



SOLAR PANEL CLEANING MACHINE

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ABSTRACT

Solar energy is a renewable source of energy, which has a great potential. Renewable energy is important to replace the using of electric energy generated by fuel. Dust and dirt particles accumulating on PV panels decrease the solar energy reaching the cells, thereby reducing the overall power output. Hence, cleaning the PV panels is a problem of great practical engineering interest in solar PV power generation. In this paper, the problem is reviewed and methods for dust removal are discussed. A portable cleaning machine was developed and features a versatile platform which travels the entire length of a panel. Programmable Logic Controller (PLC) was used as controller to move the machine and do cleaning. The machine consists of two main mechanism which are; the brush and wiper. Initial testing of the machine has provided favorable results and shows that such a system is viable. Future improvements on the design are discussed, especially the different methods of transporting the machine from one panel to another. In conclusion, it is found that solar cleaning solution is practical and can help in maintaining the clean PV panel efficiency.

1. INTRODUCTION

The sun emits energy at an extremely large rate hence there is abundant availability of solar energy in the nature. If all solar energy could be converted into usable forms, it would be more enough to supply the world's energy demand. However, this is not possible because of conditions in the atmosphere such as effect of clouds, dust and temperature. Solar energy can be converted to more usable energy forms through solar panel. There is unprecedented interest in renewable energy, particularly solar energy, which provides electricity without giving rise to any carbon dioxide emission. Of the many alternatives, photovoltaic method of extracting power from solar energy have been considered has promising toward meeting the continuously increasing demand for energy. The efficiency of solar panel is limited due natural conditions so it is very much essential to take care of parameters like dust, humidity and temperature. In this regard

the work has been taken up to study the efficiency of solar panel with and without dust collected on it. The developed project includes design and to implementation of plc based dust cleaning system. The main aim of the project is provide cleaning machine for solar panel [1].

2. MATERIAL AND METHODS

2.1 Materials

This research was developed using 3 main segments. The first segment is stepper motor, this project are going to use one type of motor with several units in order to move the solar panel cleaning machine.the water pump is for cleaning solar efficiency. For processor segment is using PLC module.

2.2 Methods

The cleaning machine moves on the board in a backward and forward movement. The wiper mounted on the installation and device unit reciprocates within the forward and backward direction. The cleaning machine in conjunction with the wiper moves along the central board splashing the water droplets towards the other end of the panel. It powers the dust to move within the heading of the movement of the cleaning unit and at long last flows it absent at the edge of the panel. Once the cleaning unit comes to the other end, the water splashing stops and it again returns back. Once it comes to the domestic position, it sends the signals to the PLC. The cleaning machine stop.

2.3 Characterization

System that use to control this solar panel cleaning machine is including the usage of Programmable Logic Control (PLC) to construct the programming.

3. RESULTS AND DISCUSSION

The misfortunes of the output control of the fixed solar board is approximately 20% of the rated abdicate and can be higher depending on the dust form. The earth and fowl drop make a hotspot in the panel, and it can make transitory fail within the panel. Dry cleaning can' not evacuate all the soil on the surface of the solar panel, but it is able to remove the external layers of the clean. Cleaning solar panel with water increments the cleaning productivity by removing larger part of the earth kept on the panel. No external

powers are required as the self-cleaning framework takes its control from the battery of the sun oriented panel. Figure 1 showed the solar cleaning machine that control by using stepper motor and PLC that experiment on solar panel.



Figure 1. Solar panel cleaning machine

4. CONCLUSIONS

This study successfully provide a method to clean the dust on the solar panel directly by using the solar panel cleaning machine. The sticky dust needs to be remove using hard brush or through mopping action. So as know prevention is better than curing as a result the cleaning action prevents the primary accumulating surface dust on the solar panel before it becomes to sticky to remove.

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