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Increasing solar energy generation through solar panels cloudy or sunny day with MPPT & solar tracker

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Abstract: Houses large solar power panel required. This is long term investment so understanding impact from climate change. power generation from pv power plant is strongly determined by short term availability of clouds .and it's depends on geographic condition Therefore, it is necessary to concentrate our forces to reduced the appliance cost. To increase their performance. This paper presents solar energy generation through solar panel in cloudy or hazy day. Using maximum power point tracking technique and automatic solar tracking system.MPPT is needed to maximize the generation of solar energy.MPPT technique to operate the photovoltaic module in a manner to Take out the maximum power from the system. Mppt can be achieved by modifying the output voltage and current. MPPT is effective during cold weather cloudy or hazy days. Solar tracker are device to orient the photovoltaics and other optical devices toward the sun. Sun position in the sky changes with the weather, climate change and time of the day. Trackers are used to collect maximum intensity on solar panels to the maximize energy generation.

Keyword: [MPPT] maximum power point tracking ,photovoltaic, PV efficiency and output, solar tracker,

INTRODUCTION

photovoltaic PV technology offers electricity with high value of rapidly improving technological and economic terms. Technology has the advantage of having short lead time and this can be quickly destroyed to close the energy efficiency cap large capabilities of photovoltaics integrated into transmission and distribution grid. Nowadays there is increase in development of photovoltaic power plants which serve as a source of clean energy for power whether the large industries for small houses This photovoltaic plants convert sunlight to electricity by various types of photovoltaic cells which differ both in used construction material efficiency and cost and increase of temperature is cause to decrease of effectiveness of the solar photovoltaic panels pv generation system have two major problem the conversation efficiency in electric power generation is low in general less than 18 percent especially under low radiation condition and amount of electric energy generated by solar array changes with weather condition. In this paper we analyzed different types of MPPT techniques. We are compared one and more MPPT techniques (1) constant voltage technique, (2) open voltage technique and incremental conductance technique. And increasing solar radiation intensity on solar panels using different types of solar tracking system. Block diagram shown in fig.[1].

In this paper data collected by some research papers from Nelson A. Kelly, Miguel Romero, paper and other my study, practical basis.

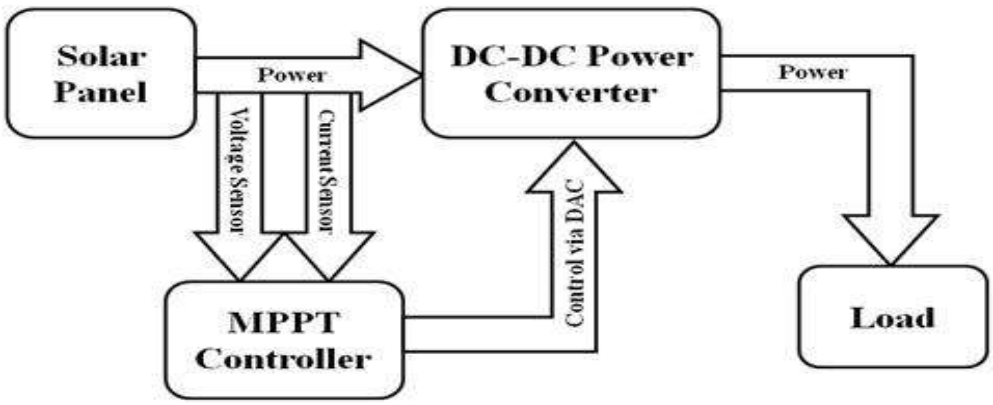

Fig.(1) Block diagram of MPPT Technique

1 Techniques of MPPT

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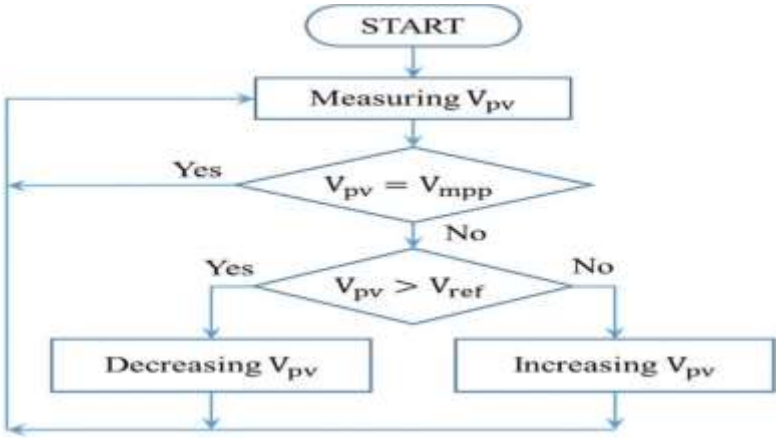
1.1 Constant Voltage Technique of MPPT

The Constant Voltage (CV) method is the handiest MPPT manipulate operation. The working factor of the photovoltaic array is, every nth step, stored close to the most strength factor through regulating the array voltage and matching it to a hard and fast reference voltage VREF same to the voltage most strength factor of the function photovoltaic module or any other pre-valuated voltage value. The consistent technique assumes that insulation and temperature versions at the array are unimportant at the VMPP, and that the consistent reference voltage VREF is an ok similarity of the actual MPP. The working factor is by no means precisely on the MPP and exclusive statistics ought to be acquired for exclusive geographical condition. The CV method desires the dimension of the PV array voltage VPV with a view to installation the duty-cycle. It is have a look at that after the photovoltaic panel is in low insulation conditions, the consistent voltage technique is, extra powerful than both the P&O method or the IC method. this is ideal implementation function, the CV method is regularly mixed collectively with different MPPT method.

