

AUTOMATIC CLEANING SYSTEM FOR SOLAR PANELS

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Abstract - Energy is one of the major issues that the world is facing in India, the supply of energy has been one of the major problems for both urban and rural households. About 60% to 70% of the energy demand of the country is met by fuelwood and agriculture residues. Solar energy is a renewable source of energy, which has a great potential and it is radiated by the sun. Renewable energy is important to replace the using of electric energy generated by petroleum. Solar power has become a source of renewable energy and solar energy application should be enhanced.

The solar PV modules are generally employed in dusty environments which are the case tropical countries like India. The dust gets accumulated on the front surface of the module and blocks the incident light from the sun. It reduces the power generation capacity of the module. The power output reduces as much as by 50% if the module is not cleaned for a month. In order to regularly clean the dust, an automatic cleaning system has been designed, which senses the dust on the solar panel and also cleans the module automatically. In terms of daily energy generation, the presented automatic cleaning scheme provides about 30% more energy output when compared to the dust accumulated PV module.

Thus cleaning system has been designed which cleans the module by controlling the Arduino programming. To remove the dust in the PV modules to improving the power efficiency

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 microcontroller based dust cleaning system. The main aim of the project is provide automatic dust cleaning mechanism for solar panel. Traditionally cleaning system was done manually. The manual cleaning has disadvantages like risk of staff accidents and damage of the panels, movement difficulties, poor maintenance etc. The automatic dust cleaning system of solar panels has taken to overcome the difficulties arise in the traditional cleaning and also produces an effective, non-abrasive cleaning and avoids the irregularities in the productivity due to the deposition of dust. The studies carried out to evaluate the efficiency of solar panel for dust collected on it for one day, one week and a month. The efficiency of solar panel also calculated after cleaning the surface for one day, one week and a month. And finally comparing both the efficiencies it is proved that solar panel efficiency increases considerably. Thus the developed model enhances the solar panel performance.

COST ESTIMATION

COMPONENT	RATING/QUANTITY	TOTAL COST
Solar Panel	3Watt	500
Resistors& LED	10K,470ohm/7,5	20
Diode	1n4007/4	20.00
Opto coupler(1&2)	Mct2e 2410,2430	100
Transformer	220V,9-0-12V/1	150.00
Voltage regulator	7812CV/1	100.00
Transistor	NPN-547/1	20.00
Relay	6V/1	70.00
PCB	1	50
Dc motors	9-12v/4	400.00
Capacitor	2400microfarad/1	20.00
Arduino	Atmega328,9v/1	350.00
Wires	20	150
Adaptor	1	350.00
Glue gun&Rolling brush	1,1	300
Water pump	12v/1	250.00
Soldering machine	1	200

Total amount		3000.00
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CONCLUSION

In three phase application if low voltage is available in any one phase, and you want your equipment to work on normal voltage, this automatic phase changer will solve your problem.

This device is more reliable, is of less cost and maintenance free.

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REFERENCE

- <http://www.allbookez.com/>
- <en.wikipedia.org/>
- <http://www.roshanengineeringcorporation.com/>
- en.wikipedia.org/wiki/Voltage_regulator_module