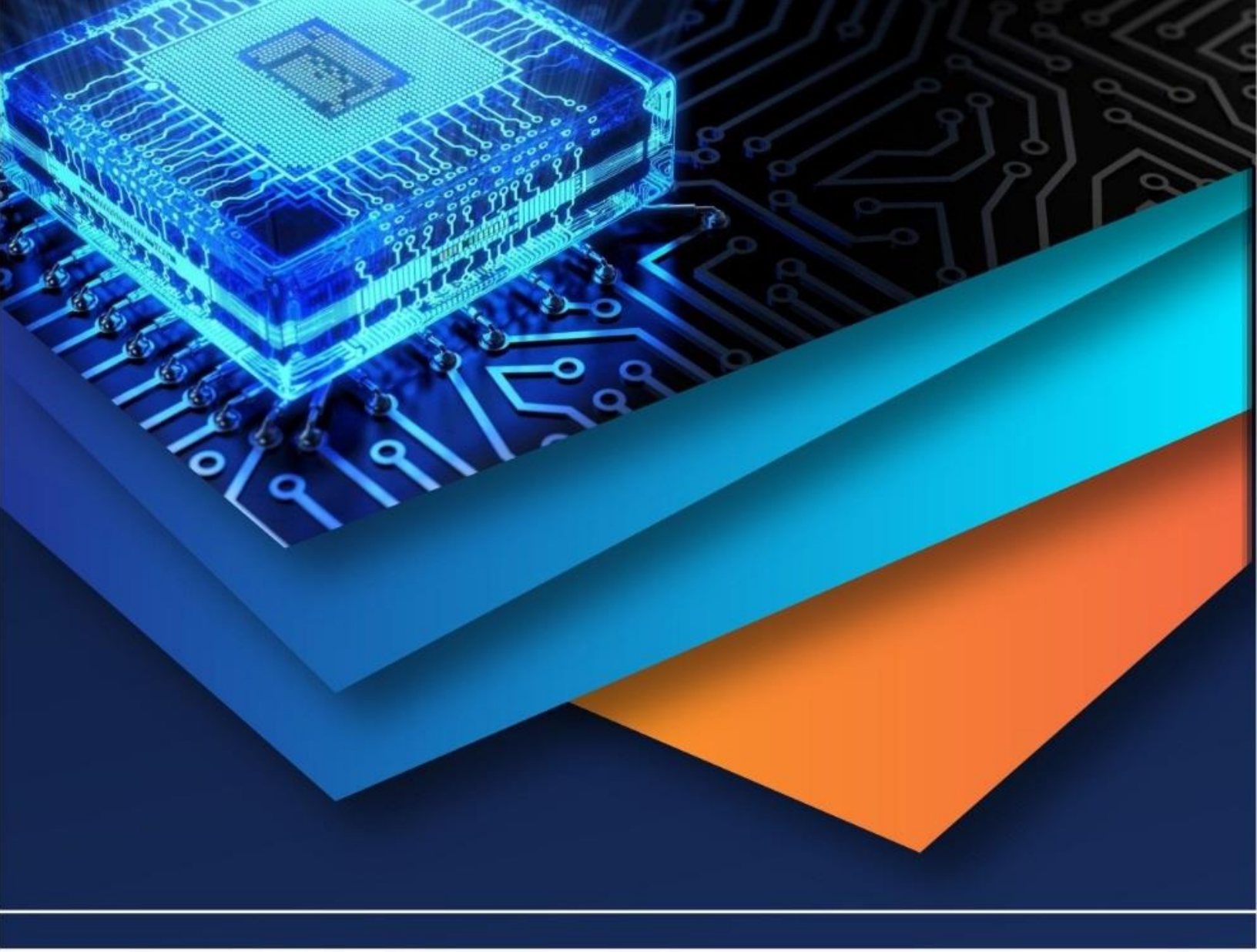

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