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POWER GENERATION THROUGH NON-CONVENTIONAL ENERGY SOURCES

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Abstract - This work deals with power generation through non-conventional energy sources. Now a days it is well understand that the burning of fossil fuels in electric power stations has a significant influence on the global climate and due to greenhouse gases. In many countries, the use of less cost-effective and low-carbon electricity energy resources are becoming an important energy policy. Among different kinds of clean energy resources suchas solar power plants, hydro power plants and so on, wind power is the fastest growing form of renewable energyin present time. Through next several decades, the renewable energy technologies are playing a vital role. So thatby the middle of the 21st century renewable energy, in its various forms, should be supplying half of the world'senergy needs. The paper describes about the power generation through renewable energy. The small windmill uses for the domestic needs is designed and fabricated. A wind turbine charges twelve volts battery and runs various twelve volts home appliances like small fans, lights, mobile chargers etc.

Key Words: - Renewable energy, Wind turbine, home appliances, multi-meter.

I. INTRODUCTION

Renewable energy is energy that is collected from renewable resources that are naturally available in nature. Air flow can be used to run wind turbines. Modern utility-scale wind turbines range from around 600 Kw to 9 MW of rated power. The power available from the wind is a function of the cube of the wind speed, so as wind speed increases, power output increases up to the maximum output for the turbine. Wind turbines have three basic parts–a tower, blades, and a generator. These parts work together to convert energy from the wind into electrical energy. When the wind blows, it pushes against the blades, causing them to spin. As the blades spin, they cause the generator to turn. The turning of the generator generates electricity, which can be used to light a light bulb or play music on your stereo. HAWT have blades that rotate around a horizontal axis and are the most common type of wind turbine. They are usually mounted on tall towers and have a generator at the top of the tower. The blades of the Horizontal axis wind turbines which fixed with the tower and the head with at the instant height. VAWT have blades that rotate around a vertical axis and are less common than HAWT. They come in a variety of shapes and designs, including cylindrical and conical shapes. VAWT are often smaller and less expensive than HAWT but are also less efficient. Vertical axis wind turbines are a type of wind turbine where the blades rotate around a vertical axis, instead of a horizontal axis like in Horizontal AxisWind Turbines.

II. LITERATURE REVIEW

Manoj Kumar Shanmugam et.al., (1)– Renewable energy has been on an increasing demand in the recent due to over stress on non-renewable resources and their increasing cost. Thus, producing electricity with the use of renewable resource Wind energy has been taken up in this project. A Windmill, which rotates when there is enough wind, generates electricity owing to magnetic coupling between the rotating and stationary coil. Let us go ahead and look at some of the features these VAWT offer to the homeowner. In the end, this paper provides insightful information for future research papers on the matter, regarding manufacturing technologies. Furthermore, the resulted blades will be tested in relevant conditions in the aerodynamic tunnel. Mayresh Gokhale et.al., (2)- In This Journal the exhaustion of fossil fuels, spreading global warming, higher need of energy and lack of power supplies leads to the use renewable source of energy like wind-energy. Although there are abundant of wind energy available in many regions in our country, the application of wind turbines to harness power efficiently is very limited. Wind Turbine is a device which converts wind's kinetic energy into electrical energy. most favorable

social impacts compared to other sources of energy which includes less greenhouse gas emissions, water consumption demands etc... Rotor blades are also an important part of the wind turbine as they decide the 12 performance of the turbine. Mule Sai Krishna Reddy et.al., (3) -Recent scenario reveals the imbalance in power generation and power demand in many of the countries. Major amount of power is generated through thermal power plants across the globe. For Thermal power plants we need non-renewable fuel sources some of them are Coal, Nuclear materials etc., The consumption of energy is directly proportional to the progress of mankind. The primary source of energy is Fossil fuel. However, the finiteness of fossil fuels is causing degradation of environment. So, the non-conventional, Renewable Energy Technologies. Kalagotla Chenchireddy et.al., (4)- Energy is the ability of a physical system to perform work. We use energy in our daily lives from various for doing work. We use muscular energy for carrying out physical work, electrical energy for running multiple appliances, and chemical energy for energy in its usable form. They were obtained from the earth's crest. They can be obtained from the environment such as sun, wind, water, etc., Coal and fossil fuels are two examples Wind, solar energy, and Biomass are two examples Conventional energy sources and non-conventional ones are vital resources for domestic and commercial consumption. Souvick Chakraborty et.al., (5) –Energy is the most important and most collective measure of all kinds work by human beings and nature. Everything what happen the world is the term of flow of energy in one of its forms. Energy is the major input to drive the life cycle of human beings. Energy consumption has closely linked with the progress of the mankind. There are necessary for future to improvement in the living standard of the mankind, significant role to maintain economic growth. The upward countries would countenance such impact of the energy crisis. The power sector is a example of the major significant constituent of infrastructure. Basically, India is dependent on three types of conventional sources of energy like thermal, hydro, and nuclear.

