



SOLAR MOBILE CHARGER

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ABSTRACT

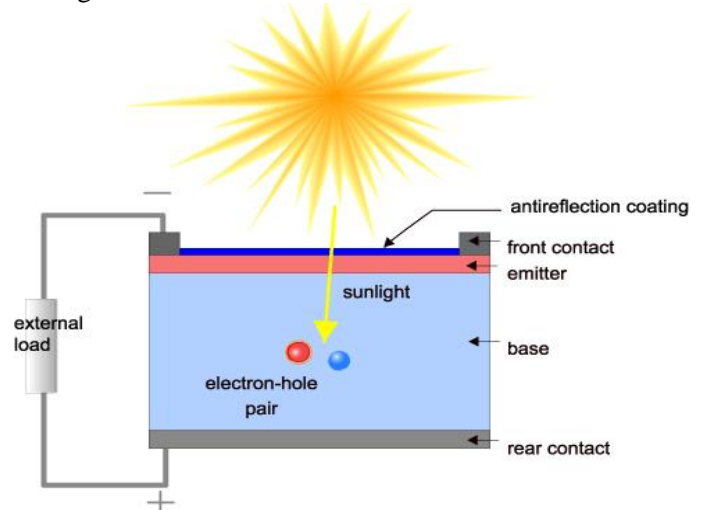
Ancient literatures in India even state the use of flying machines which were powered using the sun. Coming 21st century, we have come a long way in developing solar cells which are the devices powering our future, converting sun's energy into electricity. This work is about using non-conventional energy i.e. solar energy for mobile battery charging. Solar chargers are simple, easily or conveniently transported and ready to use devices which can be used by anyone especially in remote areas. Solar panels don't supply regulated voltage while batteries need so for charging. Hence, an external adjustable voltage regulator is used to have the coveted constant voltage.

Keywords: Battery charger, non-conventional and conventional energy

INTRODUCTION

In today's environment conscious world, a lot of interest is being taken in alternate forms of energy. Solar power is a renewable source of energy, which has become increasingly popular in modern days. Today 80% of the energy we use comes from fossil fuels and about 1% comes from solar energy. It is estimated that the world's oil reserves will last for 30 to 40 years, whereas solar energy is forever. Solar energy has two big advantages over fossil fuels. The first is in the fact that it is renewable; it is never going to fail. The second is its effect on the environment. Burning of fossil fuels introduces many harmful pollutants into the atmosphere and contributes to global warming and acid rain. Solar cell directly converts solar energy into electricity. The solar cells that are connected together make up the solar panel. This can last up-to several decades without replacement. However, there is a drawback of solar power: energy can be produced only in the presence of sunlight. To overcome this, the solar panels are coupled with the rechargeable batteries, which can store excess power generated and provide energy in the absence of sunlight. Solar energy has advantages over other renewable energy sources including wind and water power: solar power is generated using solar panels, which do not require any major mechanical parts, such as wind turbines. These mechanical parts can breakdown and cause maintenance issues and can also be quite noisy. Both of these issues are virtually non-existent with solar panels. This project aims at harvesting solar

energy and storing it in a rechargeable battery. Using this battery various low-voltage device can be charged. Also, the charge in the battery is displayed on an LCD through a micro-controller.

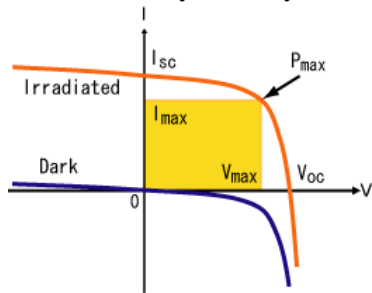


Solar cells have come a long way from bulky 6% efficient chunks to thin films with as much as 30% efficiency. They are selling like hot cakes today given their essential and utility. And the reason being they are reliable good chaps unlike oil which will soon be more precious to us than diamonds and the black monster: coal which has polluted the air, hand in cut off with the other fossil fuels.

We need to understand solar panels so as to understand their applications. Mono-crystalline are so far the most efficient, given that they have the maximum silicon in a

unit area so more current for the same number of photons. They are made out of a single silicon crystal as a continuous grille. While for the polycrystalline panels, molten silicon is decant into molds and separate boundaries can be seen due to this. Less amount of silicon in a unit area means lesser efficiency of production of electricity. Amorphous thin film panels are layers of silicon on a glass surface and are the least expensive. Hence, they are used in applications where you can do away with expert in avoiding wasted time and efforts for lowering the costs.

Solar panels are really useful in broad daylight but we need energy when the Sun isn't shining above our rooftops. That's why we need solar chargers which will depot energy in rechargeable batteries. This project aims to make a solar charger using a voltage regulator IC so as to charge a Lead Acid Battery with the constant output voltage obtained through this IC LM317(Details explained later). Today there are more options like a solar charger ic lt3652. This is an IC with embedded MPPT (Maximum Power Point Tracking) algorithm. MPPT simply means the IC gets the maximum possible power from the solar panel by sampling its output and applying the proper load resistance. This small chip make simpler or easier to reduce the life given its ease of use and maximum efficiency is always ensured.



