© 2017 IJSRST | Volume 3 | Issue 8 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X
Themed Section: Science and Technology

Bicycle Based Mobile Phones Charging System Used In Wind Energy

Maharshi Singh, L. Natrayan
School of Mechanical and Building Sciences, VIT University, Chennai, Tamilnadu, India

ABSTRACT

Renewable energy is generally defined as the energy that comes from resources which are naturally replenished on a human timescale such as sunlight, wind, rain, tides, waves and geothermal. Aspects Renewable energy replaces conventional fuels in four distinct areas: electricity generation, hot water/space heating, motor fuels, and rural (off-grid) energy services. Cell phones are small potatoes in the big picture of energy consumption. Just unplug your phone from the wall, and in the time that it takes for you to rig up this circulate your phone will be out of juice and you'll be due for a long ride. To overcome these problems the user is going introduce a new model which is combination of wind turbine and bike ride. These systems consist of a battery to make charge mobiles at any time. This battery will be recharged at the time of ride our bike with the help of wind turbine and DC generator.

Keywords : Mobile phone, charger, Renewable energy, wind turbine, battery, DC generator.

I. INTRODUCTION

Cell phones are small potatoes in the big picture of energy consumption. This idea is taken off grid mobile phone charging system in bicycle using man power. These goods mean these represent only a partial solution to the mobile phone charging problem. Renewable energy is generally defined as energy that comes from resources which are naturally replenished on a human timescale such as sunlight, wind, rain, tides, waves and geothermal heat.

Renewable energy replaces conventional fuels in four distinct areas such like electricity generation, hot water/space heating, motor fuels, and rural (off-grid) energy services.

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 biofuels and hydrogen derived from renewable resources. Wind power is the conversion of wind energy such as using wind turbines to produce electrical energy. Wind power is growing at the rate of 30% annually, with a worldwide installed capacity of 282,482 megawatts (MW) at the end of 2012, and is widely used in Europe, Asia, and the United States. We introduce new system to charge the mobile using renewable energy. This renewable energy source is taken from motor vehicles such as bike. This system is consist of one battery, it also help to store the energy for lateral use. Because of that it will reduce the economic cost for electricity for mobile charging.

The idea for this project is taken from mobile phone charging from bicycle. In that project they are using a dynamo when engaged, the generator wheel rolls against the bike tire. The motion produces electricity, and the greater your speed, the greater the voltage output. The cord from the generator leads first to the circuit board's bridge rectifier, which converts the AC to DC. In other words, the up-and-down, positive-to-negative current becomes a steady positive current. Then, the capacitor levels out the DC voltage, producing a steady voltage inflow to the voltage regulator. The voltage regulator is crucial, as the phone only needs five volts to charge, whereas fast pedaling can produce 30 volts or more, which is enough to fry the average cell phone. The regulator controls the voltage, putting a five-volt ceiling on the power entering the phone to produce an electrical energy from man work.

This project results with starting with a dead cell phone, plugged in and placed in my basket, I spent approximately three hours and 25 miles riding in the

streets of San Francisco to charge it back to full power. Much to my surprise, an easy speed of only four miles per hour was enough to keep the power production at the necessary five volts, and almost as soon as I rolled out the door, the phone lit up and beeped, indicating that it had begun to charge.

II. METHODS AND MATERIAL

1. Objective

To design and fabricate the charging system for mobile phones in bikes using wind energy.

2. Wind Energy

It is the one type of renewable energy source which produce the electric power by using wind turbine by means of converting mechanical energy into electrical energy. Wind power, as an alternative to fossil fuels, is plentiful, renewable, widely distributed, clean, produces no greenhouse gas emissions during operation and uses little land. Wind power is very consistent from year to year but has significant variation over shorter time scales. As the proportion of wind power in a region increases, a need to upgrade the grid, and a lowered ability to supplant conventional production can occur.

