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SOLAR POWERED AIR PURIFIRE

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Abstract: Air pollution has become a serious problem these modern days. Air pollution is present outside in the environment and has become difficult to provide safety inside the house. This polluted air can cause many serious health problems in cities. If someone is suffering from breathing problems like Asthma or Sinus or suffering from any lung problem then air-purifieracts as a surviving tool. Air purifier reduces the chances of health issues caused by indoor pollutants, which directly trigger neurological problems, respiratory infection or symptoms inasthma suffering. Hence, the fabrication of a low-cost solar-powered air-purifier made using aair filter, Activated Filter, Solar Panel, and some miscellaneous components that can becomea low-cost but efficient alternative for surviving in such difficult times. This air purifier uses various processes like filtering large dirt particles on the first pre-filter, then capturing dust particles and smoke molecules at the air filter, and uses Carbon-filter to capture micro-particlesproduces clean purified air. The analysis and results conclude that the Air Purifier can produce96 percent of clean air and can run up to 14 hours a day by a solar-powered system.

Keywords **-Solar panel, Battery, ESP8266(NODEMCU), Active carbon filter**

I. INTRODUCTION

As we know that air pollution level in cities is very high. Most of pollution comes as by-productfrom vehicle and construction of buildings, these are in form of particulate matter which are like methane, carbon dioxide, dust particulate etc. These create a lot of health problems like respiratory illness, decreased lung functions, development of diseases like asthma etc. Larger dust particles are major particulate among these and if its air quality value is down to minimumthen air has very improved quality in which all type of living things can breathe easily.

The majority of contamination comes as result from vehicle and civil construction areas, gaseslike CO2, earth dust, air particulates, abnormal gases, dusty area, etc. All the produce health issues when respired. The contaminated particles and air should be cleaned to reduce the respiratory from inhalation of the air. The respiratory organ may be produced to progression ofsicknesses like asthma attack, etc. Bigger earth particles square-up a measure for significant waste material among these and the air in the surrounding will need a purification process as to the standard levels of pure air. Despite the fact that these measures undergo multiple processes of air track arrangement that square measure out there in market anyway none of them square measure sufficiently spare to convey its working intensity openly puts like transport stand, near medical clinics, traffic signals etc. Government organizations have terriblylow take into account setup of clean air for improved production. So, such an air purification system is suggested for areas that are polluted by abnormal particulates as this is economical and has better efficiency.

Although there are many types of air purifier that are available in market but none of them aresufficient enough to deliver its working efficiency in public places like bus stand, near hospitals, traffic signals etc. Many institutes are also not able to afford these because of high cost and installation cost. Government organizations have very low budget for air purifier likeextra expenditure. So, it is advisable to develop such air purifier which can cost less and are highly efficient.

A solar powered air purifier is designed, which runs on solar energy with use of filters and alsoworks for longer duration than other types of purifiers. The component used are solar panel, fan, solar charge controller, air filter.

LITERATURE SURVEY

National Air Quality Index

National Air Quality Index Awareness of daily levels of air pollution is important to the citizens, especially for those who suffer from illnesses caused by exposure to air pollution.Further, success of a nation to improve air quality depends on the support of its citizens who are well-informed about local and national air pollution problems and about the progress of mitigation efforts. Thus, a simple yet effective communication of air quality isimportant. The concept of an air quality index (AQI) that transforms weighted values of individual air pollution related parameters (e.g., SO2, CO, visibility, etc.) into a single number or set of numbers is widely used for air quality communication and decision making in many countries.

Identification and Characterization of Particulate Matter Concentrations at Construction Jobsites

The identification and characterization of particulate matter (PM) concentrations from construction site activities pose major challenges due to the diverse characteristics related to different aspects, such as concentration, particle size and particle composition. Moreover, the characterization of particulate matter is influenced by meteorological conditions, including temperature, humidity, rainfall and wind speed. This paper is part ofa broader investigation that aims to develop a methodology for assessing the environmental impacts caused by the PM emissions that arise from construction activities. The objective of this paper is to identify and characterize the PM emissions on a construction site with different aerodynamic diameters

(PM2.5, PM10, total suspended particulates (TSP)), basedon an exploratory study. Initially, a protocol was developed to standardize the constructionsite selection criteria, laboratory procedures, field sample collection and laboratory analysis.

Design and Fabrication of Solar Powered Roof Ventilators. Authors: - Ti Wai Chan, Umar Nirmal (2015) Methodology: - Scale model experiment Review: - This research intends to design a solar powered roof exhaust fan with a simple installation design. -The design has a structure such that parts are oriented around the axis of the fan. Two types of fans were tested: a centrifugal fan and an axial fan. In these experiments, parameters such as ambient, room and attic temperature were measured. The results showed that the axial fan is more effective.

