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Abstract-

Energy from wind is the fastest growing source of electricity in the world. In this project wind energy is used to generate electricity with the help of aero leaves. Several leaf shaped aero leaves are placed in the form of tree, called Wind Tree. Wind Tree uses tiny blades housed in the aero leaves to generate power from wind energy. These wind trees are able to generate power regardless of the wind direction and with minimum wind speed of 7Kmph. In this project we have used tree shaped structure, covered with leaf shaped mini turbines called aeroleaves which are of savonius type turbine and designed to produce the power which will catch the wind from all the directions. All cables and generators are integrated into the leaves and branches. Artificial leaves operate as mini vertical turbines all around the tree. When the wind blows, the leaf turbines rotate and quietly produce the energy. This project concludes that, the power generated from wind tree is environmental friendly, mainly it generates power with least noise and it can be installed at different locations.

Keywords: Aeroleaf, Vertical axis wind turbine, Savonius type

1. Introduction

Energy can neither be created nor be destroyed but it can be transformed from one form to another form. There are two types of energy sources available, which can be used to generate the electricity. They are Renewable and Nonrenewable energy resources. Non-renewable energy resources are coal, nuclear, oil and natural gases which are limitedly available, and the Renewable energy resources are Sunlight, Wind, Rain, Tides, Waves and Geothermal heat and these sources are naturally replenished on a human time scale. This type of resource is much desirable to use because often a resource renews

so fast that it will have regenerated by the time we used it up. In this project we considered wind as a renewable source of energy to generate electricity. Wind energy is a source of renewable power which comes from air current flowing across the earth's surface. Wind power plants can make a significant contribution to the regional electricity supply diversification. Wind energy system transforms the kinetic energy of the wind into electrical energy that can be used for practical use. Wind electric turbines are employed to generate electricity. And there are two basic designs of wind electric turbine, Horizontal axis wind turbine and Vertical axis wind turbine. Vertical axis wind turbine can further classified into two types Darrieus type and Savonius type. Darrieus type rotor wind mill needs much less surface area. It is shaped like an egg beater and has two or three blades shaped like aero foils. Savonius turbine is S-shaped if viewed from top. This turbine turns relatively slow, but yields high torque. It is used for grinding grains and for pumping water..

The Project aim to generate electricity for using peak load demand or street light ,railway station lighting and also domestic purpose because this project use low cost equipments ,also it is very eco friendly and pollution less. It is almost use very low cost and also it have not use any fuel regarding operation. So it accurate non conventional energy source. To solve this problem, a motor control system that can generate a user opposition force and more particularly simulate a weight stack, is proposed in this project. In order to generate a torque to oppose the user force. The Battery use for storing the energy from wind source which switch wated

in wind source. This type of generated electricity does not require any energy from Electricity board. Energy can neither be created nor be destroyed but it can be transformed from one form to another form.

2. Problem Statement

Some of the problems being faced by the Indian electricity power generation are:

Inefficient coal linkages leading to huge losses to the private power generating companies, lower than expected growth of electricity demand.

The inefficient state government own power plants, under investment in transmission, under priced electricity, high losses of distribution utilities, groundwater depletion from cheap electricity are the key challenges to power generation sector,

so solving such a problem the wind tree power generation helps to generation power

3. Objectives

Wind is considered as the fastest growing clean energy source which is readily available. The concept of wind tree is unique in itself the turbines are sculpted in the form of an artificial tree. It aims at utilizing the low winds that circulate around buildings and streets. The artificial Aeroleafs serving as microturbines spin on a vertical axis and is capable of harnessing more gentle winds. The turbine being small and light in weight are set in motion by winds as light as 4.4 miles/hr. The Betz's law calculates the maximum power that can be extracted from the wind, independent of the design of a wind turbine. According to Betz's law, no turbine can capture more than 59.3% of the kinetic energy in wind. Betz law explains that power extracted from wind energy is directly proportional to the cube of wind velocity.

4. Existing System

- The present wind tree cannot be implemented in our natural surroundings. As it is not sensitive to all wind direction by its design it gives partial efficiency and increases cost of design, transplantation, installation and maintenance to overcome these effects and disadvantages of present wind energy system a new hybrid design

of wind tree must be introduced. This research paper takes to the new era of windtree technology with its interesting applications. The main advantage of using this wind tree is that they do not need to be placed in the direction of wind due to its omni-directional characteristics. Other advantage is that it increases the surrounding beauty due to its tree look. It can be generate as well as add beauty to surrounding. The idea of creating an electrical power generating system in the form of a tree, with its each leaf as an actual mini wind turbine. Capturing low wind speed and turbulence is at the crux of this novel approach which can deliver power and autonomy simply through a proliferation of leaves. It is the first human scale biomimetic wind turbine capable of recreating a sympathetic bond between the consumer and their means of power generation. Multiple turbines combine to capture the lowest wind and accumulate their power.

