



AUTOMATIC SOLAR TRACKING PANEL USING WIRELESS POWER TRANSMISSION SYSTEM THROUGH SATELLITE

Ranjeet Kumar¹, O. Singh²

Electrical Engineering Department, School of Engineering
Gautam Buddha University, Greater Noida Uttar Pradesh

Abstract

An automatic solar tracking panel based on satellite wireless power transmission system is presented in this article. Concept of Wireless electricity is utilized for electronic appliances. Electronic Appliances can be a Hand Phone, MP3 Player. The basic principle of how electrical energy can be transferred without wires is exhibited in this. A prototype model is implemented which shows the efficacy of this concept. This proposed model consist a solar panel with stepper motor and electronic circuit to track the Sun light so that maximum sun light is incident upon the panel at any given time of the day. In the proposed model, solar panel rotates according to the intensity of the Sun light. This system performs and working by the using of a microcontroller and to give the output to stepped pulses in time period intervals for the stepper motor to rotate the movement panel as desired. Then the output of solar panel can be at higher level.

Keywords: Solar Panel, Wireless Power, Radiation, Temperature, Prototype

I. INTRODUCTION

Generation of Energy is generally depends upon the fossil fuels like thermal, nuclear and others [1, 2] but these all fossil fuels creates pollution in the atmosphere. So, green energy concept was came for ending this issue. The Sun is the main contributor in generating clean and green energy. The Sun move through a hundred and eighty degrees east to west Daily, however from the angle of any mounted location the visible portion is a hundred and eighty degrees throughout a median day amount (maximum in spring and summer; less, in down and winter).The idea of

WPT isn't new at all; it had been initial when 1890 discoverer Tesla experimented with transmission power by inductive and electrical phenomenon coupling victimization spark-excited frequency resonant transformers. This experiment was booming then the opposite completely different perform accustomed power transmitted in one place to a different place while not victimization wire.

The conversion of star light-weight into voltage represents one among the foremost vital functions. the various aria during which the employment of the solar battery and get the power generated in house villages and industries system this processes is known as solar power generating system and the power transmitted in without wire is known as wireless power transmitted system. Solar tracker is a system that orients to a payload in the Sun. Solar panels and in which the used of operated troughs, Fresnel, mirrors or lenses. Flat-panel of the Solar panel photovoltaic (PV) systems, trackers are used to minimize the angle of distance incidence between the solar panel on incoming sunlight and a PV Panel [3-10]. This increases the high amount of energy produced from a fixed amount of power generating capacity and in the standard PV application system.

A solar panel is a fixed then the sun light is not meet on the solar panel and dawn sunset extremes will see a motion of 70 degrees to either side, and thus, according to the solar panel direction function will lose 70% of the energy in the morning time and then evening from the rotation. Moving the panels to the east and west can help motor and attached the sensor in both

end parts of solar panel. A tracker moving in the both direction is known as sun tracker system.

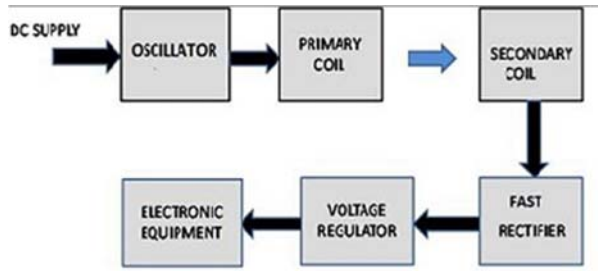


Figure 1 Block diagram of the proposed system

The proposed idea in this paper refers to the design of a one axis solar tracker system that automatically move the solar panel and PV panel position with respect to the sun by means of a Direct Current (DC) motor controlled by an electrical drive unit (microcontroller) that receives input signals from a light dependent resistor sensor and Light Dependent Register (LDR) with work in the direction of sun light. This movement in power save in any battery and the power to send wireless system and get transmission energy one place to another place without wire.