Power management techniques such as having excess capacity storage, geographically distributed turbines, dis patchable backing sources, storage such as pumped-storage hydroelectricity, exporting and importing power to neighboring areas or reducing demand when wind production is low, can greatly mitigate these problems. A wind farm is a group of wind turbines in the same location used for production of electricity. A large wind farm may consist of several hundred individual wind turbines distributed over an extended area, but the land between the turbines may be used for agricultural or other purposes. A wind farm may also be located offshore.

Almost all large wind turbines have the same design a horizontal axis wind turbine having an upwind rotor with three blades, attached to a nacelle on top of a tall tubular tower. In a wind farm, individual turbines are interconnected with a medium voltage (often 34.5 kV), power collection system and communications network. At a substation, this medium-voltage electric current is increased in voltage with a transformer for connection to the high voltage electric power transmission system.

3. Wind Mills

Types of wind mills:
Generally there are two types in wind mills according to their rotationalaxis.
They are,

a. Vertical wind turbines
b. Horizontal wind turbines

(a) Vertical wind turbine:

Vertical-axis wind turbines (or VAWTs) have the main rotor shaft arranged vertically. One advantage of this arrangement is that the turbine does not need to be pointed into the wind to be effective, which is an advantage on a site where the wind direction is highly variable, for example when the turbine is integrated into a building. Also, the generator and gearbox can be placed near the ground, using a direct drive from the rotor assembly to the ground-based gearbox, improving accessibility for maintenance.

Figure 1: Vertical axis wind turbine

(b) Horizontal axis wind turbine:
(HAWT) have the main rotor shaft and electrical generator at the top of a tower, and must be pointed into the wind. Small turbines are pointed by a simple wind vane, while large turbines generally use a wind sensor coupled with a servo motor. Most have a

gearbox, which turns the slow rotation of the blades into a quicker rotation that is more suitable to drive an electrical generator.

Since a tower produces turbulence behind it, the turbine is usually positioned upwind of its supporting tower. Turbine blades are made stiff to prevent the blades from being pushed into the tower by high winds. Additionally, the blades are placed a considerable distance in front of the tower and are sometimes tilted forward into the wind a small amount.

Downwind machines have been built, despite the problem of turbulence (mast wake), because they don't need an additional mechanism for keeping them in line with the wind, and because in high winds the blades can be allowed to bend which reduces their swept area and thus their wind resistance. Since cyclical (that is repetitive) turbulence may lead to fatigue failures, most HAWTs are of upwind design.

III. RESULTS AND DISCUSSION

Mobile Charging Through Bicycle

Cell phones are small potatoes in the big picture of energy consumption. Just unplug your phone from the wall, and in the time that it takes for you to rig up this circulates your phone will be out of juice and you'll be due for a long ride. Mobile phone charging consists of two different type of charging. One is wired charging another one is inductive charging Mobile phones are touted as the digital devices transforming underdeveloped regions. Information and Communication Technology (ICT) developers recognize the potential for these devices to impact education, health and income generation among consumers at the "bottom of the pyramid" or the world's poorest earning under Rs 50 per day.

Human-Computer Interaction (HCI) researchers and development experts continue to develop novel applications for them. Underlying the hopes for these applications are assumptions about users' abilities to keep a cell phone handset battery charged. About 1.4 billion people are off- grid or lack access to electricity; the vast majority (85%) lives in rural parts of the developing world.

These settings are far from the national electrical grids making charging handset batteries difficult. Thus, one important challenge facing HCI4D/ICTD researchers is identifying and developing effective ways for these rural, off-grid and poor consumers to charge their mobile phones and all the accompanying applications they can support. Without power, the digital divide will increase and the benefits accompanying cellular telecommunication will remain an urban fantasy. Solutions do exist including car batteries; diesel generators, solar installations and entrepreneurial charging kiosks, but all have limits,

Mostly their lack of affordability by the poorest and most remote, inconvenience and required maintenance. Solar photovoltaic-powered devices aimed at ordinary consumers have emerged as one promising solution and are often presented as the solution but photovoltaic panels are costly, wiring fragile and batteries heavy and not durable. Long periods without sun over long rainy seasons and over-use by many family members and friends can shorten battery life. Meanwhile, human power is plentiful throughout the developing world.