Fig.(2) flow chart of cv method.



1.2 Open Voltage technique of MPPT

It is essentially primarily based totally at the remark that the voltage VMPP is constantly near a fixed % of the open-voltage circuit of VOV. Production spread, temperature & restoration sun insulation degrees alternate the location of the most electricity factor inside 3% tolerance band. This approach used 74% of VOV as reference cost VREF. In general, this cost is near the VMPP. This manage strategies calls for measurements of the voltage VOV whilst the circuit is opened. it's far important to suggest a static transfer into the photovoltaic gadget; for the open voltage approach the transfer have to be used to open the circuit. When IPV=zero none electricity is furnished via way of means of the gadget and no power is generated. on this approach size of the photovoltaic array voltage VPV is want via way of means of the regulator.

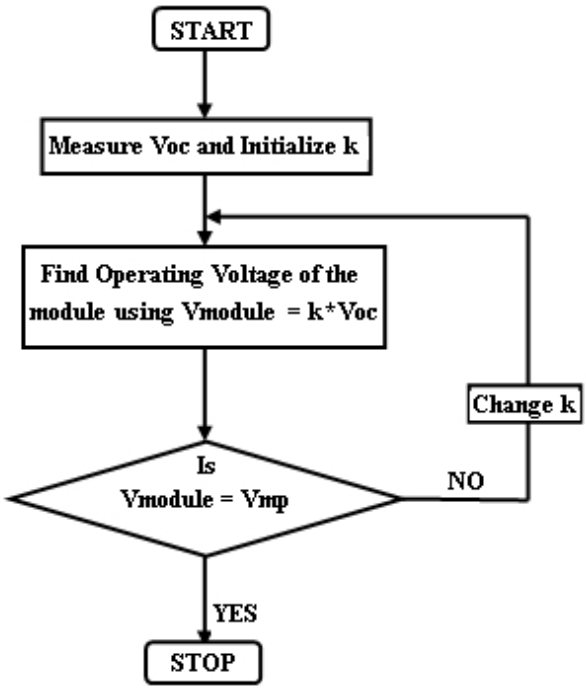


Fig.(3) Flow chart open – voltage method

2 Solar tracker

Renewable energy is continuously gaining importance as an energy resource as fossil fuel prices up and down. solar energy is one of best renewable energy sources. Many researches were conducted to develop some techniques to increase the efficiency of Photo Voltaic systems. One such technique to employ a solar panel tracking system .This project work with a microcontroller based solar panel tracking system. Solar tracking enables more energy to be generated because the solar panel is always able to maintain a perpendicular line to the sun's radiation. Development of solar panel tracking systems has been ongoing for many years. As the sun moves across the sky during the day, it is helpful to have the solar panels track the location of the sun, such that the panels are always perpendicular to the solar

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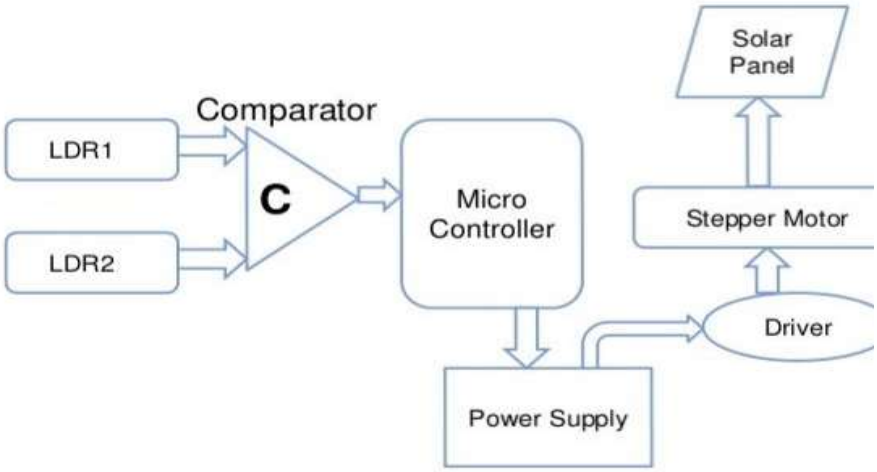
energy radiated by the sun. This will tend to maximize the amount of power absorbed by photovoltaic systems. It has been estimated that the use of a tracking system, over a fixed system, can increase the power output by 40% - 70%.

