

# Solar Powered Outdoor Air Purifier with Air Quality Monitor

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**Abstract** - This research paper is about designing and fabricating an air purifier system which is powered by solar energy and testing the effectiveness of the system to curb the air pollution. The focus is on extracting the suspended particulate matter from the air which are the major contributors in the pollution of air in many urban cities. It works on a non-conventional method and intends to achieve best possible air purification results using eco-friendly and economical method. It works on the basic principle of adhesion of the suspended particles in the air with the liquid and settles down due to being heavier than air and gets separated from the air helping us to achieve better air quality index. The fans and the pump in system are operated with the help of solar energy, produced by solar panels, which converts the solar radiations into electricity.

**Keywords:** Solar power, Air Quality index, Filters, Atmega328, MQ sensors.

## I. INTRODUCTION

As we know that air pollution level in cities is very high. Most of pollution comes as by-product from 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 are down to minimum then air has very improved quality in which all type of living things can breathe easily.

Although there are many types of air purifier that are available in market but none of them are sufficient 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 like extra expenditure. So, it is advisable to develop such air purifier which can cost less and are highly efficient. So, we are making solar powered air purifier, which runs on solar energy without use of filters and also works for longer

duration than others. It uses component like solar panel, fan, converter, pump, etc.

## II. METHODOLOGY

There is a chamber during which air is sucked in by the fan, while the air is coming into it more developed channel. At the same time water is wired from supply to the at miser that proselytes water into little water drops and these drops square measure suspended into the chamber close to air. These water beads have glue property because of that the stuff and mud particles get retained on them.

This way air is purged and is flown out from chamber by fan. The water with earth and stuff is gathered in vanishing tank, any place water underneath goes characteristic dissipation strategy, leaving the soil and stuff these square measure irregularly purged and water is utilized again in air tidy up technique. Furthermore there's a gadget unit that recognizes the break O level in air and contrast and the power source O level at long last the filtration and show the correlation previously and when the sanitization on the diode show that is associated with it.

We make it easier to monitor your outdoor air, designing integrated sensor and software systems that take the hassle and risk out of air quality monitoring.

Robust, purpose-built for the outdoors, and simple to set up, our outdoor air monitoring systems are suitable for a wide range of applications. Our solutions have helped environmental professionals and industrial hygienists mitigate the impact of air pollution on communities and workers around the world.

Reference sensor technology delivers accurate, defensible data for:

- Particulate matter (TSP, PM10, PM2.5, PM1)
- Gases (Ozone, NO<sub>2</sub>, VOCs, CO<sub>2</sub>, H<sub>2</sub>S, BTEX)
- Meteorological (Temperature, humidity, rain, pressure, wind speed/direction, solar radiation, noise)

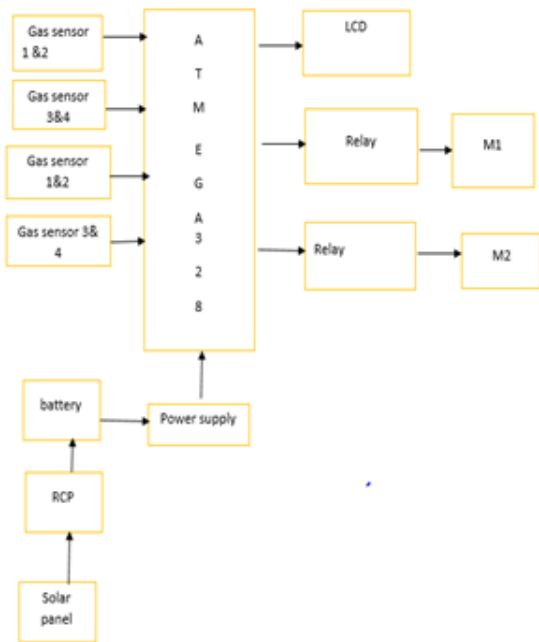


Figure 1: Block Diagram

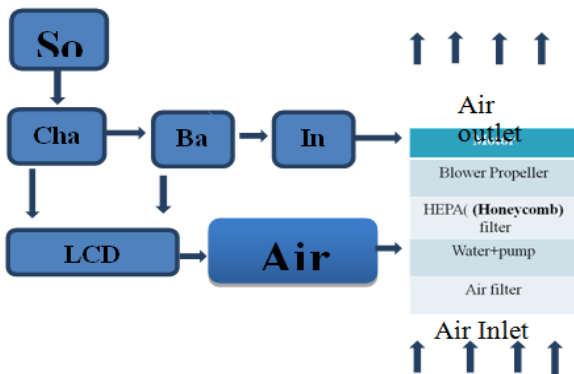


Figure 2: Block Diagram of Solar Powered Outdoor Air Purifier with Air Quality Monitor

