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Single Axis Solar Tracking System and Dual Axis Solar Tracking System

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Abstract
Dual different types first is single-axis tracing and another one is dual-axis solar monitoring.The emergence of mankind, particularly solar energy, is renewable energy. The primary energy source falls under solar power, which provides an infinite energy supply for everyone. The electricity yielded by the solar-panel is clean and green. The throughput of the solar-panel module has improved enormously in the last period, with 80% of the deployment of all solar-panels modules over the last decade. The power production often rises as modern technology develops.

Keywords: *Solar, Solar-panel module, Technologies, Efficiency, Solitary axis tracing, Dualaxis tracing.*

I. INTRODUCTION:

The answer for the future, as unrelated energy supplies hit the limit and will eventually be entirely depleted, is renewable energy [2]. As a part of this accelerated growth in the area of renewable energy, progress is being made. New innovation appears each day and promotes device performance. In the last years, solar power generation has risen 80 percent[3], the fastest-growing renewable energy market. Several methods for growing solar-panel module energy output such as solar monitoring have been applied. The monitoring of the solar system comprises two forms, the one being a single-axis and the second being a double-axis tracking to maximize the presentation of the solar-panels [4].

Solar energy is acknowledged for infinitely well-organized sources of energy that are much cleaner and free from hazardous environmental impacts. Increased yield of power from the nearby planetary community is marketable to upsurge competency. Indirective to increase the performance of the solar-panels, an individual needsto maintain the panelsline up with the sun, which ensures that the pursuing of the sun is necessary. Solar trackers seem to be the most relevant and tested technologies to create the performance of solar-panels by having the panels matched towards the location of the sun. Solar trackers systems are in progress across the planet as late as possible to combat solar energy in the maximum productive way.The impartial of this research paper is to organize the sun following

January - February 2020
ISSN: 0193 - 4120 Page No. 2628 - 2632

nearby planetary group model which is a device that pursues the development of the Sun paying little heed to the speed of the engine. Next to that, it is to progress the general power production by employing single-axis sun pursuing system and furthermore to provide the plan fordomesticapplication.

II. PROPOSED METHOD

A. Single Axis Solar tracking:

The trackers focus the solar or the modules towards the light. Such devices switch paths for the rest of the day to follow the path of the sun in addition to optimize the capture of fuel. The incidence angle is reduced by trackers in photovoltaic devices. The sunlight is specifically acknowledged by the determined solar thermal and photovoltaic systems. Therefore, the calculation of the inclination of the solar trackers must be correct for the collection of fuel. The movement of the single-axis monitor is on one axis, moving back and forth in a specific direction. There are various types of trackers, such as vertical, polar aligned, horizontal and tilted, whose rotation is indicated by the name of the tracker. The rotation of the dual-axis trackers is in dual various paths and continues facing the light. The mirror is aligned with dual-axis detection and the illumination is guided along a set direction to a static transmitter.The utmost production of solar energy is achieved by the trackers, as these trackers have the capacity of succeeding the sun horizontally as well as vertically. Solar-trackers are resultant of numerous other approaches. The single-axis solar tracking is a modus operandi employed for pursuing the sun to upgrade the output of solar-panelunit. It is acknowledged as single-axis as it only tracks sun inthe horizontaldirection[5].

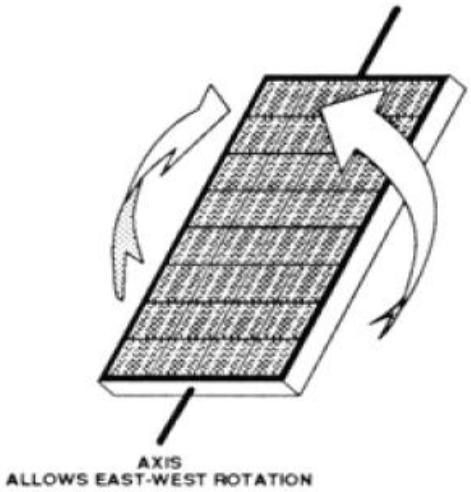


Figure 1: Single-axis tracking

The monitoring is conceded out by means of a motor and a frame on that, a solar-panel is mounted. The engine collects information for rotation by a microcontroller system (Arduino Uno) utilizing the Light Detector Resistor (LDR).

