IMPLEMENTATION OF MOBILE CHARGING CIRCUIT USING INTEGRATED SOLAR AND WIND ENERGY

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Abstract: Today's complex world has become a century of power starting from toys to space application. Power has become the part and parcel of day to day life. The wide spread use of cell phones and other electronic gadgets are battery powered. Charging has become the most priority even for smart phones which consumes a major part of the battery life. In this paper charging of a battery using non-conventional energy sources have been implemented.

***Index Terms* – Solar Panel, Wind Fan, DC Series Generator, Charging Circuit, Cell Phone.**

I. INTRODUCTION

Energy has become the part and parcel of today life. The Nation development and its recognition in the world in the present era have been completely dictated by its power resources [1].

The cellular industry is the largest industry which is growing at an alarming rate so at the pace of population. As all the cell phones are battery powered devices power backup has become a predominant problem. As technology is improving it is demanding more power as entertainment has also become a part of cell phones. Nowadays rather than communication purpose it is mainly used for Internet, Games, as a Camera.

Today the cell phone has become a multipurpose device. There are many mobile applications although online transactions have become very common. Now a day's banking applications and other such transactions are completely done through cellular network.

In view of all the above facts power is very much necessary and also consumption of battery power increases so with the application that is being utilized. The nation has lot of potential of non-conventional sources which is underutilized. The present work aims at tapping the non-conventional sources to charge the cell phones.

Conventional resources are fast depleting now a days and the whole world is looking towards alternating source of energy. Cell phones are all battery powered devices charging the cell phones while on the journey is a bit tedious task. In own vehicles separate charger can be maintained for the purpose, but for a common man while on the journey is a difficult task. The present project is one such attempt to use non-conventional energy sources for the charging of cell phones. The potential for non-renewable energy sources are enormous and India is a country having highest potential for particularly solar and wind energy systems.

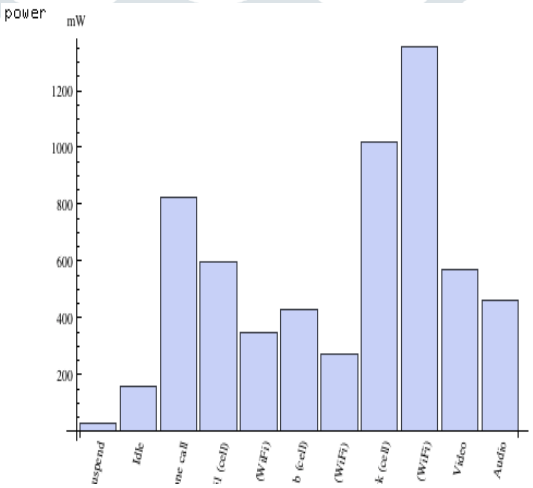

Figure 1: Battery power consumption for different application in smart phone

The Non-Conventional resources till today are under-utilized for various reasons starting from political interference economic feasibility and performance as parameters.

The power being utilized by the smart mobile for different applications are summarized in Figure 1. From the figure it is evident that more the features that are being used more is the power consumption.

Today the scenarios in the public places are people waiting for the power sockets to get their cellular phone charged. As the number of sockets are available in public places are very much limited hence a longer queue is a common scenario. The present paper is one such a attempt to provide a non conventional sources of power charging circuit for the cellular phones.

The conventional sources of power are fast depleting day by day and world is looking towards alternate sources of energy for power generation. The more and more use electronic gadgets the more power is consumed. But the installed capacity of the generating station remaining the same but the load is increasing at an alarming rate.

Charging the cell phones while travelling by public transport is a tedious factor. As still our public transports are not modernized as per the present scenario. The present works mainly focus on the charging the cellular phones while travelling. The model is build around a simple approach of using solar panels and wind mills. The basic idea behind using the wind mills is that there is a lot of potential of wind while traveling which can be harnessed for the electrical applications. Not forgetting the other counterpart, the solar energy, the solar panel is also mounted and hence optimum power tapping can be conveniently handled. The main object is to design and implement the cell phone charger by using the integration of solar and wind energy sources and to test and demonstrate the cell phone charger.

