FINAL YEAR PROJECT REPORT

Wind Turbine Power Generation System

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Abstract

The goal of this project is to design and implement a wind turbine system that charge up the dc battery with capabilities of charge controller a digital voltmeter to monitor battery voltages and an inverter module to convert dc into ac. Some of the specifications that we sought to achieve in our project is to design a mechanical system for turbine generator to produce 12V or above in a wind speed of about 12 to 13 Mph a charge controller based on voltage level sensing a 31/2 digit digital voltmeter with 0.1% accuracy and a 100 watt inverter module. The complete system will consist on wind turbine mounting assembly and three processing circuits charge controller, digital voltmeter and an inverter module. By implementing this system we are showing how different devices are integrate together to form a complete active alternative energy system.

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1. Introduction

There is rising need for alternate and renewable sources of energy, especially in developing countries, whose progress and economic growth may strongly be indexed to its development. With the ever increasing growth in energy consumption and rapidly depleting fossil fuel reserves, it is feared the world will soon exhaust its fossil fuel reserves.

As, we know about the electrical energy crisis, therefore it is needed to discover some alternative energy, one of them is wind energy. Wind is a form of solar energy. Winds are caused by the uneven heating of the atmosphere by the sun, the irregularities of the earth's surface and rotation of earth. Wind flows patterns are modified by the earth's terrain, bodies of water and vegetative cover. This wind flows when harvested by modern wind turbines can be used to generate electricity. The terms wind energy or wind power describes the process by which the wind is used to generate mechanical power or electricity. Wind turbines convert the kinetic energy in the wind to mechanical power. This mechanical power can be used for specific tasks like grinding grains or pumping water or a generator can convert this mechanical power into electricity to power homes, business, schools etc.

1.1 Wind Turbines

Wind turbines, like aircraft propeller blades, turn in the moving air and power an electric generator that supplies an electric current. Simply stated, a wind turbine is the opposite of a fan. Instead of using electricity to make wind, like a fan, wind turbines use wind to make electricity. The wind turns the blades, which spin a shaft, which connects to a generator and makes electricity.

1.2 Turbine Materiel

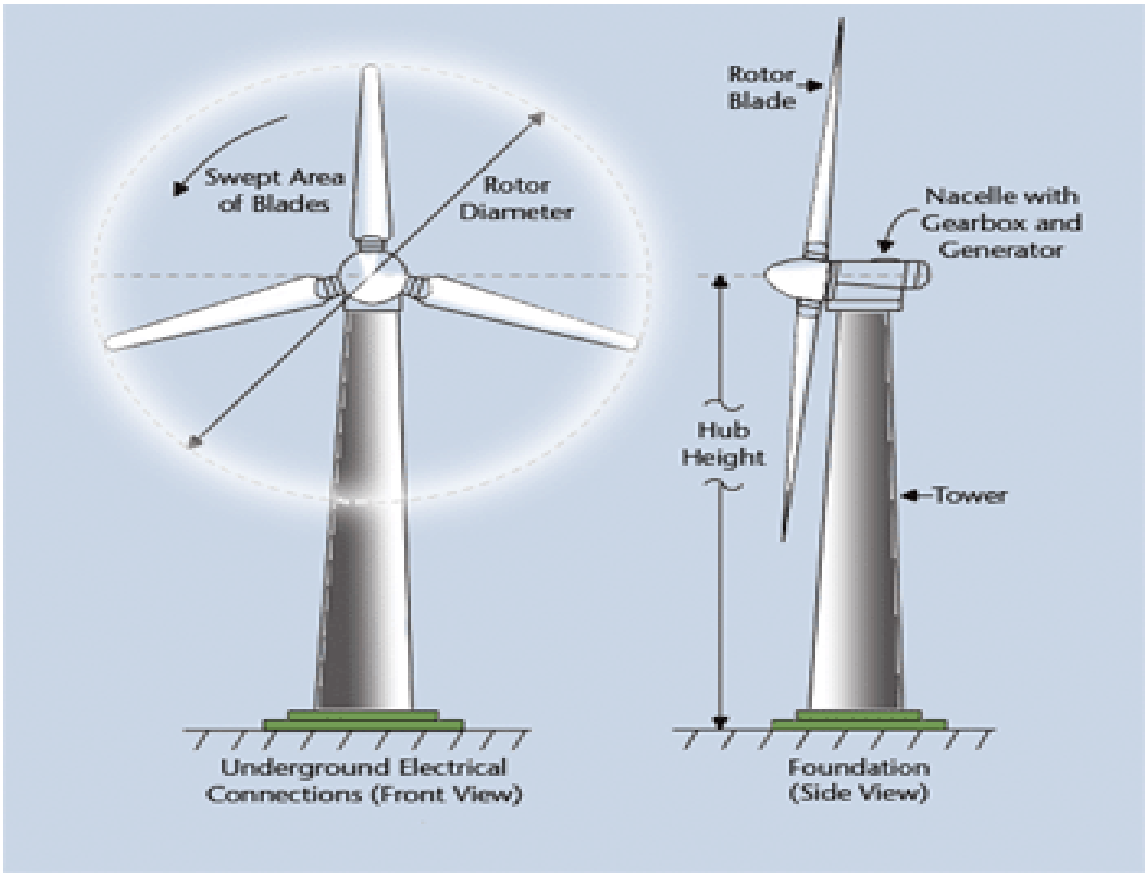
The towers are mostly tubular and made of steel. The blades are made of fiberglass-reinforced polyester or wood-epoxy.

1.3 Wind Turbine Types

Modern wind turbines fall into two basic groups; the horizontal-axis variety, like the traditional farm windmills used for pumping water, and the vertical-axis design, like the eggbeater-style Durries model, named after its French inventor. The vertical one is identified by blades mounted on vertical shafts while the horizontal one is by propeller-like blades. Depending on the availability of the wind, both types can be installed on towers or poles or even on our rooftop.

“Most large modern wind turbines are horizontal-axis turbines.”

1.3.1 Horizontal wind turbine



Drawing of the rotor and blades of a wind turbine, courtesy of ESN

Fig-1.1 horizontal wind turbine