III. METHODOLOGY

Wind turbines work on a simple principle as shown in the fig 1 instead of using electricity to make wind—like a fan—wind turbines use wind to make electricity. Wind turns the propeller-like blades of a turbine around a rotor, which spins a generator, which creates electricity. The terms "wind energy" and "windpower" both describe the process by which the wind is used to generate mechanical power or electricity. Thismechanical power can be used for specific tasks (such as grinding grain or pumping water), or a generator canconvert this mechanical power into electricity.

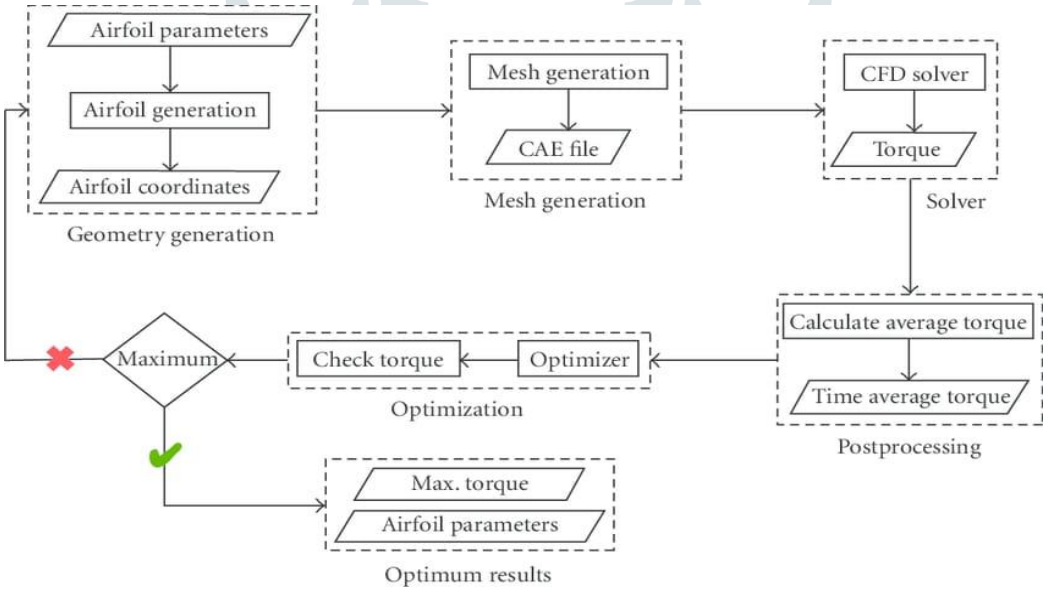

Fig - 1: Methodology flow chart of wind turbine

WORKING PRINCIPLE

The working principle of a wind turbine is given as follows:

- The stand is made by the plastic pipes which handle the weight of the whole turbine.
- The blades are used plastic pipes cut into the shape of blades.
- The blades are fitted to the wooden pieces acts as a turbine blade holder.
- These blades and wooden pieces are fitted with the hub.
- Hub will place in middle of the generator, which placed in the certain distance from the ground.
- The blades are as shown in fig 2 rotated with help of the wind. The connecting wires are connected tothe multi-meter to watch the power out from the turbine is shown in the volts

Fig - 2: Turbine.

IV. FABRICATION

The Components Used In The Fabrication Of the Mini-Wind Turbine Is Shown As Follows.

HUB

The Hub Is Used to Hold the Rotating Blades. Part ofthe Turbine's Drive train, Turbine Blades Fit into The Hub That Is Connected to the Turbine's Main Shaft. The diagram of the hub is given below.

BLADES

Most turbines have three blades which are made mostly of fiberglass. Turbine blades vary in size, but a typical modern land-based wind turbine has used four blades that will rotates with the wind with effective speed. The largestturbine is GE's Haliade-X offshore wind turbine, with blades 351 feet long (107 meters) – about the same length as a football field.

DC GENERATOR

A DC generator is an electrical machine whose main function is to convert mechanical energy into electricity. When the conductor slashes magnetic flux, an emf will be generated based on the electromagnetic induction principle of Faraday's Laws. This electromotive force can cause a flow of current whenthe conductor circuit is closed. A DC generator can also be used as a DC motor without changing its construction. Therefore, a DC motor, otherwise a DC generator, can be called a DC machine.

MULTI-METER

A multi-meter is a measuring unit as shown in fig 3 that can measure multipleelectrical properties. A typical multimeter can measure voltage, resistance, and current,in which case it is also known as a volt-ohm (VOM), as the unit is equipped with voltmeter, ammeter, and the maters ohmmeter functionality, or volt- ohmmeter for short. Some feature the measurement of additional properties such as temperature and capacitance. Most multimeters inherently measure voltage and pass a current to be measured through a shunt resistance, measuring the voltage developed across it.

Fig - 3: multi-meter

EXPERIMENTAL SETUP

The fabrication of the wind mill is which can made by the following steps.