Energy plays an integral role in economic growth. Moreover, it is considered as a significant non-conventional energy supply system. Tesla had invariably tried to introduce worldwide wireless power distribution system. During this system the facility transmitted in regularly to send wire and while not wireless within the one place to a different place this presses is thought as satellite power gear mechanism. In recent in Asian nation there has been a good demand for energy attributable to a spurt in economic purpose and different system [9]. Future economic process heavily depends on the long amount availableness of energy that's use in solar energy generating system and this method accessible, and environmentally property.

II. PROBLEM DEFINITION

The transfer of power from source to different receiver system and use different –different component in receiving station is a technology that has existed for over a period. Wireless power transfer has been made feasible in recent years due to advances in technology and better implementations of transfer techniques. Silicon solar panel that is PV panels in the incident of

sun rays to a temperature of more than 70 °C and get solar panel high level heat from when they are subjected to intense sunlight for a prolonged duration of time. At in this time period during the high temperature, and get the high temperature these panels show the low efficiency while converting sunlight into energy low As a result, the system performance is diminished and the solar energy power generation system encounters a one-third loss approximately. Therefore, a solar energy system is exposed to different amounts of sunlight because power is not same with respect to time, which controls the amount of power generated by the solar energy conversion system.

Solar energy system is produced exposed to different amounts of sunlight and the power is produced in the form of DC system, the DC power in the stored battery which controls the maximum amount of power generated by the solar power energy conversion system. In other words, the system generates more power when it is exposed to greater amount of sun light. In this paper we design a solar seeker to follow a sun. solar seeker follow the sun and if the sensor attach on the sensor a sense sun then solar seeker is stop automatically because the use of microcontroller in the stepper motor through.

Technology and increasing use of renewable energy there's a continuing increase with in the demand for wireless technology that is surroundings friendly. The primary step in wireless power is providing power to any device wirelessly. If the Potency of transmission the ability wirelessly is redoubled slightly additional, then wireless power transmission might become a regular suggests that for charging any

III. METHODOLOGY FOR SOLAR TRACKING SYSTEM

Investigators design an automatic tracking solar panel by using satellite wireless power transmission system. solar tracker follow the sun rays because the use of LDR and if the sensor attach on the sensor a sense a sun direction with respect to the sunlight and the position in them and the solar tracker is stop automatically. Now after some time sun move from its position that is east to west, then again tracker sensor senses the light and moves the motor very slowly. If the sensor senses the signal then automatically stop the tracker. Movement of the seeker is restricted from left to right with respect to sensor for

limited area and the direction of sun light position. To control the left and right limit of the sensor we use reed sensor for this purpose. The Reed sensor is a magnetically and direction of the sun. The proses are known as sensor functional proses.

Sometime sun move from its position of sun and, then again seeker sensor sense the light and move the motor very slow in the direction of sun. If the sensor senses the signal then automatically stop the seeker because the use microcontroller for sensing the sun light we mount the photo sensor on the top of the solar seeker. Photo sensor senses the light and gave to the motor control circuit. If the light is sufficient the Photo detector provide a signal to the microcontroller and microcontroller stop the motor at this position. We use 2 LDR as a photograph sensing element. One LDR monitor the sunshine and supply to the controller for stop the motor and second LDR sense each day or night logic. If the darkness is there then controller stop the seeker for looking out a lightweight. Currently seeker searches lightweight a lightweight within the day light solely. If the darkness is there or within the night then seeker stop the seeker for movement. To control the intensity of the LDR we have a tendency to use op-amp as a comparator.

During this project investigators have a tendency to mount a PV cell on the star seeker to induce a voltage from the sun. Once PV cell is beneath the sun then photovoltaic cell give a voltage. We have a tendency to get this voltage and charge the guilty battery.

IV. SOLAR POWER SATELLITE

An economical technique of wireless power transmission is developed; one attainable application would be an alternative energy satellite. This idea consists of getting a satellite with star panels orbiting the world. The satellite generates current exploitation its star cells. This energy is reborn into a radiation and transmitted wirelessly to receivers on the world. The receivers then convert the transmitted energy back to usable electric power.

