

Benefits Of Using Solar Panel Cleaner

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ABSTRACT

As climate change and global warming threaten the future of our planet, it is becoming increasingly important to find sustainable ways to meet our energy needs. One of the most efficient ways to switch to a renewable and environmentally friendly energy source is to use solar panels to generate electricity using the energy of the sun.

Solar panels are one of the most cost-effective and maintenance-free power generation methods due to the lack of moving parts. Despite all those benefits, the efficiency of solar panels can decrease as dust, dirt, and dirt build up. To maintain maximum power generation efficiency, solar panels need to be cleaned in a timely manner. However, manual cleaning of solar panels is dangerous and time consuming.

This solar panel cleaner aims to maintain the efficiency of solar power generation by keeping the solar panels clean without endangering people. This cleaner is equipped with a brush to remove all dirt and dirt from the surface of the panel. This solar panel cleaner works remotely.

Keyword : - Solar1 , Cleaner2, Energy3, and powe4r

1. Introduction

Solar energy is the most abundant source of energy for all life forms on Earth. It is also the basic source of all energy sources except nuclear power. Solar energy faces many challenges, including high cost, unpredictable and unpredictable nature, storage requirements, and low efficiency. It is today's situation that increasing the efficiency of photovoltaic power plants by solving the problem of dust buildup on the surface of solar panels, which leads to a decrease in power plant production and overall power plant efficiency. Is the most important. We are proposing the development of a solar panel cleaning system that can maintain the performance of a photovoltaic power plant by regularly removing dust accumulated on the surface.

1.1 Problem Statement

DUST AND DIRT

1 To cleaning the dust on surface of panel it leads to improvement in panel output and overall panel efficiency. To clean the solar panel effectively.

- 2 Solar cells cannot absorb light as effectively when the surface of the solar panels are covered with dirt or birds droppings, which doesn't get washed by the rain. Making frequent physical inspections and spraying water on your modules can help reduce the problem.
- 3 This can reduce output and efficiency of the system completely if left untreated for years.
- 4 A typical cleaning will result in a 10%-60% increase in efficiency.

REMOVAL OF DUST AND DIRT

Dusty environment accumulation of dust on the solar panels leads to reduction of the transmittance of the panel. Solar desalination plants in some of the middle-east countries like the solar desalination plant of Abu Dhabi suffers from the deposition of dust on its solar plates. The effect of the accumulated dust will be reduced with the increasing of tilt angle, since the tilt angle will affect the exposure time to the sunlight also. But the best way to eliminate the effect of the accumulated dust on the solar panels is to clean the panels. Cleaning the solar panels is normally by washing which is tedious and cumbersome and also expensive in terms of the labour involved and time. In practice cleaning of solar panels should be frequently done.

1.2 Objective

- 1 To increase the efficiency of solar panel.
- 2 To make the system automated.

1.3 Scope

- It can be implement on large PV panels.
- Silicon brushes can be used where it gives max life of cleaning
- Replacing the rack and pinion mechanism with other type of mechanism like track system for bigger power plants.
- Wireless Transmission :- the movement of the tool which is done wirelessly by using radio frequency which will reduce the cost involved in installing the system and also the complexity in maintaining the system will be reduced.
- Wireless Monitoring :- The system monitored by interfacing With PLC by wiring can also be done wireless.
- Interfacing with VFD(Variable-Frequency Drive) for optimizing the power consumed by the system.

2.Literature Review

Solar energy is an efficient source of energy for all the forms on the planet. Being a renewable source it has multiple advantages like pollution free, abundant availability hazardless etc. The solar panel works by absorbing the light into solar cells. The power of the solar panel depends on the intensity of sun radiating on the surface. Due to inclined solar panels, they are more liable to build up the dust on it. Our project aims at increasing the efficiency of solar power panel by solving the problem of gathering of dust on the surface of solar panel. Thus, by cleaning the dust on surface of panel it leads to improvement in panel output and overall panel efficiency.

3 Design Of Soalr Panel

CAD allows you to design curves and shapes in two-dimensional (2D) space. Alternatively, a curved and rugged computer-aided design (CAD) is the use of the computer system "or workstation". Helps create, modify, analyze, or optimize your designs. CAD software is used to improve productivity, design quality, and document communication for engineers and create databases for manufacturing. CAD output is often in the form of electronic files for printing, machining, or other manufacturing operations. The term CADD (Computer Aided Design and Drafting) is also used.

Its use in the design of electronic systems is known as Electronic Design Automation (EDA). Mechanical design, called mechanical design (MDA) or computer-aided drawing (CAD), involves the process of creating a design using computer software. Mechanical CAD software can also use vector-based graphics to represent traditional drawing objects or to generate graphics that show the overall appearance of the object under design. But it's not just a form. Similar to manual engineering and drafting, CAD output must convey information such as materials, processes, dimensions, and tolerances according to application-specific rules. In three-dimensional (3D) space

4. Working Principle

Energy is one of the major problems facing the Indian world. Energy supply is one of the biggest problems for urban and rural households. About 60% to 70% of the country's energy demand is covered by firewood and agricultural residues. Solar energy has great potential and is a renewable energy source radiated from the sun. Renewable energy is important to replace the use of petroleum-based electrical energy. Solar energy is a source of renewable energy and the use of solar energy needs to be improved. PV modules are commonly used in dusty environments. This is true for tropical countries such as India. Dust collects on the front of the module and blocks incoming sunlight. The power generation capacity of the module will decrease. If you do not clean the module for a month, the output will drop by up to 50%. The cleaning system is designed to clean the module by controlling the Arduino programming. The sun emits energy at a very high rate, so solar energy is abundant in nature. Being able to convert all of the sun's energy into usable forms would be more than sufficient to meet the world's energy needs. However, this is not possible due to atmospheric conditions such as clouds, dust, and temperature. Solar energy can be converted into a more user-friendly form of energy by solar panels. There is unprecedented interest in renewable energies, especially solar energy, which supplies electricity without emitting carbon. Among many options, photovoltaic methods for generating electricity from solar energy have been seen as promising to meet ever-increasing energy demand. Since the efficiency of solar panels is limited by natural conditions, it is very important to pay attention to parameters such as dust, humidity and temperature. In this regard, work has begun to study the efficiency of solar panels with and without dust buildup. The developed project includes the design and implementation of a microcontroller-based dust cleaning system. The main goal of the project is to provide an automatic dust cleaning mechanism for solar panels.

5. Conclusion

The goal of this project is to develop an automatic solar panel cleaner that addresses the adverse effects of pollution on commercial solar cells. Specifically, I wanted to create a device that would work for up to 7 years at a cost of less than £ 10,000, while improving the efficiency of dirty panels by 10%. In addition, a successful design works without water and requires only annual maintenance. Current devices use a brush cleaning system that cleans with a set cleaning cycle. Use a rolling brush to clean the series of slabs as you move them horizontally. The device is mounted on a set of battery-powered electric wheels. At the end of the panel is a docking station for charging. In addition to improving efficiency, we hope that our designs will continue to drive the growth of solar energy around the world. Efficient purification equipment not only helps communities move to the use of cleaner alternative fuel sources, but also helps society as a whole reach its goal of using reliable energy.

6. REFERENCES

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