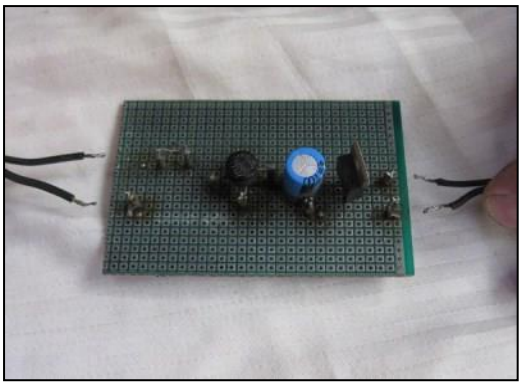
It is already being harnessed for treadle irrigation, pedal-powered transportation, brick making, road building, and other sectors. This system consist of the following steps to involve the design.

Step 1: Mount the generator onto your bicycle as directed on the package. It will work on either the rear or front axle.

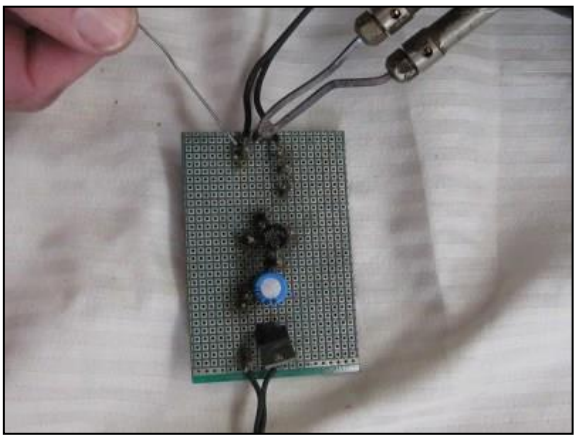
I mounted mine on the rear. Cut the cord off of your cell phone charger. Strip the insulation from the cut end

to expose about a half-inch of both the positive and negative wires.

Step 2: Assemble the circuit, as shown below. Push the wires from the components through the holes in the circuit board. Use mounting pins to connect to the electronic components when necessary, and connect from pin to pin with the hookup wire.

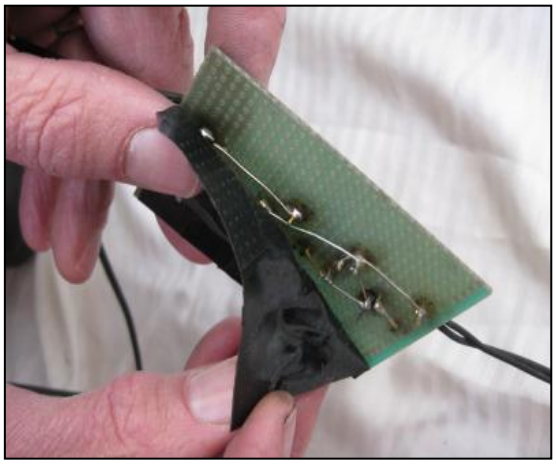


Step 3: Solder the two cut, stripped leads from the cell phone charger to the mounting pins connected to the voltage regulator. The wire going to the center of the power jack is usually the positive/red one. Connect the wire coming from the generator to the AC terminals of the bridge rectifier. Check your work against the circuit diagram at top.