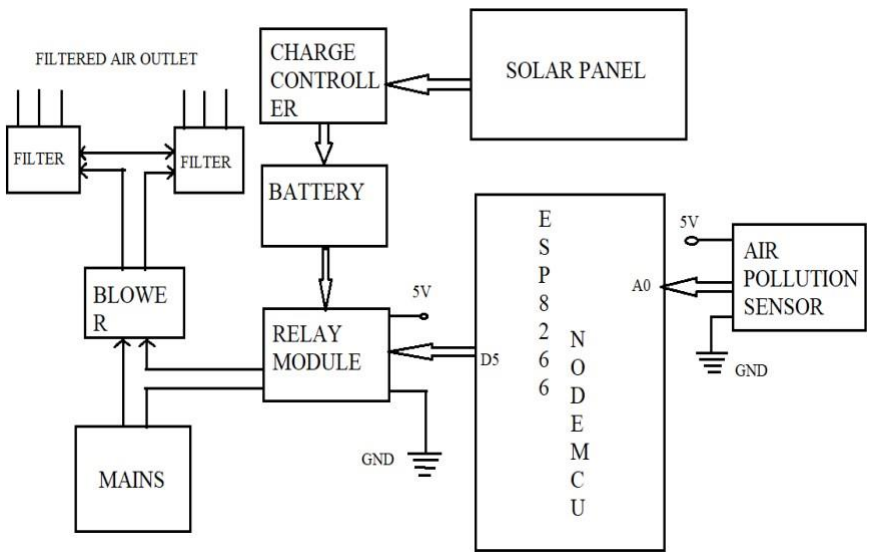
PROBLEM STATEMENT

- Commercial HEPA air filters cannot reduce level of atmospheric Carbon Dioxide.
- Toxic pollutants are not filtered in the existing projects
- Cost of Electricity is more per unit.
- Above air purifier does not filter the small dust particles.
- The earlier purifiers cannot operate at variable speed it runs only at moderate speed tofilters the air.

OBJECTIVES

- Improves the pure air quality.
- Eliminate the hazardous asbestos particles.
- Serve better and pure air for world.
- Limit the spread of harmful residues.

METHODOLOGY



DESCRIPTION

The Solar Panel captures sunlight and converts solar-energy into electrical-energy, then sendsit to Solar Charge Controller to handle the unstable current. The Solar Charge Controller supplies stabilized current with 12 Volts to the battery. The battery stores the current accordingto its respective capacity. From Battery it is connected to relay module at 12V, from the relay module it is connected to microcontroller (ESP8266(NODEMCU)), relay powers 5V to the microcontroller. To the microcontroller MQ135 air sensor is connected, it requires 5v dc supplyto operate. From the mains supply the blower is connected to the air filters. Blower is used to suck the impure air and send to the filter for the filtration of the impure air.

When the impure air comes in contact with the air quality sensor it detects the present in the air and this sends the message to the microcontroller. The microcontroller send the signal to the blynk app showing the particulate matter present in the surrounding atmosphere, when the air quality level of surrounding atmosphere goes above the normal level the filter should be turned on. This can be control over from anywhere by connecting the WI-FI to filter through the ESP8266(NODEMCU) module. The filters used in this filter is a type of green coloured filter, which has the ability to filter the dust particles, carbon dioxide and harmful bacteria's. The charge controller used is of MMPT type which helps mainly in the conversion of AC to DC power supply and this also helps in amplifies the bulk solar power coming from solar panel.Relay is used to control the power supply from AC supply to the components. Air Quality sensors MQ135 connected to front and back of Air Purifier read the Polluted Air going insideand Clean Air coming outside.

ADVANTAGES

- Eliminates harmful chemicals from environments
- Neutralizes unpleasant odours
- Reduces the chances of airborne diseases
- Removes harmful radon
- It can increase life expectancy

APPLICATIONS

- It is used for the domestic purpose.
- It is used to maintain clean and healthy air in the Hospitals.
- It is used in the Institutions to maintain the good condition air in schools andcollege.
- It used in the Commercial buildings.
- It can be used in the Industrial plants.

CONCLUSION

- This Solar Powered Air Purifier is efficient than other type of device available in market.
- It is also very economical and do not have to replace any component frequently.
- It reduces particulate level to satisfactory position where a person does not worry about pollution related problems.
- A pure and clean air is right of a human being and all other living creatures on thisearth and this project is an effort to purify and full fill the basic requirement of everyliving organism.
- It can be controlled over anywhere through mobile using the Wi-Fi module.

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