

Energy Generation by Roof Top Ventilator

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ABSTRACT: This project is about generating electricity from Rooftop Turbine Ventilator (RTV). Generally RTV are used for ventilation purpose. A standard RVT is typically mounted on rooftops of industry/factory. We are using this RTV for electricity generation. It can produce electricity for low wind speed. System can produce electricity without causing any kind of pollution. Wind energy is renewable source of energy. Here, we are using inverter to convert DC to AC and operate light load or for other applications.

Wind energy is a renewable energy which can be adapted for many uses such as water pumping, domestic air ventilation, and electricity generation because wind is clean energy without any pollution to environment. Therefore, presently, there is the technological development of applying wind energy for the electricity generation. Wind energy is used to replace fossil energy such as oil and coal, causing environmental Pollution. This paper presents the electric power generation by using Rooftop Turbine Ventilator (R.T.V). Various methods have been presented previously like Axial Flux PMSG, AC-Generator and AC Synchronous Generator which are driven by Rooftop Turbine Ventilator (R.T.V). This paper proposed the roof ventilator system equipped with a small dc motor. Generated electricity is stored in battery for lighting loads and it can served both ventilation and lighting purpose.

I.INTRODUCTION

India comes under the warm zone. Hence there's always warmness throughout year, specially in March to may. This temperature rises upto 32—43°C. due to the high temperature the production and efficiency is get affected. Hence the temperature ventilation is essential in any industry, workplace or factory. Hence the ventilation is necessary for this. The roof top ventilator is the good option in this case.

The main function of free spinning RTV is to provide fresh air in room, space and living areas all year around 24 hrs a day free of charge. By using this the better air ventilation is achieved. The main and additional advantage of this project is to produce the electrical energy from the roof ventilator



Fig no:1 Hot air extraction-stack effect

The main component of this system is the DC motor. It will convert kinetic energy of air into electrical energy. The reverse polarity Protection is used for no back flow current if roof ventilator not functioning. Produced electricity is boost by booster circuit and stored in battery by charging circuit. If we want to drive an AC load then inverter is used

to convert DC to AC.

II.PROBLEM STATEMENT

The excessive use of fuel such as coal, diesel and gas contribute to pollution that leads to global warming. So, we can make use of renewable sources of energy such as wind energy, but the main problem arises when the power is not continuous and thus efficiency is not upto the mark. By using **Roof top ventilator** we can extend the power thus making the plant efficient.

III.OBJECTIVES

- Generation electricity by roof top ventilator.
- To decide and design energy generation device with Rotational device.
- To design a rapid charge mechanism for energy storing Reservoir
- Generation of electricity eco friendly with nature.

IV. METHODOLOGY

A.ROOF TOP VENTILATOR

Wind turbo ventilator is a wind driven ventilator that is installed on the roof of building to provide effective ventilation It is use in all types of industries, workshops, warehouse .The air ventilation works on the simple principle of wind assisted rotation and stack effect .The main function of the free spinning is to provide fresh air in roof space and living area. Air are free around 24 hours of a day on all year .The additional function of this product is to produce the electrical energy from the roof ventilator that will spin the wind is exits.

To design to generate the electricity by roof Ventilator the dc motor of 1000 rpm is connected to the roof Ventilator DC motor generate output 2-3 volt and it is very low so booster is connected to motor. booster output is reserved in battery by charging circuit and it consists reverse polarity protection. For ac load inverter is connected to DC motor in which ic 555 timer is act as multivibrator then it step up to 240 volt by step up converter.

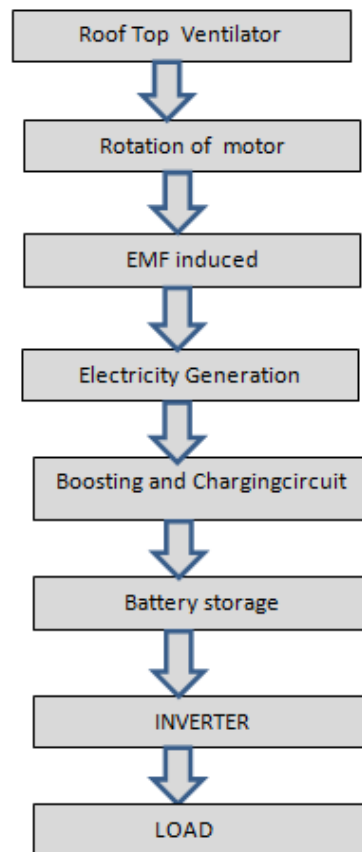


Fig.2 Methodology

The consumers not just can enjoy the benefits of the better air ventilation in the house, but also have extra electricity supply for load appliances such as radio, mobile phone charger and aquarium oxygen pump.