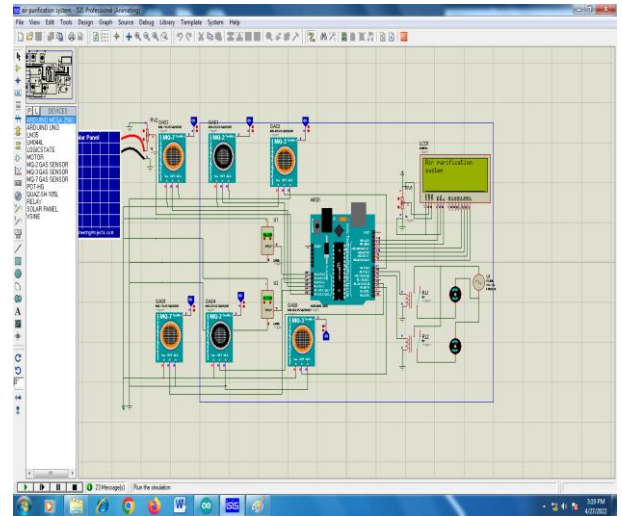


Figure 4: PROTEUS Simulation Result 2

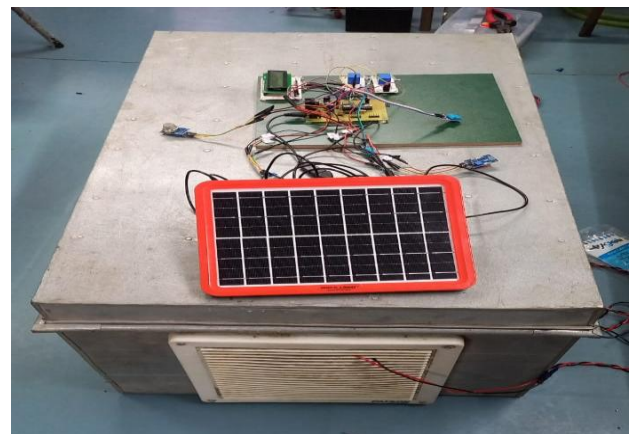


Figure 5: Hardware Implementation

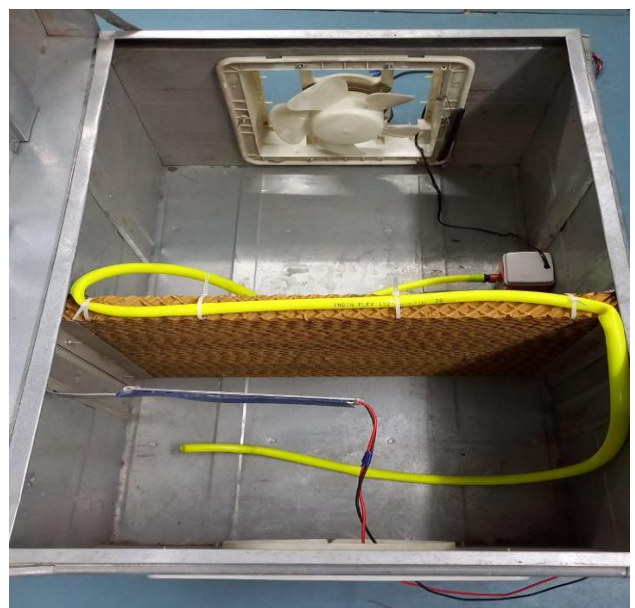


Figure 6: Hardware Implementation

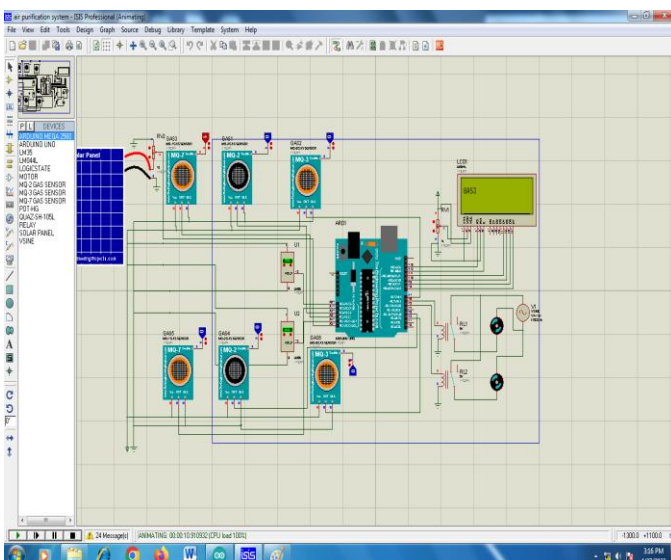


Figure 3: PROTEUS Simulation result 1

#### IV. RESULTS AND CONCLUSION

The purification of air is so important that it eradicates any air borne disease. This study presents the development of a novel portable air purifier with a set of filters for improvement of air quality for outdoor. Detailed hardware and software design are shown and experiments in a real world office environment are performed. The depicted battery controlled setup for monitoring and supply of clean air. pure and clean air is right of a human being and all Other living creatures on this earth and this project is a small Effort from our side to give the all their right. In this study paper the solar powered air purifier with air quality monitoring system we use different gas sensor which is detected co<sub>2</sub> gas. And also detected inner temperature and outer temperature of chamber. the most important application about this project we use UV rays are installed in a chamber. This UV rays can kill the all bacteria present in an air.

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