

Research of Solar Panel System for Future Scope

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Abstract - with the forthcoming drought of Non-renewable resources, people are considering using alternate sources of energy. Solar energy is one such type it is simply attaining center stage as an important means of amplifying renewable energy resources. So it normal to those in the engineering field to easily understand the technologies associated with this field & design new ideas. The recommended system capture the sun's action and tries to maintain the solar panel straight to sun rays, assure that the maximum amount of sunlight is incident on the panel. This is more appropriate than the situated solar panel, where the panel is situated and can't capture the transition of the sun from east to west, hence originate optimum energy. This recommended system solves the problem by arranging for the solar panel to trace the sun.

Key Words: solar energy, solar tracker, stepper motor, differential measurement unit, solar panel .

1. INTRODUCTION

Renewable energy resources pass almost 15% of the total world energy demand. It includes biomass, hydropower, geothermal, solar, wind and tidal energy. In all of this our concentration is solar energy which is reachable in both formation direct as well as indirect form. The sun send out energy at a rate of 3.8×10^{23} KW of which approximately 1.8×10^{14} kW is interrupted by Earth. Solar energy can be converted into electricity with the help of photovoltaic panels. Therefore converting this abundant amount of solar energy into electrical energy would do much good because conventional energy sources are finite & fast depleting. Solar power is used reciprocally with solar energy but refers more accurately to the conversion of sunlight into electricity by photovoltaic.

2. REVIEW OF LITERATURE

Photovoltaic panel manufacturing has increased all over in response to the increasing demand for solar energy. This has been the result of an increased awareness of the damage to the environment that using fossil fuel sources has had done the years.

2.1 Electrostatics cleaning:

Electrostatics cleaning technology is termed "Harvesting electricity". This cleaning technology was first refined by scientists to solve the point at issue of dust deposits on the surfaces of PVs. This technology can also be used in dry dusty

places on Earth. Electrostatic charge material is used on a transparent plastic sheet or glass that wraps the solar panels. Sensors monitor dust zone and activates the system in to cleaning mode. The dust is shaken off the solar panels when an electrically charged wave breaks over the outside material. This is not a safe way for home owners who are using solar panels because the panel shakes which may loosen its connection to the roof and it could fall down and cause injury. However, it is an effective solution for larger systems elsewhere In two minutes this system can remove up to 90% of dust from the surfaces of the PV panels by sending an electrical dust deterring wave which causes the dust to fall off onto the ground. However, this system is not going to remove dust when it gets wet, or if it is in a moist environment. The movement of the wave mechanism requires only a small amount of electricity which makes it a power efficient system however at present; the worldwide usage of the harvesting system is only 4%. (See fig 2.1)



Fig -2.1:Electrostatics cleaning

2.2 Heliotex Technology

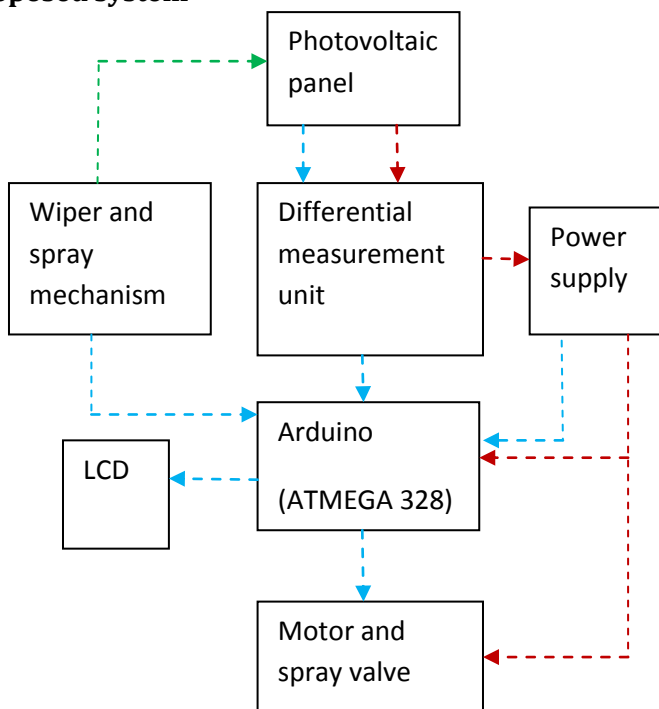
Heliotex is an automatic cleaning system that cleans and rinses solar panel outsides. The cleaning system can be programmed whenever it is urgent, depending on the environment. It does not need any further attention without the replacement of the water purify sand the occasional refilling of the soap concentrate. It consist of five-gallon reservoir for soap, which does not create any damage to the solar panels. The Heliotex system sources the water from the residence via a hose or pipe attach to the pump and attached to nozzles on the solar panel outside without causing rubbing. The system can be fitting to any panel array configuration.

The Heliotex system can be initiated to any size or number of solar panels. (See fig 2.2)



Fig-2.2: Heliotex technology

Proposed system



Electrical power	----->
Data	----->
Mechanical action	----->

Fig-2.3: Block diagram of solar panel cleaning system

I) Photovoltaic Panel (PV Panel):

Solar panels consume the sunlight as a source of energy to create electricity or heat. A photovoltaic (PV) module is a photovoltaic solar cell. Photovoltaic modules fixed the photovoltaic array of a photovoltaic system that creates and supplies solar electricity in commercial and residential applications. Each module is classified by its DC output power under standard test conditions (STC), and typically ranges from 100 to 365 Watts (W). The efficiency of a module actuate the area of a module liable the same rated output. We can use this system for any multicrystalline type of solar panel for prototype; we have considered here a panel which is generating 17Watts 18 Volts.

II) Differential Measurement Unit (DMU): It is a decision making component of this paper. DMU makes decision from the microcontroller unit that either cleans the panel with wiper and spray mechanism or to continue the conversion. DMU consists of adjustable timer so that we can make a timer for cleaning of PV panel after set time interval. As time elapsed and timer reaches its count value then DMU activates the wiper and spray mechanism and start the cleaning of PV panel.

III) Wiper and Spray system: As its name suggest that it is a system which is use to clean the PV panel. It consists of wiper or brush fixed on PV panel. When timer activate this mechanism then mechanism will start moving from one end of PV panel to clean it and it will move towards the other end of a PV panel. This mechanism is controlled by motor and spray valve control block.

IV) Microcontroller: It will operate the whole system. μC will operate various blocks of this paper i.e. DMU, Wiper and Spray Mechanism, Motor and Spray Valve Control etc. As per the coding we can operate these blocks. For coding it requires a C programming.

V) Motor and Spray Valve Control: This block is use to operate the motor assembly and spray valve. It will pump the water from water tank to wiper and spray mechanism. Motor assembly will move the wiper and spray mechanism across the PV panel.

VI) Power Supply: As its name indicates that it will generate the power which need for operation of whole system. A 12 V DC supply will need to operate the motors for rotating the PV panel and to move the robot on the PV panel. Another power supply of 5 V DC supply will require to operate the ICs in the circuit e.g. Microcontroller.

ADVANTAGES

- 1.The surface of PV panel remains clean always.
- 2.By using adjustable timer, user can clean the panel as per convenience.
- 3.It gives better efficiency comparing with general systems
- 4.No man power is required for cleaning.

DISADVANTAGES

- 1.As wiper is used wear and tear increased.
- 2.Consumption of water.

3. CONCLUSION

In this paper, we focus mainly on research of solar panel system or their upcoming sources that help to improve our efficiency of solar panel system.

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