II. METHODOLOGY

A. Block Diagram

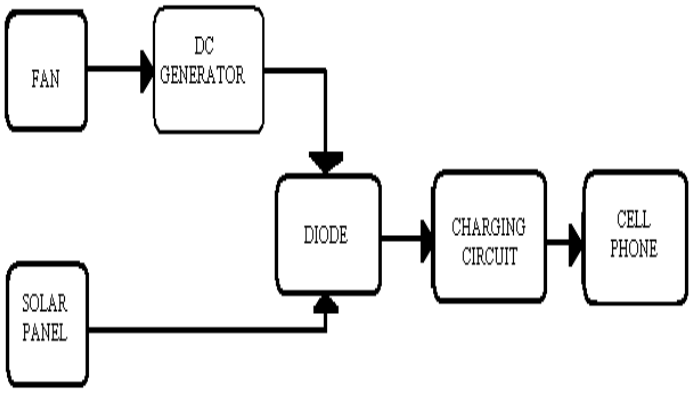

Figure 2: Block Diagram of the proposed model

In the present paper we are using hybrid energy sources to recharge the mobile batteries. Wind is one of the source of energy which we are using, Mechanical energy generated from the fan is converted into electrical energy by means of dc generator.

Another source of energy is the solar energy, the energy from the sun is converted into electrical energy by solar panels. Electrical energy from these two sources is given to the diode. Output from the diode will be given to the charging circuit where the voltage and currents are controlled to a required level to charge the cell phone batteries.

B. Charging Circuit

Figure 3 represents a simple L200 based charging circuit with reverse polarity indication.

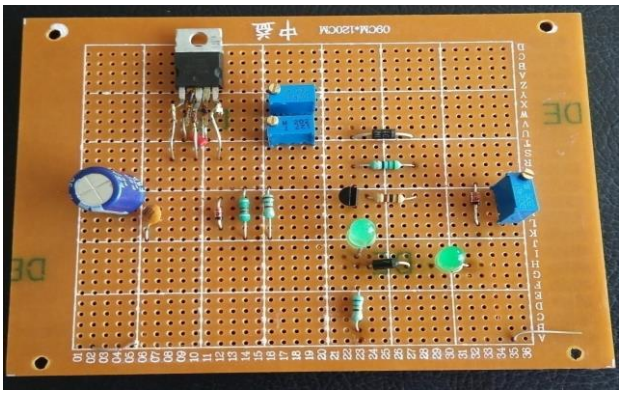

Figure 3: Charging Circuit

L200 is a five pin IC of variable voltage and current regulator. Voltage from the bridge rectifier or center tapped rectifier can be given as the dc input to the charging circuit. The charging voltage can be kept constant by using IC L200. Parallel combination of the resistors R2 & R3 controls the charging current to the battery. Charging current can be adjusted by using POT P1. Design of this charging circuit is such that it can charge a mobile battery. The battery reverse indication is done by transistor t1, diode D3 and LED. If the battery is connected in the reverse polarity, LED D5 which acts as a reverse indicator glows. The battery charging indicator green LED D4 glows when the battery charging process is going on.

C. Complete Model

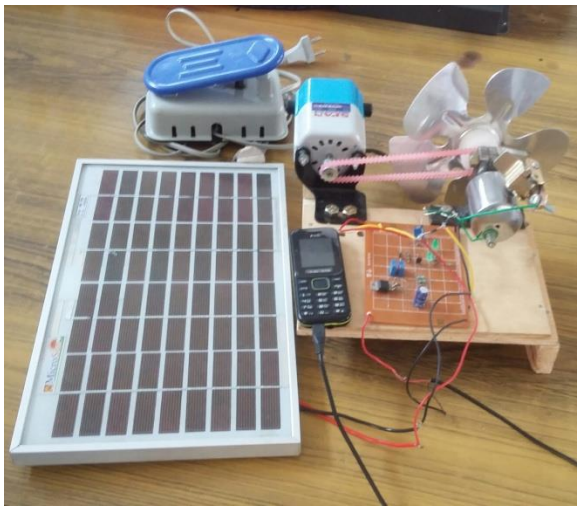

Figure 4: Integrated Model of charging a phone

The kinetic energy from the wind will be converted into mechanical energy through the blades of the fan. This mechanical energy is converted into electrical energy by DC generator which is coupled to the fan. Since the generated power is ac, it will be given to the bridge rectifier to convert ac power into dc.

The solar panel converts heat and light energy from the sun into electrical energy. This generated electrical power will be in the form of dc.

The energy generated from these two sources will be given to the charging circuit where the voltage and current are controlled to a required level to charge the cell phone.