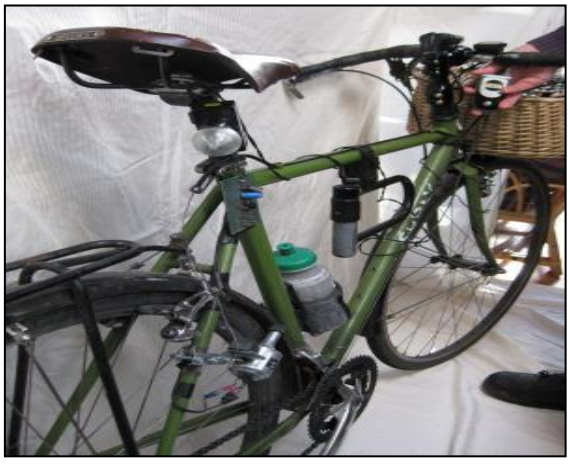
Step 4: Protect the solder side of the circuit board with a layer of electrical tape.

This will help protect the circuit from shorts due to accidental contact with conductive material, and from exposure to the elements.



Step 5: It is almost ready to go. It only need to secure the wire to the frame of your bike with tape and position the circuit board somewhere out of the way.

Step 6: Where it place the charging cell phone while you ride is up to you. I keep a basket hanging from my handlebars, so I ran the wire along the length of the center bar of the bike such that the DC plug-in ended up in the basket, where the phone stays while I'm riding. Other options are to keep the phone in a tool bag under the seat or in a saddle bag on the rear rack.



Step 7: Plug in phone and start pedaling! The phone should react just as if it were charging from a wall outlet.

IV. CONCLUSION

The project work has provided us an excellent opportunity and experience, to use our limited experience. We gained a lot of practical knowledge regarding, planning, purchasing, assembling and machining while doing this project work. We feel that the project work is a good solution to bridge the gap between institutions and industries.

We are proud that we have completed the work with the limited time successfully. The charging system for mobiles in bikes using wind energy` is working with satisfactory conditions. We can understand the difficulties in design of wind turbines and soldering circuits. We have done our project work; let us add few more lines about our impression on the project work.

Thus we have produced a ` charging system for mobiles in bikes using wind energy ` which helps us to achieve low cost and effective product for renewable energy sources. The production of this system reduces the use of electrical energy and increase the use of renewable energy. By using more techniques, this system can be modified with less weight and developed according to the applications.

V. REFERENCES

[1] Eltamaly, A. M. 2005 Modelling of wind turbine driving permanent magnet generator with maximum power point tracking system, Proceeding of 2nd MInia International conference for advance Trends in Engg (MICATE2005), Elminia, Egypt.

[2] Natrayan.L,G.Selvaraj,N.Alagirisamy,M.S.Santh osh Thermal Analysis of Engine Fins with Different Geometries, International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET),DOI:10.15680/IJIRSET.2016.0505040 , Vol. 5, Issue 5, May 2016, Page no: 6900-6906.

[3] Natrayan.L, K.Sathish Kumar, E.Aravindraj, FEA Analysis of using Para (polyarylamide) Materials in Radiator Pump Impeller, International Journal of Modern Trends in Engineering and Research (IJMTER), Volume 03, Issue 04, [April– 2016] ISSN 2349–9745.

[4] Natrayan.L, M.S.Santhosh and S.Yogeshwaran, Design and Investigation of Safety Cross Stand For Scrambler, International Research Journal of Engineering and Technology - Vol. 3, Issue 09, October 2016.

[5] A Novel Design of wind driven mobile battery charger by K.Sudhakar & Priyanka Saxena, International Journal of Science, Engineering and Technology Research (IJSETR),March 2013.

[6] Natrayan.L, R.Prabhu , Vehicle Compartment Heat Control Using Phase Change Materials, International Journal for Research in Applied Science & Engineering Technology - Vol 4 , Issue IX , ISSN : 2321-9653, September 2016.

[7] Dongbing Zhang, Designing A SEPIC Converter"(SNVA168E–May 2006-Revised April 2013)

[8] Natrayan.L, P.Sakthivel, T.Amalesh, Design and Finite Element Analysis of Industrial Radial Flow Impeller. International Journal of Advanced Research, ISSN 2320-5407, DOI: 10.21474/IJAR01, Page no 1525-1531, Vol 4, Issue 4, April 2016.