

# Solar Exhaust Fan

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## Abstract

*A star supercharged standing dc fan may be a small, moveable style of fan that's employed in varied rooms of home or office. It's additional convenient compared to alternative types, like room exhaust, window, and pedestal fans because of its portability. It serves variety of functions for home house owners and workplace staff cherishes conservation of energy, removal of warmth and unwanted fumes from indoor areas, cooling an area and generation of Mechanical noise that helps to distract someone's attention from undesirable background thus one might focus on his task. The concept of a star fan has been established to be superb particularly for a rustic like Nigeria that enjoys a median of eight hours of daylight daily.*

**Keywords:** Exhaust fan, dc motor, and solar energy.

## 1. Introduction

In the household application the fan has main role. The exhaust fan is employed to unfold smoke from space to outside the room. it's work on AC provide and it will consume more power. Hence we have a tendency to are manufacture a brand new fan i.e. star exhaust fan that is work on solar energy. Solar energy presently represents the foremost abundant inexhaustible, non polluting and free energy resources that would be used economically to provide man's increasing energy demands.

Over the years, there has been a good insight into the need to tap into the proper utilization of the renewable energy. As a result, there are nice strides in trying out many electrical gadgets and equipment as to how they could be powered with renewable energy sources just like the star energy.

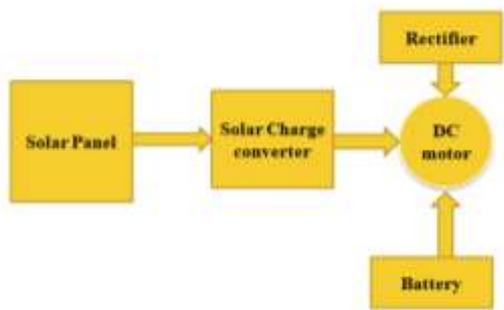
The share of renewable in electricity generation is around 19%, with 16% of global electricity returning from electricity and 3% from new renewable. (Renewable Energy Policy Network for the twenty first Centuries, 2011).

One of the most exciting developments in the renewable energy sector in recent years has been the decline within the price of Photo-voltaic (PV) cells. PV module prices at the start of 2012 were nearly 50% down on a year earlier, and a few 76 low their level within the summer of 2008, The Spanish PV boom was at its height (UNEP, 2012).[2].As availability of fossil fuel is decreasing due to over-dependence in its use except for its effects on ozone layer depletion, it is convinced that solar power will contribute considerably to addressing the current challenges in energy and climate change. "There is a notable growing need for countries to reduce their emissions and achieve greater energy",[1] independence while facing increasing volatility in fossil fuel prices, significant increase in energy demand and CO2 emissions in emerging countries and decreased nuclear generation within the energy mixture of developed and developing countries. Several if not all day-to-day useful gadgets such as fans, water dispensers, among others ought to function on the star energy. Gernrally, solar DC-powered fan is a lot of convenient compared to other types, like room exhaust, window, and pedestal fans because of its portability. There are 2 primary types of fans, namely; centrifugal and axial [2].

A typical fan system consists of a fan, an electric motor, a drive system, duct or piping and flow control devices Fan style could be a compromise between the assorted fan parameters that have an effect on fan efficiency. The capacity is directly proportional to the speed of fan ; the pressure (static, total, or velocity) is proportional to the sq. of the fan speed; and the power required is proportional to the cube of the fan speed .There The aim of this work therefore is to style an energy economical star exhaust fan This aim is achieved by creating design ideas on the product (solar exhaust fan) through product style specifications that would enhance better lifestyles and luxury of the user, planning a star fan that meets safety requirements of the user in his environment; and save the electrical energy.

## 2. Methodology

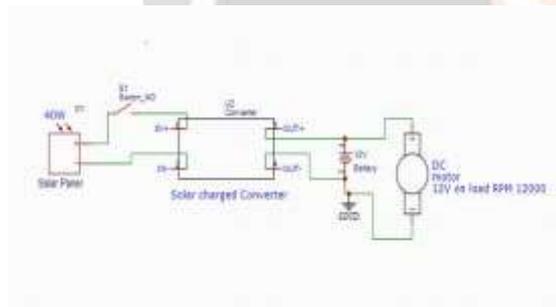
This paper we have design such type of exhaust fan which is directly connected on the solar in which the battery charging circuit is not required. And this fan has comparable output of the general AC exhaust.