5. PROPOSED SYSTEM

- This is the circuit diagram of the complete system, in which electricity is generated by wind tree. So here we are using mainly three generators as if you can see in the diagram itself (generator-1, generator-2, generator-3) the main use of these generators is to convert mechanical energy into electrical energy in other words we can say that conversion of kinetic energy into potential energy which is in the form of AC (alternating current). The mechanical energy is generated by vertical axis wind turbine. Further these generators are connected to the bridge rectifier. Here we used bridge rectifier because the generators are generating the power in the form of AC and we required DC power so for that purpose we required rectifier to convert AC to DC. The bridge rectifier is producing pulsating DC power and for that complete filtration the capacitors is connected itself in the bridge rectifier to get the pure form of DC power. Further the bridge rectifier is connected to buck converter which mainly used of stepping down the power. If we are getting higher value of power it will step down the voltage. Similar as of stabilizer. And lastly it connected

to battery which will store the power and this will be used for the purpose of lighting up the street, residential areas, stadiums, or buildings. Or it can be used to charge electric cars or vehicles. This system can light up the villages which are near the highways.

6. Related Work

- Wind turbines produce electricity by utilizing the wholesome power of the wind to steer a generator. As the wind is a clean and sustainable fuel source, it mainly does not create pollution and most importantly it will not run out as it continually tops up by energy. There are two different types of wind turbines. One is horizontal axis wind turbine and the second is vertical axis wind turbine. One is assembled for areas which require high speed for generating electricity, and the other is assembled specifically for the area which requires low wind speed mainly like places residential areas. Wind turbines consist of a set of blades attached to a rotor hub, which together form the rotor; this rotor deflects the airflow, which creates a force on the blades, which in turn produces a torque on the shaft such that the rotor moves around a horizontal axis, which is mainly attached to a gearbox and generator. These are inside the nacelle, which is located at the top end of the tower, along with several other electrical parts. The generator generates electricity, which is moved down from the tower and out to an available transformer, so that it can be converted from the output voltage to the same voltage for any personal use. Each house and the server installed in local substations.

7. System Block Diagram

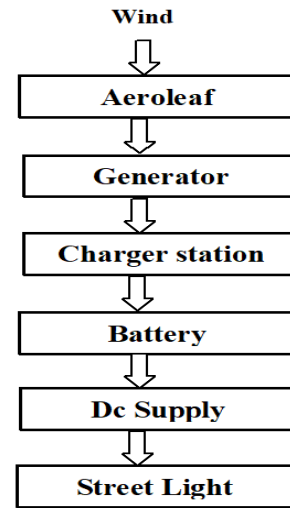


Fig 1. Block Diagram of system

8. System Description

Wind is considered as the fastest growing clean energy source which is readily available. The concept of wind tree is unique in itself; the turbines are sculpted in the form of an artificial tree. It aims at utilizing the low winds that circulate around buildings and streets. The artificial Aeroleafs serving as microturbines spin on a vertical axis and are capable of harnessing more gentle winds. The turbines, being small and light in weight, are set in motion by winds as light as 4.4 miles/hr. Betz's law calculates the maximum power that can be extracted from the wind, independent of the design of a wind turbine. According to Betz's law, no turbine can capture more than 59.3% of the kinetic energy in wind. Betz's law explains that power extracted from wind energy is directly proportional to the cube of wind velocity.

9. Circuit Diagram

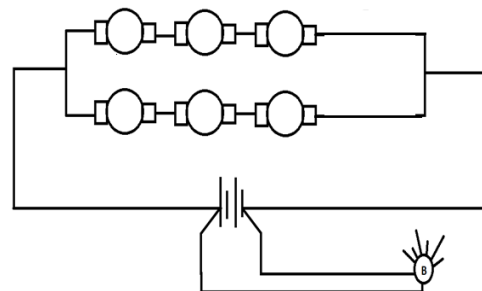


Fig 3. Circuit Diagram of system

10. Results

This project is very useful generation of low cost electricity. It produces same effect as produced by manual work .

It saves the valuable time .

11. Advantages

- Gearbox is not necessary. 2. Generating 2400kwh with an Aeroleaves avoids creating the 3.2 tons of CO₂ that results from producing the same amount of electricity in an oil fired power station. 3. Wind tree works silently with least noise about 5 dB and hence these can be installed everywhere. 4. As wind tree is located near to the consumer premises transmission cost will be very less. 5. With a low wind speed threshold, the low-inertia rotor system is able to generate production \pm 300 days per year. 6. It can produce electricity irrespective of the wind direction

12. Conclusion

In course of the project, we have come to the conclusion that is still a lot of scope of energy production with the help of wind turbines. With better design and increasing the number of turbines along with some advanced technology it is Possible to implement this project on a large scale. It would not only solve the Problem of energy crisis to a great extent but would also give a landscapic view to the city. We highly recommend these wind trees alongside the streets in order to save electricity required for the street load. By further increasing the height and the number of turbines, it is possible to Light up an entire building with the help of these wind trees. Even though the Wind is being fluctuating in nature, it is constantly available 24*7 which make it a more reliable option than the solar panels.

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