D. Solar Panel

Figure 5: Forty eight cell solar panel

Solar panel refers to a panel designed to absorb the sun's rays as a source of energy for generating electricity or heating. Solar modules use light energy from the sun to generate electricity through the photovoltaic effect.

E. Wind Fan

Figure 6: Wind fan

The electric fan was one of the most important electric inventions of all time. The electric fan has blades similar to a water or steam turbine. A DC or AC motor drives a rotating shaft. Sizes of fans have gotten much smaller and lighter over the years. As engineers improved the electric motor and blade design they figured out how to get more performance out of a design that uses less copper and steel.

F. Dc Generator

Figure 7: DC Generator

The DC generator converts mechanical energy into electrical energy. It works on the principle of Faraday's law of electromagnetic induction. According to this law, when a conductor moves in a magnetic field it cuts magnetic lines of force, due to which an emf is induced in the conductor. The magnitude of this induced emf depends upon the rate of change of flux (magnetic lines of forces) linkage with the conductor. This emf will cause a current to flow if the conductor circuit is closed.

III. RESULTS AND DISCUSSIONS

The present work was carried out and rigged up successfully in analog electronic circuit laboratory department of Electrical and Electronic lab and satisfactory results were obtained. The cell phone got charged for both wind and solar system which is depicted in the figures 8 and 9 respectively.

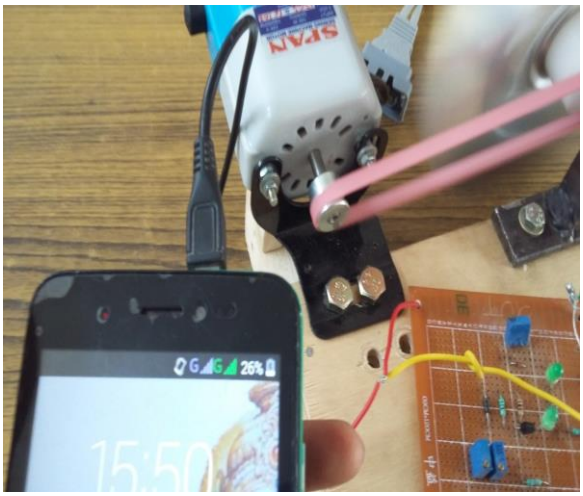

Figure 8: Charging a smart phone using wind energy

Figure 9: Charging a cell phone using solar energy

IV. CONCLUSIONS

The present work is one such attempt to use the underutilized non-conventional resources for the day to day needs of cell phone charging, wherein the present era is marked as the era of communication which in turn demands the power backup and the same can be achieved through the resource as depicted in the present work which saves the significant part of the conventional resources and indirectly the carbon emissions which can lead to the global warming and it is avoided at a very smaller rate and hence significant improvement and future technology can enhances the performance of the battery charging devices.

REFERENCES

[1] Vijay, Tanuj Manglani, Pankaj Kumar, Ramkishan Meena, Anita Khedia, "Wind and Solar Mobile Charger Vol. VII, Issue 4, December 2014, ISSN 2277-8322.

[2] Saikumar, Thamaraikannan, Yuvaraj, "Wind Energy Based Solar Mobile Charger", International Journal for Research and Development in Engineering (IJRDE), vol. 2. 2013.

[3] K Sudhakar, "A novel design of Wind driven Mobile Battery Charger," International Journal of Science, Engineering and Technology Research, March 2013, pp. 271-350.

[4] S.Pragadeesan, "Portable battery charger using renewable like solar and wind energy," unpublished.

[5] N raghu Ram Reddy, "Mechanical and Electrical Mobile Charger," Int. Journal of Engineering Research and applications ISSN: 2248-9622, Vol. 3, Issue 6, and Nov-Dec 2013

[6] N Raghu Ram Reddy, "Mechanical and Electrical Mobile Charger," Int. Journal of Engineering Research and Applications ISSN: 2248-9622, Vol. 3, Issue 6, Nov-Dec 2013, pp.1705-1708.

[7] Rohit kamble, Sameer Yerolkar, Dinesh Shirsath, Bharat Kulkarni, "Solar Mobile Charger," International Journal of Science, Engineering and Technology Research, Volume-2, Issue-4, July-2014.

[8] "Wind Powered Mobile Phone Charger", unpublished.

[9] "A Study on Renewable Energy Sources in India", Environmental Engineering and Applications, volume 12, September 2010.

[10] Neha Kondekar, Amit K Gupta "Solar Charger Circuit". Indian Institute of Science, Bangalore, unpublished.