



## Charging the Mobile Using Renewable Energy

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### ABSTRACT:

Wind is a form of solar energy. Caused by uneven heating of atmosphere by the Sun, irregularities of the Earth's surface, and rotation of the Earth. The amount and speed of wind depends on the Earth's terrain and other factors. During frequent power cuts and long journeys, it is difficult to charge the mobiles. Here the idea is to use the wind energy to recharge mobiles. This high speed winds helps us to rotate the turbine, which will help generate enough power, for various applications. The compact windmill to generate the power, which can be used to charge the mobiles. Wind power is converted into electric power by magnet moving past stationary coils of wire known as stator. It will produce DC power which can be used to charge the batteries.

**KEYWORDS:** Renewable energy, Converter, Dc Motor, Materials strength.

### I. INTRODUCTION:

Renewable energy is energy which comes from natural resources such as sunlight, wind, rain, tides, waves and geothermal heat, which are renewable. Renewable energy is derived from natural processes that are replenished constantly. In its various forms, it derives directly from the sun, or from heat generated deep within the earth. Included in the definition is electricity and heat generated from solar, wind, ocean, hydropower, biomass, geothermal resources, and bio-fuels and hydrogen derived from renewable resources. Solar energy is the energy derived from the sun through the form of solar radiation. Solar powered electrical generation relies on photovoltaic and heat engines. A partial list of other solar applications include space heating and cooling through solar architecture, day lighting, solar hot water, solar cooking and high temperature process heat for industrial purposes. Biomass is a renewable energy source because the energy it comes from the sun. Through the process of photosynthesis, plants capture the sun's energy. When the plants are burnt, they release the sun's energy they contain. In this way, biomass functions as a sort of natural battery for storing solar energy. Geothermal energy is from thermal energy generated and stored in the earth. Thermal energy is the energy that determines the temperature of matter. Earth's geothermal energy originates from the original formation of the planet and from radioactive decay of minerals. The geothermal gradient which is the difference in temperature between the core of the planet and its surface, drives a continuous conduction of thermal energy in the form of heat from the core to the surface. Energy in water can be harnessed and used. Since water is about 800 times denser than air, even a slow flowing stream of water, or moderate sea swell, can yield considerable amounts of energy. The hydroelectric power refers to the energy produced from water (rainfall flowing into rivers, etc). The force of flowing & falling water is used to run water turbines to generate energy.

### II. WIND ENERGY:

Wind energy has been used for several purposes throughout history. It has been used in such ways as food production, draining lakes and marshes, pumping water for farms and ranches, and eventually to generate electricity for homes and industry. The purpose of using wind energy is because the human race is always

looking for ways to become more efficient in energy production that minimizes cost and maximizes efficiency.” In 1891, the Dane Poul La Cour developed the first electrical output wind machine to incorporate the aerodynamic design principles (low-solidity, four-bladed rotors incorporating primitive airfoil shapes) used in the best European tower mills.” (Dodge) Wind energy is a very important source for a large amount of the energy used to power industry in the world today and is used everywhere because of its traits being a renewable energy source and eco-friendly. The creation and utilization of wind energy is one of the fastest growing sources being explored. There are now clusters of wind turbines in Texas and Colorado, as well as newly updated sites in California. “According to the American Wind Energy Association (AWEA), there are now wind energy products in almost every state west of the Mississippi, and in many Northeastern states.”

All renewable energy (except tidal and geothermal power), ultimately comes from the sun. The earth receives  $1.74 \times 10^{17}$  watts of power (per hour) from the sun. About one or 2 percent of this energy is converted to wind energy (which is about 50-100 times more than the energy converted to biomass by all plants on earth. Winds are influenced by the ground surface at altitudes up to 100 meters. Wind is slowed by the surface roughness and obstacles. When dealing with wind energy, we are concerned with surface winds. A wind turbine obtains its power input by converting the force of the wind into torque (turning force) acting on the rotor blades. The amount of energy which the wind transfers to the rotor depends on the density of the air, the rotor area, and the wind speed. The kinetic energy of a moving body is proportional to its mass (or weight). The kinetic energy in the wind thus depends on the density of the air, i.e. its mass per unit of volume.

In other words, the "heavier" the air, the more energy is received by the turbine. At 15° Celsius air weighs about 1.225 kg per cubic meter, but the density decreases slightly with increasing humidity. A typical 600 kW wind turbine has a rotor diameter of 43-44 meters, which is a rotor area of some 1,500 square meters. The rotor area determines how much energy a wind turbine is able to harvest from the wind. Since the rotor area increases with the square of the rotor diameter, a turbine which is twice as large will receive  $2^2 = 2 \times 2 =$  four times as much energy. To be considered a good location for wind energy, an area needs to have average annual wind speeds of at least 12 miles per hour. The use of wind power is increasing at an annual rate of 20% with a worldwide installed capacity of 2, 38,000 Megawatts at the end of 2011.

The wind blows day and night, which allows windmills to produce electricity throughout the day. (Faster during the day) Energy output from a wind turbine will vary as the wind varies, although the most rapid variations will to some extent be compensated for by the inertia of the wind turbine rotor. Wind energy is a domestic, renewable source of energy that generates no pollution and has little environmental impact. Up to 95 percent of land used for wind farms can also be used for other profitable activities including ranching, farming and forestry. Wind energy is friendly to the surrounding environment, as no fossil fuels are burnt to generate electricity from wind energy.