**Fig 2.1: Block diagram of solar exhaust fan**

### Working of project

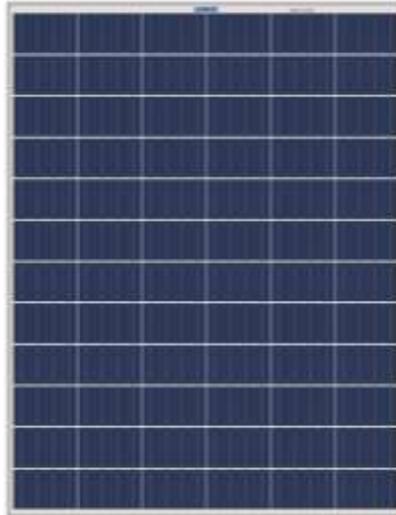
Our project is solar exhaust fan. It is works on dc power supply. The solar panel is converting the light energy into electrical energy. The output of the solar panel is not pure DC supply it has some variation or we called it is pulsating DC supply. Therefore we using the solar charge converter with buck converter that can reduces the over voltage and give the constant DC supply to the exhaust fan. But when the during the winter season or while at night the exhaust fan is not work ? Hence we are give the provision of Connecting the battery or dc charger to the exhaust fan.



**Fig: Circuit Diagram of the Project**

### Components Required

1. Solar panel



**Fig 2.2: solar panel 12volt.**

**Table 2.1: Specification of the solar panels**

Parameters	Details
Model	Tata
Wattage (Wp)	40 Wp
Panel Type	Polycrystalline
Warranty	60 months
Solar Panel Dimension (L*B*T) cm	43.5*67*3.4 cm
Net weight (kg.)	3.3 kg
Short Circuit Current, Isc (A)	2.42 A
Maximum Power Voltage Vmp (V)	18 V
Open Circuit Voltage, Voc (V)	22 V
Maximum Power Current , Imp (A)	2.23 A

## 2. Solar charged converter (boost converter)



**Fig 2.3: Buck Converter**

This buck converter helps to provide constant voltage and appropriate current to battery to charge efficiently. And it handles the input voltage of 3-40volt and drops up to 1.5-35 voltage with adjustable facility. The conversion efficiency is 92% highest. And the output current is 2-3Amp.

## 3. High Speed motor



**Fig 2.4 High speed motor**

### Specification of motor

- Motor Type: 775.
- Operating Voltage: 6~20Vdc. (Nominal 12Vdc)
- Power rating is 100 watts
- No Load Speed: 13000 - 15,000 RPM @ 12V.
- Rated current: 1.2A @ 12V.
- Stall Torque: 79Ncm @ 14.4V.
- Cooling Fan: Internal
- Overall Size: 98x42mm.
- Shaft: Full Round Type Ø5mm.
- Mounting Screw Size: M4.
- Weight: 350g.

## 3. Conclusion

We have successfully design the solar based exhaust fan which works on the solar and its output very near to general exhaust fan which can work on the AC supply.

## 4. Advantages

- It works on DC power supply. thus this promotes to save lots of the energy.
- It has facility to figure on battery similarly DC adapter.
- It is moveable with the place.
- It needed less value as compare with the AC exhaust fan.
- A star fan is additionally environmentally friendly.
- Weight less instrumentality.
- Reliability is high Works consistent with the sun direction.

## 5. Applications

- This project is widespread in hotels.
- It is used in industry that works at high temperatures.
- Can be used in kitchens and latrines.
- This is intended for use in hospitals and homes to maintain normal temperature. We can use there too.
- Industrial Applications
- Sporting Purpose

## 6. Future scope

This project get used as a smart family application like once the temperature of smoke happens in area then the fan will be activate until the space maintain the temperature. This comes additionally work on latrines. Once somebody goes for convenience then the fan is automatically activate and once him/her left from convenience the fan is automatically flip off. This exhaust fan additionally works at offices or alternative company and it will be remotely operated by the mechanical man cell phone.

## 7. Result



**Fig.7.1 Experimental Set-up**

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