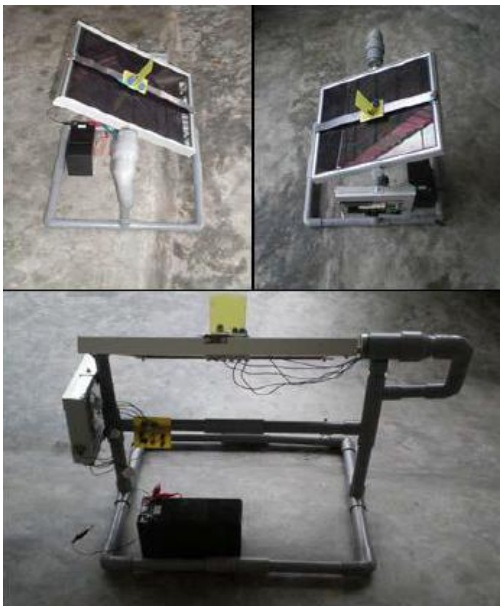


Figure 2: Single Axis Tracker Setup

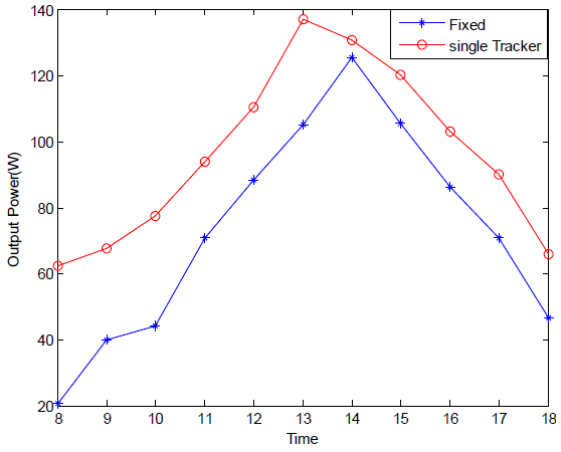
Figure 2 shows the configuration of the “single-axis tracker” wherein the “LDR sensors” are configured in the center of the solar-panel module.

B. The efficacy of Single Axis Tracker System:

The solar-panel power production asthe output of the “single-axis tracker” and the adjusted attached

January - February 2020
ISSN: 0193 - 4120 Page No. 2628 - 2632

system is logged for one day and tabulated. The average power manufactured by the single tracing system is more than that of the static mounting system. The energy generated by the "single-axis tracker" is said to be 13 percent advanced than the static mounted system [6]. The documented information is shown in the table below and the graph shows a more accurate comparison of recorded information.



Graph 1: Single-axis tracking vs fixed mounted system

HOUR	POWER FOR FIXED MOUNT(mW)	POWER FOR SINGLE-AXIS(mW)
0800	20.664	62.403
0900	39.780	67.473
1000	44.176	77.212
1100	70.616	93.772
1200	88.110	110.430
1300	104.960	137.160
1400	125.334	130.754
1500	105.342	120.335
1600	86.172	103.096
1700	70.620	89.910
1800	46.494	65.625

Table 1: Fixed Mounted System vs Single Axis Tracking System

C. Dual Axis Solar Tracing System:

The dual-axis monitoring system monitors the direction of the sun both horizontally and vertically. The dual-axis tracking classification serves the same purpose as the single-axis tracing system. The only distinction is that it processes the sun in four directions. The unit has two servo motors, two LDR detectors and a microcontroller [7].

