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AUTOMATIC SOLAR PANEL CLEANING SYSTEM USING IOT

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Abstract: This project provides transparency in the solar cleaning system by using newly invented technology, which offers better performance, stability, and extensible solution for removing dirt particles on the solar panels. Energy is the central issue that we are facing. The transfer of energy has been a significant problem in rural areas. In both urban and rural zones, most of the solar panel road lights are used. After the installation of the solar panel road lights, it only works for a few days. This problem occurs due to the solar panel is not cleaned frequently. The dirt gets accumulated on the solar panel surface and blocks the energy from the sun, and it reduces the power generation capacity of the panels. Then it does not give the desired output, and we have to replace solar panels every time. This automatic solar system is controlled by application from the whole world. Also, this process reduces the manpower for cleaning the solar panel. This is an automatic solar panel cleaning system.

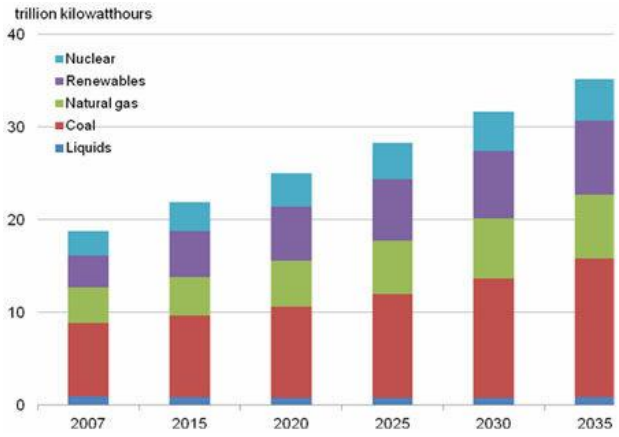
Keywords **- Solar Panel, Arduino board, Application, Cleaning, Automated System, Water Spray, NodeMCU, IoT.**

I. INTRODUCTION

Electricity is one of the critical issues targeting the world. Over 60 to 70 percent of the country's energy demand is through contact with energy timber and agricultural reserves. The sun-based vitality is the constant well-being of the life force, which has incredible vibrancy and is channelized by the sun.

Dirt particles accumulate on solar panels that cause a decrease in the optical performance of systems. Accumulation of dirt particles like ash, limestone, red soil, water, and silica sand significantly impacts the performance of (photovoltaic) modules. It affects the surface of the solar panel and obstructs or distracts sunlight energy from reaching the solar cells, and result in a reduction in energy production.

The solar cleaning system was done by staffing. Manual cleaning has some disadvantages, like the risk of staff disasters and damage to the panels. In addition, it increases the cost of maintenance. The automatic dirt cleaning of solar panels has been chosen to reduce the obstacles in cleaning, provide an efficient way of cleaning, and avoid inconsistencies in productivity due to dust deposition such as ash, silica sands, etc.

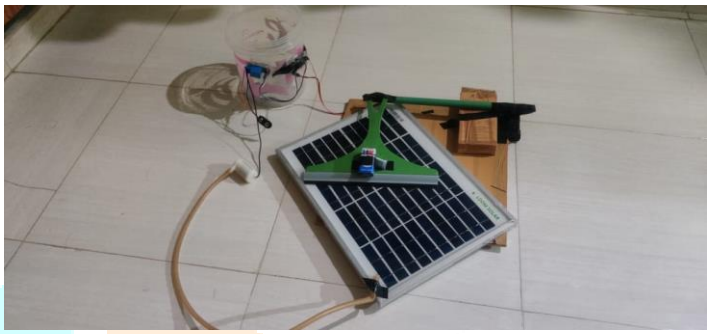


II. METHODS

This automatic solar panel cleaning system is run by using an android application. The power supply is handing over to the solar panels through the 12-volt battery, and it occurs by touching the switch from the android application. The wiper tool is moved horizontally by pressing a button in the android application. It enables the output signal given through Wi-Fi to the stepper motor. The Stepper motor is connected with a wiper, and it provides movement on the solar panel. This cleaning tool moves backward and forward. The stepper motor carries this entire wiper movement mechanism.

During wiper tool movement, together 12-volt water pump is pumping the water on the top of the solar panel corner edge; this is done by pressing a button in the android application. Water is sprayed from up to down, and simultaneously wiper wipes solar panel dust, and the dirty water flows away at the bottom edge of the solar panel. Then it gives the off signal from the mobile application, and the cleaning process will stop.

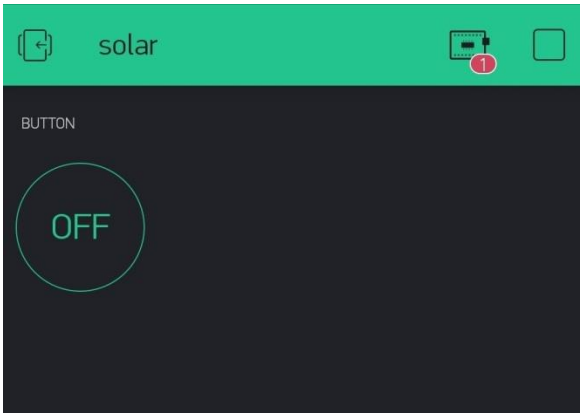
III. MATERIALS



Automatic solar panel cleaning system [whole view]

Water Pump

Top View of Automatic solar panel cleaning system



Mobile Application to control solar panel cleaning system

IV. RESULTS

Dust particles or some other specks of dirt are the reasons for of losses power. Another method is bucket soap cleaning. However, it leads to damage to the solar cells. In this solar cleaning system, no manpower is required. This system uses a reusable battery, and the battery is recharged directly from a solar panel, which consumes light energy from the sun. And this system controls by an android application by pressing the on button. This system is made of lightweight- better materials, so the cost of maintenance and power consumption are less than other systems. Water cools the temperature of the solar plate during the process of cleaning. It also increases power generation.

V. CONCLUSION

In final, the automatic solar panel cleaning system working accurately. We see the proper solar panel cleaning is done. This automatic solar panel cleaning system is operable from anywhere through the mobile application. In the future, by replacing the existing system with newly updated technology, it can be designed for different types of solar panel installations. And it is also based on the need for cleaning dependent on the continent's weather and type of land. This model can be implemented on a small scale like single panels, solar pump cleaning, etc.

VI. ACKNOWLEDGMENT

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