2.1 Working principle of the tracker

in figure (4) show the block diagram of solar tracking system. when sun reflection fall the sensor attach to the right side and the solar panel move left side and similarly, Sun reflection fall in in right side attached sensor and the solar panel move right side. the working principle of incidence and reflection our solar tracker system And the other is the principle on which the solar panel works, which is on the incidence of the solar rays on the photovoltaic cells, will generate electricity.

Fig.(4) block diagram solar panel tracking system



2.2 Position of the sun

In this figure (4) shown the position of sun. Where son located in the sky and earth location specify by two angles (1)solar azimuth angle and (2) solar latitude angle. This angles between su0ln and horizontal surface of earth.

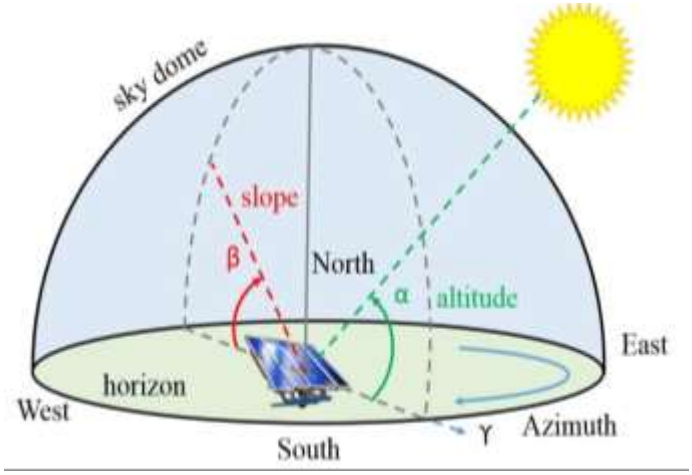


fig. (5) angle representation

3 RESULT

MPPT technique used in PV system one of the most important factor affecting the efficiency of the system.. As result analysis of cost , after decided to use an MPPT system by the researcher, it's important to decide which techniques will be used in application. MPPT techniques will be increase system efficiency and output and increase generation of electricity.

In this paper, normal classification and descriptions of the most widely used MPPT techniques are analyzed in details. Operating principle & application processes of MPPT techniques such as perturb and observe, constant voltage and open voltage, incremental conductance,

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results of analysis, obtained efficiency ranges and other criteria for compare given in table. As shown, different advantages may be selection reason for each technique. capacity, portube & observe and incremental conductance MPPT technique are the most beneficial systems in terms of electrical efficiency.In example, the most widely used commercial designs are portube & observe and IC techniques due to their simple structures and low cost.

Comparison on basis of some parameter	Portube&observe technique	P&O technique	Constant voltage technique	Incremental conductance technique
Efficiency	82.5-85	92 - 95	87 - 88	73 -86
Analog and digital cantrol	both	Digital	both	digital
Measured parameter	V & c	V & c	V & c	V & c

3.1 **CONCLUSION**

increase in solar energy on cloudy days and hazy day we have to work on how collect maximum radiation intensity through solar panels and developed more accurate Mechanism and techniques for increasing solar energy generation. They will work during climate change, cloud days and hazy days ,winter season etc. And developed techniques should be low cost and durable. We should use MPPT charge controller. They will work for increasing efficiency and output of solar panels. because less solar energy is available on hazy days vs cloudy days. To the additional solar energy collected by a hybrid tracking(H type) system using single axis solar tracker and double axis tracking on sunny days and a fixed H configuration. We can take double output from solar panels during two types of panel rotation (1) horizontal rotation and (2) vertical rotation. Other up – down reflection.

4 **REFERENCE**

[1] Nelson A. Kelly ⇑, Thomas L. Gibson General Motors R&D Center, 480-106-269, Chemical Sciences and Materials Systems Laboratory,30500 Mound Road, Warren, MI 48090-9055, USA

[2] DOLARA, R. FARANDA, S. LEVA Department of Energy of Politecnico di Milano, Via la Masa 34, 20156, Milano, Italy.

[3] Marcel Suri1, Tomas Cebecauer1, Artur Skoczek1, Ronald Marais2,Crescent Mushwana2,Josh Reinecke3 and Riaan Slovaki GeoModel Solar, Pionierska 15, 83102 Bratislava, Slovakia; Eskom, Transmission Grid Planning, Megawatt Park, Maxwell Drive, Sunninghill, Sandton, South Africa;

[4] Syamsiah Mashohor, Khairulmizam Samsudin, Amirullah M. Noor and Adi Razlan, A. Rahman, “Evaluation of Genetic Algorithm based Solar Tracking System for Photovoltaic Panels”, ICSET, IEEE 2008.

[5] Miguel Romero, Rafael Lemuz, Irene O. Ayaquica Martinez, Griselda Salda˜na-Gonz´alez, “A Calibration Algorithm for Solar Tracking System”, 10th Mexican International Conference on Artificial Intelligence,