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STUDY AND COMPARISON OF DIFFERENT SOLAR TRACKING SYSTEMS

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Abstract:
Use of renewable energy can help the globe to fulfill their energy requirements and which is reliable and affordable. There are so many renewable sources like biomass, geothermal, solar energy, tidal power, and wind and wave energy.

Keywords*: *LDR-Light Dependent Resistor, Single axis and Dual axis solar tracking system

INTRODUCTION

With comparison of all other renewable energy resources, solar energy can easily and efficiently converted into electrical energy. But due to drawback of cost of solar cell, it is not used worldwide in comparison of hydro, wind, geothermal. So it is necessary to recover as much energy as possible.

Fig.1

ADVANTAGES

Storage & smarter losses can be reduced; harvesting is depended upon angle of incidence of solar light. If this angle is closer to perpendicular, greater power is obtained. If a fixed solar panel is mounted on ground level then sunlight will have an angle on incidence close to 0º. In progress to mid-day the angle of incidence is close to 90º, maximum power is achieved. By using above observation we required to maintain incidence angle as close to 90°. To achieve maximum power output this can be done by continuously tilting solar panel towards the sun which is called as solar tracking system, there are two types of solar tracking system

1) Single axis solar tracking system
2) Dual axis solar tracking system

Principal of solar tracking system simplest method is to use LDR (Light dependent resister) for tracking system. In this method two transistor are shielded from sunlight. Main constrain with this method is sensitivity of photo transistor is low.

Single axis solar tracking system:

It is economical & simple method of solar tracking. In this method horizontal axis controls of solar panel is achieved. Tracking system with sunlight as reference. Tracking sensor senses sunlight & according to it position of solar panel is adjusted automatically. The sensor aligns the solar plat at 90° to sunlight due to this maximum power is obtained through sun light.

Tracking system with time as reference:

There is no availability of sensor in this design. In this system the solar panel is adjusted to sun light according to preset time, and clock is used as a reference. According to preset time controlling unit generates pulse which is given to motor, given pulses amplified because of its lower voltage range and motor requires higher voltage than controlling unit. In the morning panels are positioned in east side as the day progresses panels are oriented horizontally and at 12 pm it is parallel to earth surface. And by evening it is aligned to west.

Advantages of single axis solar tracking system:

It is cheap, simple mechanism and running cost is low. By comparing above two methods single axis solar tracking sunlight reference is superior, the reason behind this is that in time reference time for solar panel rotation are fixed we have no control over position of sun and in different season sunlight is not perpendicular to solar panel, which will not favorable in achieving maximum power though solar panel.

Dual axis solar tracking system:

To develop dual axis tracking system LDR is used as sensor the resistance of LDR decreases with increasing light intensity, there are two sensors used in system, one indicates position of sun and other one to determine movement of sun from east to west. Two 12 volt stepper motor are used to rotate solar panel in two different axis.

The Shadow will fall on the sensor; when sensor is not directed towards the sun, Due to this a difference in resistance of LDRs is recognized. The Difference is detected by the control system & signals are generated. This signal is given to stepper motor which move the panels according to the magnitude of difference signal and tracker is aligned again towards the sun. This system of solar tracking has maximum efficiency than other systems.

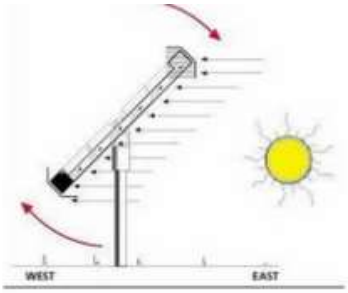
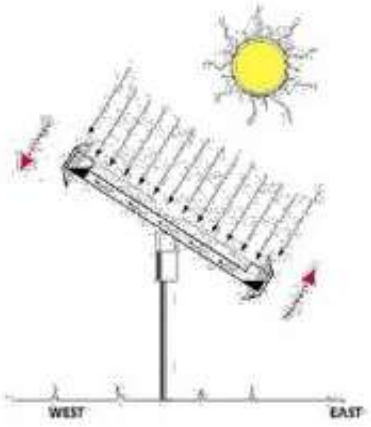


Fig 2



CONCLUSION

This paper explains the different methods of solar tracking system. By comparing all methods it is clear that dual axis solar tracking system is most efficient, as it has advantages of getting aligned towards the sun this results in more output than single axis system.

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