1. First of all, we make a stand with the iron rod which will hold the whole turbines and blades of the windturbine.
2. After that we have to make a rotor blade and fix it with the hub.
3. The blades and the hub placed on the 12v generator and which it converts the mechanical energy intoelectrical energy.
4. All the components fix with generator placed on the stand with the help of welding.
5. The final view of the wind turbine as shown in the below figure 4

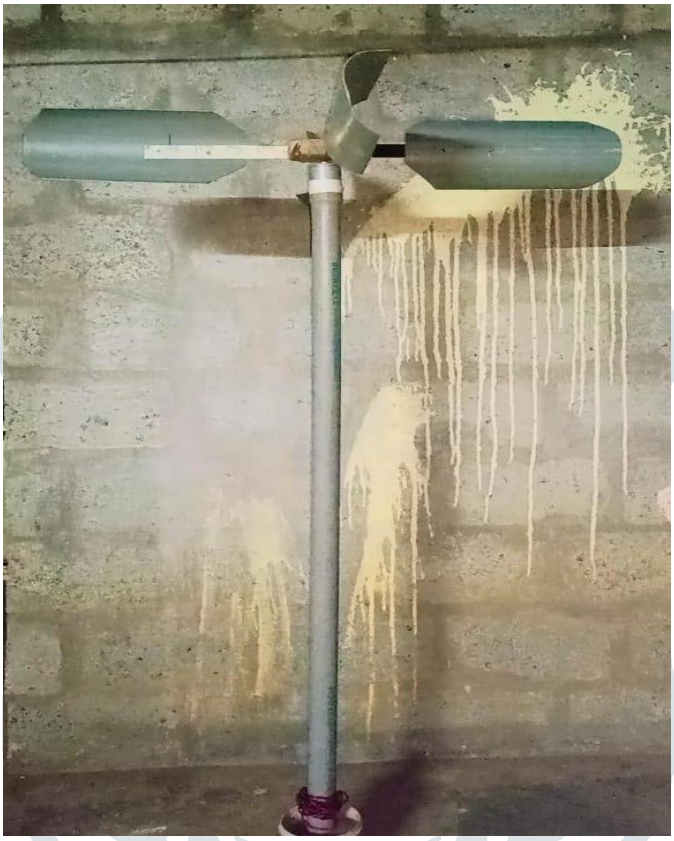

Fig – 4: mini wind turbine

IV. RESULT AND DISCUSSIONS

CALCULATIONS

The calculation is given as follows:

The Wind Turbine Rotates with The Help of The Velocity and The Wind Travels with Some Velocity.
To Calculate the Power as shown in the table 1 out from The Turbine Used the Given Formula.

$$P = (0.5) \times (\rho) \times (A) \times (Cp) \times (V^3)$$

Where,

P = Power Generated in Watts

ρ = Air density in kg/m^2

A = Blades swept area in m^3

$A=\pi \div 4\ (d^2)$

Cp = Power Coefficient = (1.000)

V = Velocity of the Wind in m/S

Table 1: Power Generated by the Wind Turbine in Different Velocities.

SI.NO	VELOCITY (m/s)	AIR DENSITY(m^3)	ARE(m^2)	POWER (W)
1	8	1.225	0.229	12.8
2	9	1.225	0.229	18.3
3	10	1.225	0.229	33.4
4	12	1.225	0.229	43.3

RESULTS

The wind turbine is which operates by transforming the moving energy in the wind. It converts the kineticenergy into mechanical energy. The mechanical energy which rotates the generator shaft and shaft rotates with some rotation per minute and stores the electric energy in the generator. This electric energy is stored by the batteries and cells used to home appliances and mobile charging, bulbs in homes. It's spinning a generator, whichcreates electricity. The generator which is used for the converting of the mechanical energy to the electrical energy which is measured by the multi-meter. The electrical energy is used for the storing of in the batteries and itis used for the home appliances. The blades are made up by the poly vinyl chloride pipes and with having the mm and which will cut and heated in the shape of blades. And the holder is placed at the certain distance from the ground. The blades will rotate with some rpm and up to seven v it can produces.

DISCUSSIONS

The Discussion of The Power Generation Through Non-Conventional Energy Is Given as Follows. Windturbines convert wind energy to electrical energy for distribution. Conventional horizontal axis turbines can be divided into three components: The rotor, which is approximately 20% of the wind turbine cost, includes the blades for converting wind energy to low-speed rotational energy. The terms "wind energy" and "wind power" both describe the process by which the wind is used to generate mechanical power or electricity. This mechanicalpower can be used for specific tasks (such as grinding grain or pumping water) or a generator can convert this mechanical power into electricity. So, it is used in the daily usages and charging of batteries.

V. CONCLUSION

Wind turbines produce energy without pollution, eventually leading to a reduction in the emission of carbon dioxide, nitrogen oxide and sculpture dioxide. The use of wind energy may therefore contribute to reduce global climate change, acid rain and other serious environmental problems. From our research we were able to come up with many important conclusions and suggestions which will profit the future advancement of individual VAWT pivot wind turbines. We could outline a 4 bladed wind turbine framework that enhanced power yield when contrasted with the past projects. From our results we were able to recommend new designaspects to improve the system and efficiency. minimum speed of 12 m/s is required to have acceptable output with forty-four watts.

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