

Hybrid Energy Based Power Bank

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Abstract-In today's world, almost everyone has its own cell phone with the rapid industrialization, development and exploitation. Charging of mobile phone is a big problem when traveling a long distance journey or where power supply is not available. This paper proposes a universal mobile charger which can work on wind as well as on solar energy. This charger is highly efficient and very economical as it uses non-conventional energy sources of power.

1) INTRODUCTION:

During traveling, charging of mobile phone is a big problem as power supply source is not generally accessible. Traveling Chargers for Mobile Phones, iPods and MP3 players are available but they are expensive and need separate models for charging at home and in the car. So, a mobile charger using wind and solar energy is proposed. In the proposed work, wind energy is used to get 6 V with the help of generator and solar energy is used to 5.5V with the help of solar panel. The proposed charger will solve the problem of mobile charging during traveling, power cut and non availability of power at remote areas.

2) COMPONENTS DESCRIPTION:

A. Solar Panel :

A solar cell is a solid state electrical device that converts the energy of light directly into electricity by the photo-voltaic effect. Assemblies of cells used to make solar modules which are used to capture energy from sunlight, are known as solar panels. PV systems burn no fuel and have no moving parts hence, they are clean and silent and producing no atmospheric emissions of greenhouse gases. In the proposed work, the solar panel generates different voltage in different time.



fig.1.Solar Cell

B. Wind driven generator:

A dynamo is an electrical generator that produces direct current with the use of a commutator. The word dynamo (from the Greek word dynamics; meaning power) was originally another replacement for the word generator. A small electrical generator built into the hub of a bicycle wheel to power lights is called a hub dynamo, although these are invariably AC devices and are actually magnetos.

In the proposed work, dynamo generates different voltage in different rotation.



fig.2.Dynamo

C. Voltage Regulator IC

Member of 78xx series of fixed linear voltage regulator ICs are used to maintain the output voltage at a constant value. The xx in 78xx indicates the fixed output voltage. 7805 provides +5V regulated power supply. Capacitor of suitable values can be connected at input and output pins depending upon the respective voltage levels.

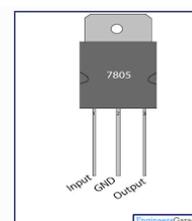


Fig.3.7805 I.C

D. Battery :

An electric battery is a device consisting of one or more electrochemical cells that convert stored chemical energy into electrical energy. Each battery consists of a negative electrode material, a positive

electrode material, an electrolyte that allows ions to move between the electrodes, and terminals that allow current to flow out of the battery to perform work. Primary batteries also called single-use or disposable are used once and discarded i.e. the electrode materials are irreversibly changed during discharge. Common examples are the alkaline battery used for flashlights and a multitude of portable devices. Secondary (rechargeable batteries) can be discharged and recharged multiple times i.e. the original composition of the electrodes can be restored by reverse current. Examples include the lead-acid batteries used in vehicles and lithium ion batteries used for portable electronics.



fig.4.Battery

E. Resistor :

The electrical resistance of an electrical conductor is the opposition to the passage of an electric current through that conductor. An object of uniform cross section has a resistance proportional to its resistivity and length and inversely proportional to its cross-sectional area. All materials show some resistance, except for superconductors, which have a resistance of zero.

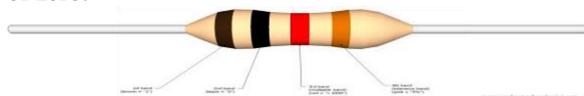


fig.5.Resistor

F. Foldable Wind Fan :

A wind turbine is device that converts kinetic energy from the wind into electrical power. A wind turbine used for charging batteries may be referred to as a wind charger.



Fig.6.Propeller

G. Wires :

Wires are used to connection of elements.

H. Led :

LED stand for Light Emitting Diode. LED's allow the current to flow in one direction.

I. Diode :

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.

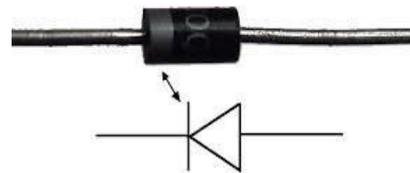


fig.7.Diode

J. Charge Controller :

A charge controller limits the rate at which electric current is add to or down from electric batteries. It Phones have rechargeable batteries which are to be charged with a DC voltage. Here, wind energy is used to generate 9v, by the rotation of generator shaft to get 9 volts. This will pass through IC 7805 and voltage maintained at 5V and current becomes 660mA. Diode prevents high voltages so output voltage always will be 5V.

Similarly, 5 watt, 12 V solar panel is used as the source of current. This solar panel converts the light energy in to electrical energy. When the sunlight is maximum, the solar module can generate around 16.5 volts at 400 mA. This current is used to charge the battery. Here, 7805 voltage regulator IC act as a step down converter. That is 12V is step down to 5V. This voltage is used for charging the phone.

A LED glows when power is available at the mobile charger. Maximum current output is 660mA, more than adequate to run any charger-powered accessory. Since the Universal Serial Bus specification provides for a five-volt power supply, it is possible to use a as a power source for recharging batteries. Output is taken across the cable. This is given to mobile phone.

3. APPLICATIONS:

- Ice landed system (remote areas).
- Industrial power saver.
- Hybrid vehicle (fuel less).
- Distributed power generation.
- Hand held device charging.

4. RESULTS AND DISCUSSION:

Hybrid power generation system is good and effective solution for power generation than conventional energy resources. It has greater efficiency. It can provide to remote places where government is unable to reach. So that the power can be utilize where it generated so that it will reduce the transmission losses and cost. Cost reduction can be done by increasing the production of the equipment. People should motivate to use the non-conventional energy resources. It is highly safe for the environment as it doesn't produce any emission and harmful waste product like conventional energy resources. It is cost effective solution for generation. It only need initial investment. It has also long life span. Overall it is good, reliable and affordable solution for electricity generation.

5. FUTURE TRENDS AND LIMITATIONS:

The enormous researches have already been carried out but there are still certain obstacles which are needed to be crossed over. They comprise: ┘

- Can the miscegenation system work with same efficiency if the load demand is increased? ┘
- The parallel operation of all the three system should have the same effectiveness even in off grid paradigm. ┘
- The efficiency of solar power system need to be increased over 60%. ┘
- The size of the system need to as such so that it can be constructed in nearly all possible terrains.

6. REFERENCES:

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