Three Tire Renewable Energy Powered Portable Energy Bank

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Abstract—The concept uses free energy for powering up devices in time of emergency. Electricity is generated from renewable sources of energies i.e. Solar, Wind & Tidal Energy. The system is so conceptualized that it can convert electricity from any said forms of renewable energy sources simultaneously. For an instant, if a person is riding on vehicle it transforms electricity from solar and wind energy, like wise a combination of tidal and solar. The concept has a huge market potential as a product.

Keywords—Portable Energy Bank, Solar Energy, Wind Energy, Tidal Energy, Electronics Gadget

I. INTRODUCTION

At the time of no electricity or at the time of travelling, Charging of mobile phone is a big problem as Power supply source is not generally accessible. Travelling Chargers for Mobile and MP3 players are available but they are Expensive and need separate models for charging at home and in the car. So, a mobile portable energy bank charger using wind and solar energy is proposed. In the proposed Work, wind energy is used to get 6v with the help of generator and solar energy is used to 5V to 12v with the help of solar panel. The proposed charger will solve the problem of mobile charging at the time of travelling or when there is no electricity near us that time this will be very helpful for us.

II. COMPONENTS DESCRIPTION

2.1 Wind energy turbine

Wind energy being one of the most important renewable energy sources, and wind turbines, which are necessary for producing wind energy, are very important in today’s environmentally aware world. Below we outline detailed information about generators, with many power options right up to 7 MW, as well as one of the most important components of wind turbines and motors that is used in place of generators in individually made wind turbines.

Fig.1 Wind Turbine

Basic Power Formula;

Blade length, l=x meter
Wind speed, v = x m/sec
Air density, ρ = 1.25kg/m³
Efficient, Cp = average 0.3 – 0.4

P total=0.5 (x) ρ (x) 3.14 (x) I² (x) v³ (x) Cp

2.2 Solar Panel

A solar panel converts solar energy into electrical energy. Solar mobile charger is a device which can charge mobile phones using solar radiation. Its major component is a compact solar panel. This solar panel traps solar energy and produces an output voltage. But, since the light radiations falling on the solar panel can vary, the output voltage becomes unstable. For charging mobile phone, stable voltage is required. So, to make the output voltage stable and regulated, we use a voltage regulator circuit along with the solar panel.

Fig.2 Solar Panel

2.3 Battery

AGM Batteries are not harmed by high amperage charge and discharge so long as the input voltage is carefully regulated.

Charge 12 volt batteries at 13.2 – 14.4 volts
Charge 6 volt batteries at 6.6 – 7.2 volts
Avoid over charging and remove from charger immediately (or divert to other load – PV, renewable). Over charged batteries will have an unnaturally short lifespan. AGM batteries are not affected by higher current charging as GEL and flooded batteries can be.

Important Note! When charging batteries you must make sure that the charger voltage is less than or equal to the battery voltage. For the best battery performance/life you should have them matched. For example: 3.7/4.2V battery and 3.7/4.2V charger: OK - 3.7/4.2V battery and 3.6/4.1V charger: OK (but not ideal) - 3.6/4.1V battery and 3.6/4.1V charger: OK - 3.6/4.1V battery and 3.7/4.2V charger NOT OK!

2.4 Diodes

A diode is a two-terminal electronic component with asymmetric conductance which means it has low (ideally zero) resistance to current flow in one direction, and high (ideally infinite) resistance in the other.

2.5 Summing Op-Amp

The summing amplifier circuit is shown below. In the circuit below VA, VB and VC are input signals. These input signals are given to the inverting terminal of the operational amplifier using input resistor like Ra, Rb and RC. In the above manner, the number of input signals can be given to the inverting i/p. Here, RF is feedback resistor and RL is the load resistor. Non inverting terminal of the operational amplifier is given to the ground terminal using Rm resistor. By applying KCL at node V2 we can get the following equation.

\[ I_f + I_b = I_a + I_b + I_c \]

The input resistance of an ideal operational Amplifier is near to infinity, so we can neglect V2 and Ib

2.6 D.C Voltage Regulator

DC to DC converters are used in portable electronic devices such as cellular phones and laptop computers, which are supplied with power from batteries primarily. Such electronic devices often contain several sub-circuits, each with its own voltage level requirement different from that supplied by the battery or an external supply (sometimes higher or lower than the supply voltage). Additionally, the battery voltage declines as its stored energy is drained. Switched DC to DC converters offer a method to increase voltage from a partially lowered battery voltage thereby saving space instead of using multiple batteries to accomplish the same thing. Most DC to DC converter circuits also regulate the output voltage. Some exceptions include high-efficiency LED power sources, which are a kind of DC to DC converter that regulates the current through the LEDs, and simple charge pumps which double or triple the output voltage.

DC to dc converters developed to maximize the energy harvest for photovoltaic systems and for wind turbines are called power optimizers.

III. BLOCK DIAGRAM
Fig. 7 shows the technical block diagram of hybrid portable energy bank to get a various voltage like 5v, 6v, and 9v that time the value of resistor, capacitor is change.

V. APPLICATION OF PROJECT

- Lighting up the loads
- Charging of batteries
- Charging of mobiles
- Mp3 player supply etc

VI. FEATURES

Our project contains the said forms of renewable energy say solar, wind, and tidal energy in one system only

- Portable
- Low cost
- Easy design
- Conceptualised system

VII. CONCLUSION

The aim of our project is to make a portable energy bank which gets charged by the use of renewable energy sources like solar energy, wind energy and tidal energy simultaneously. The project will be environment friendly and user friendly and it is not very costly. This concept has a huge market potential as a product. Six different configurations of hybrid energy systems incorporating wind energy, solar energy and battery storage were proposed, simulated and analyzed. The study confirms the feasibility of these hybrid systems with many configurations being profitable. A multi-attribute trade-off analysis was employed to determine the best hybrid system configuration option that would reduce diesel fuel consumption, and jointly minimize the CO2 emissions and net present cost (NPC). SO this study analyzes the incorporation of renewable energy.

REFERENCES