### **III. ENERGY CONVERSION:**

The major components of a typical wind energy conversion system include a wind turbine, generator, interconnection apparatus and control systems. Wind turbines can be classified into the vertical axis type and the horizontal axis type. Most modern wind turbines use a horizontal axis configuration with two or three blades, operating either down-wind or up-wind. A wind turbine can be designed for a constant speed or variable speed operation.

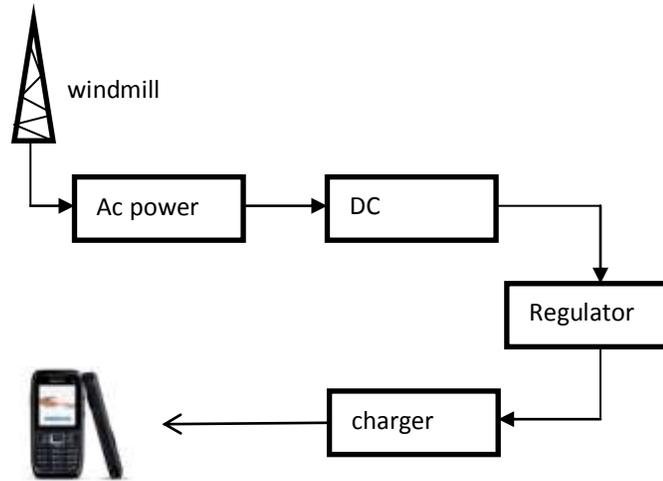


Fig1. Architecture of a compact windmill

Variable speed wind turbines can produce 8% to 15% more energy output as compared to their constant speed counterparts, however, they necessitate power electronic converters to provide a fixed frequency and fixed voltage power to their loads. Most turbine manufacturers have opted for reduction gears between the low speed turbine rotor and the high speed three-phase generators. Direct drive configuration, where a generator is coupled to the rotor of a wind turbine directly, offers high reliability, low maintenance, and possibly low cost for certain turbines. Several manufacturers have opted for the direct drive configuration in the recent turbine designs. At the present time and in the near future, generators for wind turbines will be synchronous generators, permanent magnet synchronous generators, and induction generators, including the squirrel cage type and wound rotor type. For small to medium power wind turbines, permanent magnet generators and squirrel cage induction generators are often used because of their reliability and cost advantages. Induction generators, permanent magnet synchronous generators and wound field synchronous generators are currently used in various high power wind turbines.

Interconnection apparatuses are devices to achieve power control, soft start and interconnection functions. Very often, power electronic converters are used as such devices. Most modern turbine inverters are forced commutated PWM inverters to provide a fixed voltage and fixed frequency output with a high power quality. Both voltage source voltage controlled inverters and voltage source current controlled inverters have been applied in wind turbines. For certain high power wind turbines, effective power control can be achieved with double PWM (pulse width modulation) converters which provide a bi-directional power flow between the turbine generator and the utility grid. The DC motor which converts the wind energy into electrical energy directly. The motor specification is following below:



Fig 2:EG-530YD-9B DC motor

Voltage	Range	(VDC):	6.3-11.7
Current		(Amps):	0.128
Rated	Speed	(RPM):	4000/2000
Torque			(g-cm):8
Shaft		Diameter:	0.079"
Shaft		Length:	0.37"
Size: 1.38"D x 0.98"L			

This DC Motor is available in these kinds of players, Cassette, CD player, CD-ROM, VCD, DVD, and DVDROM. This kind of charger can design by our self easily. The blade is the important one for the charger. Because the blade size will increase the output power is also increase. And the blade material is plays the important role in this compact wind mill. The cheap and effective material is plastic. But the Aluminium, Wood, Fiberglass are also providing the more power, but the cost is varying.



Fig 4. Blade

Here the blade size is 5cm and the material is plastic. It will produce the 3.7v at the speed of 35-40km wind. It is enough to charge the mobile battery. The kit design is the important one in this compact wind mill. That means the kit will displays the output voltage from the wind mill.

So we can know about the output of the compact wind mill. Then the kit is having the main components as LCD display, PIC16F877A Micro controller, input output pin from the DC motor, and the charger pin for the LCD display.



Fig 3. Circuit kit

#### IV. MOBILE CHARGING:

The rotational speed which exceeds the threshold will be enough for producing minimum voltage 3.7 to charge the mobile. The threshold Rated Speed (RPM): 4000/2000. The renewable energy like wind turbines and solar equipments will also be pollution free in nature. The mobile charging equipment primarily depends upon the charging unit which consists of permanent magnets and shafts which holds the rotational fan blades which is 2cm to 4cm.

When the wind is blown the fan automatically rotates which thus enable the coil to rotate in between the permanent magnets thus it produces current according to the faraday law. The voltage can also be measured using volt meter if necessary then the current thus produced is connected to a regulator which regulates it to the mobile charger thus the mobile gets charged.

The use of the circuit board is to display the variation of the output power. So we can maintain the speed level and get charge at the specific time limit.

The motor is having two connections. One is the mobile charger connection and another one is the circuit board connection. So the circuit connection did not disturb the mobile charger.

## V.CONCLUSION:

The development of wind power in India began in the 1990s, and has significantly increased in the last few years. Although a relative newcomer to the wind industry compared with Denmark or the United States, India has the fifth largest installed wind power capacity in the world. In 2009-10 India's growth rate was highest among the other top four countries. As of 31 Dec 2012 the installed capacity of wind power in India was 18420Mw. The mobile charger which can also be developed in future like adding an attachment which will enable to store the charge which is produced by mobile charger equipment and thus providing us consistent power supply to charging device.

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