To demonstrate technical practicableness researchers would be preferred to transmit kilowatts of power from a satellite in low-earth orbit. In addition, target eightieth conversion potency is desired among each the transmitter and also the receiver. Since the satellite orbits on top of the atmosphere, it'd systematically

assembling solar power, as critical electrical phenomenon systems on earth which can be stopped up by climatic conditions. Also, one satellite may doubtless offer power to several locations round the world by having multiple wireless power receivers connected to the satellite.

V. IMPLEMENTATION PROCEDURE

The structural components and working principle of the solar tracking system are described.

- Structure and model of the automatic solar tracking system in the mechanical wireless power transmission parts, the main technical indicators were as follows: component strength component stiffness, stability, angle range, and tracking accuracy.
- Component strength: Component should have sufficient strength; the so-called strength is defined as the ability to resist damage under load condition.
- Part stiffness: Component of star model ought to have sufficient rigidity. Sure structural deformations cannot exceed the permissible limits of traditional operation.
- Component stability: the solar system Member should have sufficient stability; the requirements of the original straight shape remain unchanged.
- Angle range: within the mechanical transmission a part of the star trailing system, the orientation axis angle ought to be a minimum of 270° , and also the corner of the pitch axis ought to be 90° .
- Tracking accuracy: At a 12° angle, the system followed the sun once in every forty-eight minutes.

Wireless Power Transfer Losses Characteristic

In this figure shoes that the losses of wireless power transfer system under given the losses are manly defend the distance on the one to another devise are connected each other than to create the losses. In this function to the losses are high and low according to load system.

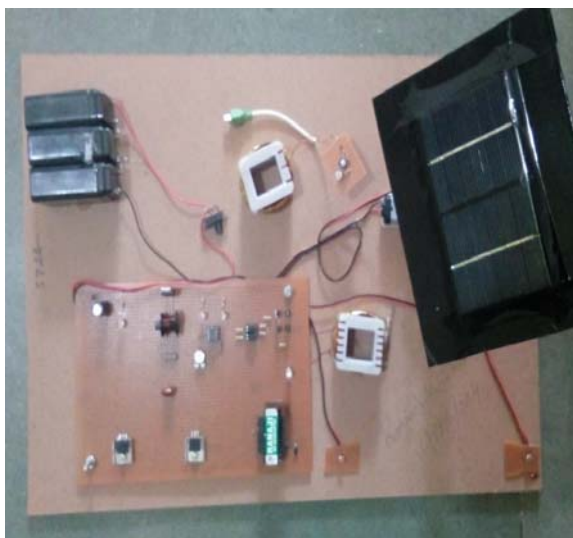


Figure 2 Proposed solar system panel

VI. RESULTS AND ANALYSIS

The results indicated that direction of daylight was invariably unbroken fastened with relation to the electrical device. Thus, we tend to obtain the most solar power and also the energy of sun light-weight could be a flow of constant from. The system deviated from the direction of daylight, there was a decrease within the rate of energy at that the system received radiation. With a rise of the solar power within the angle of deviation, there was a decrease within the rate at that the daylight knowledgeable the electrical device system. The fastened and star pursuit systems created a similar quantity of power on cloudy days star bright intensity of the star pursuit system was over that of the fastened panel.

The performance of scheme fastened and move each the systems was poor on cloudy days in amount. Thus, though the star pursuit system with efficiency collects incident radiation on sunny days, as a result of its system is ineffective on cloudy days. Therefore, the pursuit mode failed to turn out measurable will increase in power output on cloudy days. Therefore, the scheme on cloudy days, the pursuit mode ought to be suspended to avoid wasting the energy needed to drive the system.