Roof ventilators have two types

1. Roof ventilator with motor driven
2. Roof ventilator with natural air driven

In this paper second type is preferred. Roof ventilator consist of stationary part and rotational part .The stationary part is composed of base and fixed shaft and rotational part is composed of fan blades and bush put on the fixed shaft on stationary part . The construction of roof ventilator shown in following fig 2



Fig no:2 Roof Top Ventilator

Also there are two rotating principles of the ventilator. The first principle is hydromechanics that can air flow high temperature area to low temperature area to motivate blades to rotate. In that time when the turbine are rotates the high temperature air will be discharged from the room so the air density in the room can be reduced, then the outdoor cold air enters in the room to achieve the goal .The second principle is the air convector it relies on the breeze air to rotate its blades

B.DC MOTOR

Here we used 1000 rpm dc electric motor with a two-pole rotor (armature) and permanent magnet stator. “N” and “S” designate polarities on the inside axis

Faces of the magnets; the outside faces have opposite polarities when The motor rotate it gives + and – Signs show where the DC current is applied to the commutator which supplies current to the armature coils. Wheel is connected to it end shaft and which is installed such way motor rotate in the direction of ventilator rotate.

Sr. no.	Speed (rpm)	Current (mA)
1	60	33
2	80	33
3	100	52
4	200	58
5	300	60

Table 1: Measurements of operating speed and obtained current values.

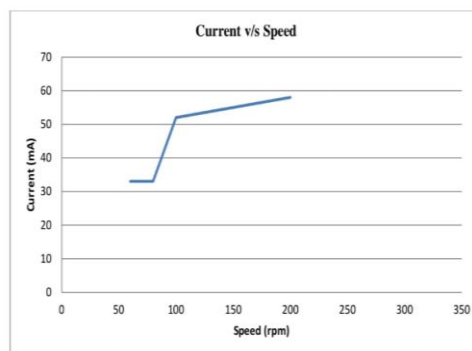


Table no:2 current vs speed graph

C.BOOSTER

This is the simple boost converter circuit. It is taken in a low voltage input of around 3-9 volt and gives an output of 30-40 volt.

You cannot use it to power anything through, since the voltage is right across the capacitor, and it falls rapidly with loading.

D.WORKING

For electricity generation purpose dc motor is used. A dc generator is one kind of electrical machine and the main function of this machine is to convert the kinetic energy into DC. The energy alteration process uses the principles of energetically induced electromotive force. Small amounts of energy generated by DC motor depends on speed of rpm.



Fig no:3Actual view of Ventilator



This energy is boost by booster circuit. This is the simple boost converter circuit. It is taken in a low voltage input of around 3-9 volt and gives an output of 30-40 volt A bridge rectifier is used for rectifying the generated voltage to pure DC they have high ripple factor 0.5 and rectification factor 0.8. The rectify output is fed to the battery charging circuit. The charge battery is used to drive the load. The load use is AC as well as DC. Whenever required load is AC the inverter circuit is used.

ADVANTAGES

- Wind energy is used to replace fossil energy for electricity generation
- Roof top ventilation system equipped small system
- 24*7 day generation
- Low cost comparatively to other similar generation systems.
- Direct compatibility with current in use system.
- Increase efficiency of the energy lighting systems in domestic as well as industrial area.

APPLICATION

- DC Generator
- Electricity Generation
- Auditoriums
- Theaters
- Work Place

V.RESULT

The booster converter was connected to 12volt batteries and the charger with roof ventilator and record DC voltage. The result of dc voltage from booster circuit and voltage from electric charger shown below.

Voltage from DC Generator	Voltage from booster circuit
0.5	1.54
1.2	3.6
1.5	5.27
2	8.24
2.3	10.66
3.0	11.42

Table no :3the voltage from dc generator and the voltage from booster circuit.

VI.CONCLUSION

This paper explain the idea about generation of electricity by roof top ventilator. Also this system provide better air ventilation inside living areas. When roof turbine rotate ,motor gets operated and hence Electricity generated. Based on practical experiments the result of the output voltage is 13-14 volt and it given to the charging circuit for battery charging at constant voltage.

VII. FUTURE SCOPE

Due to the development of technology around the world, the need of energy is increasing every year. But, what would be the best way to produce energy without polluting the air, or depleting fossil fuels? Renewable energy would also be the best solution for this problem. Of the available sources of renewable energy, wind power shows much promise. There are many benefits of using wind energy in comparison to using fossil fuels. The first is that once wind turbines are built, they don't release greenhouse gasses into the atmosphere. Wind energy also doesn't pollute the air or water with other pollutants. Renewable forms of energy are becoming more and more necessary for a sustainable future. Wind energy is a form of energy that is becoming more and more popular, and it offers a way for people to harness energy from something natural to create electricity. As we can implement this technology to use "green energy" instead and help preserve Mother Nature.

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