

DUAL AXIS SOLAR TRACKER

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ABSTRACT

Solar energy is vastly available on our planet, this solar energy is useful as we can convert the solar energy from the sun into electrical energy. And since electrical energy is used everywhere in order to work or function something. This electrical energy is the back bone of the present humanity. Since there is really high demand of the electrical energy in today's world, there is a need for using the vastly available solar energy that is coming from our nearest star, i.e. sun. hence there is a need for capturing the solar energy through the solar panels, the solar panels converts the solar energy into electrical energy. But solar panels are inefficient when is mounted on a single plane, and thus reduces the total power output capacity of the solar panels. This paper discusses about the dual axis solar panels for maximum output from the sun.

KEYWORDS: solar panels, controller, battery, motors, dual axis

INTRODUCTION

The solar energy is the main source of renewable energy now days since solar energy is free and vastly available and also does not produce any harmful or any type of greenhouse gas, thus is very safe to produce electricity[1].

The solar panels are now mounted in all over the world in order to capture the solar energy from the sun, thus reduces the global warming by not producing any greenhouse gas. The solar panels are not very efficient in today, almost about 20% to 30% efficient[2]. But in coming decades scientist and researchers will increase the efficiency of the solar panels according to the survey.

Since the solar panels are not very efficient, hence produces only 20 to 30 percent energy that is coming from the sun. The solar panels are mounted on vertical or horizontal wall as per the convenience of the user[3]. This method of mounting solar panel only in one axis reduces the overall efficiency of the solar panel[4].

Since the sun rays move all along the planet throughout the day that reduces and increases the total solar energy that falls on the solar panel, and in turn increase/decrease the overall efficiency of the solar panel[3][5].

In this paper a two axis system is developed in order to capture the solar energy throughout the day, this will increase the efficiency of the solar panel[6].

METHODOLOGY

The system consists of a solar panel, from which the solar energy is converted into electrical energy. A controller that will control and monitor the whole process of moving of solar panels in the direction of the sun and will control and monitor the charging process of battery. This system also comprises of battery, wires and other small instruments.

The system uses a solar panel that is mounted on a top of a holder that will hold the solar panel. Two motors are attached under the holder, in such a way that it controls the motion of the solar panel in all direction. There is also multiple sensors that senses the position of the sun and sends signal to the controller. The controller then analyses the signal from the sensors and then control the motion of the motor accordingly.

This will move the solar panels accordingly in the direction of the sun. By this method the solar panels now captures all of the solar energy that falls on that area. This two axis control method significantly increases the overall power output of the solar panel.

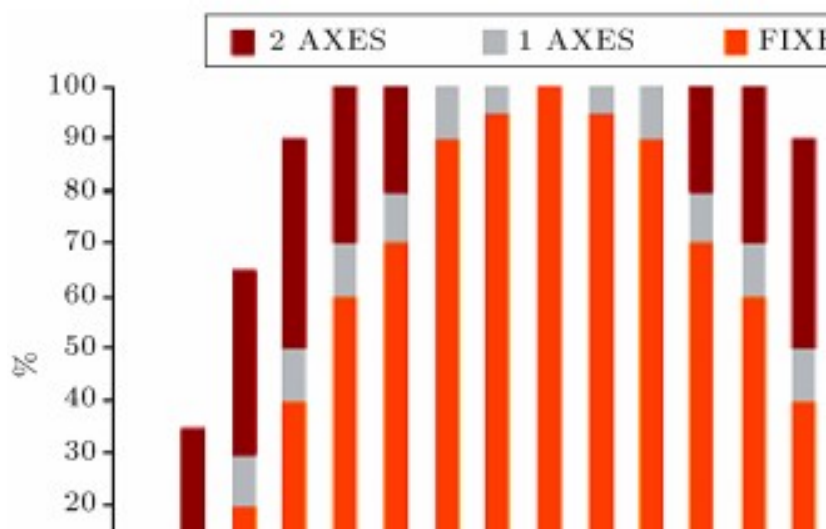


Figure 1: Comparison between fix, single and double axis control

Figure 1 shows the comparison between fix solar panels with single and double axis solar panel movement control. Since the figure 1 clearly shows that the double axis solar panel control is best suitable for the maximum power output from the solar energy.

CONCLUSION

This system shows promising results as double axis solar panel movement control captures or harvest most of the solar energy radiation that falls on that particular area. This paper also shows the simplicity of the solar panels to harvest the solar energy that is used now days in order to produce or generate electricity out of the solar energy. This technology of harvesting solar energy to produce electrical energy is used as renewable energy, since this cannot be depleted and does not produce any harmful gasses that increase the global warming.

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