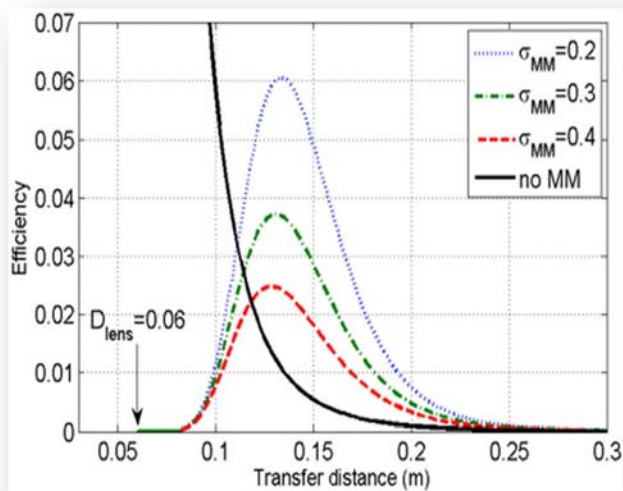


Figure 3 losses of power transfer system

VII. CONCLUSION

A solar tracking system design is proposed in this article. It will be helpful to the modern period all people and who reside in remote areas to meet their power requirements design and implementation of high efficiency solar tracking system of single axis, mainly intended for small sized applications in remote areas. Provide a property answer to the matter of usage of the non-renewable sources of energy.

The solar power that is associate degree thick style of energy may be place to most use provided the techniques for harnessing it ought to be acceptable. This would be a serious advancement within the field of technology of employing a renewable and a wireless technology along. If we will overcome these constraints, then we have a tendency to may implement this technology in numerous applications like airports, home appliances, workplace setting and the other public areas.

The transmission of power while not wires isn't a theory or a mere chance, it's currently a reality. The power will be economically transmitted while not wires to any terrestrial distance. Several researchers have established in varied observations, experiments and measurements, qualitative and quantitative. That's ultimately the ability transmitted in one place to a different place to essay transmitted.

REFERENCES:

- [1]. Omveer Singh et al., "A survey of recent automatic generation control strategies in power systems," International Journal of

- Emerging Trends in Electrical and Electronics, ISSN: 2320-9569, vol. 7, no. 2, September, 2013.
- [2]. Omveer Singh and Ibraheem Nasaruddin, "Optimal AGC regulator for multi-area interconnected power systems with parallel AC/DC links," *Systems and Control, Cogent Engineering*, Taylor and Francis, vol. 3, Issue-1, pp. 1-17, July 2016.
- [3]. M. Zahr, D. Friedrich and T. Y. Kloth, "Bionic Photovoltaic Panels Bio-Inspired by Green Leaves," *Energies*, vol. 8, 2015.
- [4]. H. R. Ghosh, N. C. Bhowmik and M. Hussein, "Determining seasonal optimum tilt angles, solar radiations on variously oriented, single and double axis tracking surfaces," *Renewable Energy*, vol. 35, pp. 1292–1297, 2010.
- [5]. F. Z. Peng, Hui Li, Gui-Jia Su and J. S. Lawler, "A new ZVS bidirectional DC-DC converter for fuel cell and battery application," *IEEE Transactions on Power Electronics*, vol. 19, pp. 54-65, January 2004.
- [6]. P. Sindhuja, "Reactive power compensation of grid controller," *International Journal of Engineering Trends and Technology*, vol. 40, no. 5, October 2016.
- [7]. S. Deshmukh, "Solar power generation and wireless power," *IOSR Journal of Electrical and Electronics Engineering*, vol. 9, no. 4, pp. 14-18, 2014.
- [8]. J. A. Daffier and W. Beckman, *Solar engineering of thermal processes*, John Wiley & Sons. Inc., 1991.
- [9]. Martins, R. Fernando, et al., "Solar energy resources assessment using geostationary satellites in Brazil: Swear Project," *Rev. Bras. Ens.*, vol.26, no.2, p.145-159, 2004.
- [10]. A. Esser and H. Skudelny, "A new approach to power supplies robots," *Industry Applications Society Annual Meeting*, vol. 27, no. 5, September/October 1990.