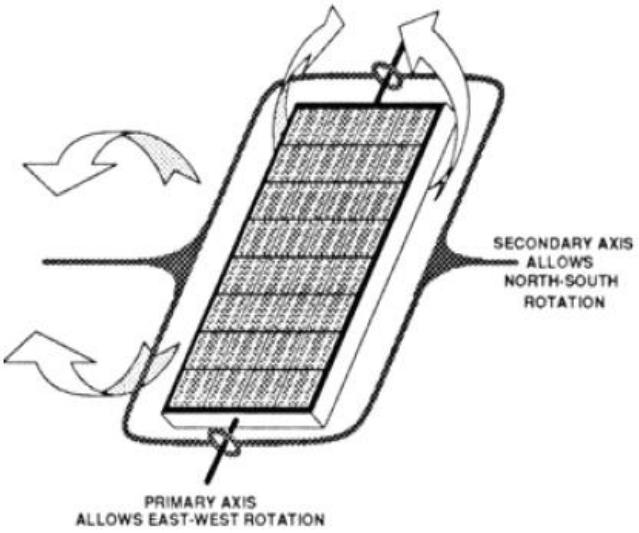


Figure 3: Dual axis solar tracing

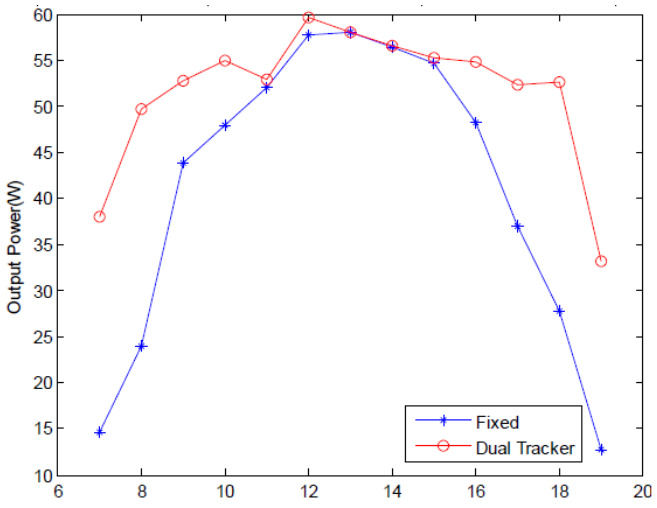
Out of two motors, one and one array of sensors can be utilized for tilting the device in the east-west orientation while the other motor and the sensor collection are obligatory for tilting the machine in the north-south direction. The micro-controller utilized to retrieve information from LDR receptors and to change the device appropriately by monitoring the engines mounted in the unit.

January - February 2020
ISSN: 0193 - 4120 Page No. 2628 - 2632

Figure 4: Dual axis solar tracking system setup

D. The effectiveness of Dual-Axis Solar MointoringArrangement:

The performance of the dual-axis solar monitoring system and the static installed unit is registered for one day and computed for one day. The overall power production performance indicates that the dual-axis solar monitoring system's maximum output is more than just a fixed installed unit. The performance of the dual-axis tracker is said to be 27 percent lesser than the fixed installed system [8]. For documented information, a chart and a map are shown below.



Graph 2: Dual axis system power output vs Fixed mounted system

HOUR	POWER FOR FIXED MOUNT(W)	POWER FOR DUAL-AXIS(W)
0700	14.575	38
0800	23.987	49.728
0900	43.876	52.701
1000	47.94	54.9519
1100	52	52.974
1200	57.6666	59.6156
1300	57.96	58.0488
1400	56.412	56.5687
1500	54.6883	55.3151
1600	48.174	54.8562
1700	36.96	52.3698
1800	27.72	52.668
1900	12.69	33.22

Table 2: Power for fixed mounted vs Dual-axis monitoring system

III. CONCLUSION

The information gathered in the aforementioned table and the data shown in the chart above indicate that in cooperation a singl axis and a dual-ais monitoring system are extremely effective particularly in comparison to a stationary mounted system. While the dual-axis solar tracingstructure is much more effective than the single-axis astral monitoring system. The dual-axis tracker completely falls in line with the Sun Direction and traces the Sun's motion in a very profitablematerialise and certainly includes the entire a magnificent upgrade of overall performance.The results of the study of the analysis specifically indicate that the monitoring of the dual-axis is sufficient for single or immovable solar structures. The recommended system is value-effective jointly as a stroke modification via our studies, we have observed that dual-axis monitoring can raise power by around forty of fixed arrangements. With a huge amount of work and significantly larger systems, we prefer to accept as true that this estimate can elevate supplementary.

January - February 2020
ISSN: 0193 - 4120 Page No. 2628 - 2632

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