A. How are Solar Panels Made

Solar energy has long been catch attention of the scientists and researchers as true alternate solution to fossil fuel energy. Noticing the tremendous abundance of sunlight available to us as a blessing from our sun, it is not unusual to wish to tap this energy which has been there since the start of time and use it drive our engines and homes. However the solar energy even though it is usable in the property of more than adequate quantity or supply, the efforts to use this energy and transfer it into a usable form and drives our day to day appliances has been in vain. That is why solar energy has not become our ground source of our energy requirements. We are either relying on hydroelectric power which in turn causes environmental tragedy or we burn coal or use nuclear energy to generate electricity. The main reason why we are not able to use the solar energy is our solar panels are not able to tap more than 20% of its energy. This results in vast investment cost but low return of

investment. This makes the investment in solar energy untempting and therefore is becoming less and less popular. However researchers all round the world have been able to develop solar panels that will tap this solar energy more expeditiously. In order to understand how this is possible we need to understand how solar panels are produced. There are two introductory types of solar panels, first is the crystalline solar panels made of crystalline silicon and other is amorphous silicon panel which is made from amorphous silicon.

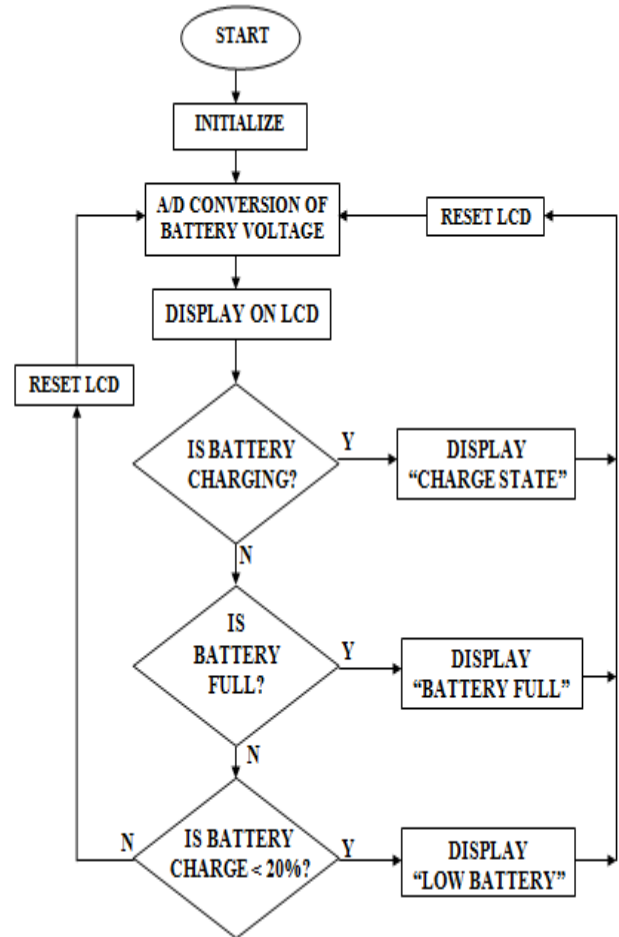
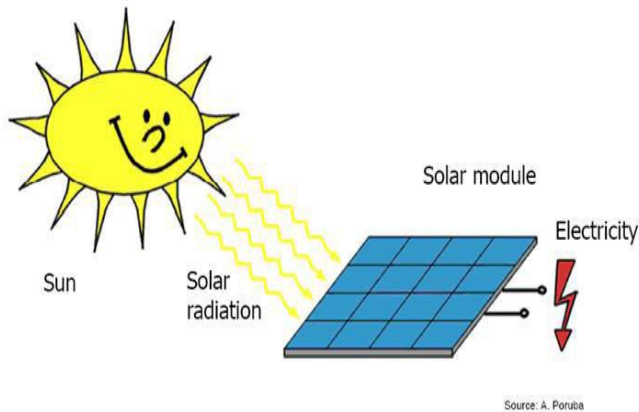


Figure 3: Flowchart to analyse the charge in the battery

B. Solar Energy Equivalence to Other Alternative Energy Sources

We have to switch to clean an energy source, which is for certainly after realizing the consequences of using the fossil fuels and destroying the environment. Millions around the world depend on the huge energy reserves available deep down the earth. The reserves are exhaust and will dry out soon. On the other hand the demand and the intake rate are not going down. This is why we have to find out an energy source which will not only be free of pollution but also be able to produce enough energy to power our needs? So the question is whether there survive and energy source that can meet our needs or

not. Let us talk about three alternative energy solutions that are available and find out whether that can be the one or not. These changes in the temperature and pressure happen due to the difference in the amounts of heat energy received by different areas from the sun depending on the earth's rotation. This energy in the form of wind can be converted into electrical or chemical energy, consume in the batteries. The devices used to tap this wind energy are windmills, as the wind go down on the rotational energy of turbines is converted into electrical energy by generators. The process is clean, eco friendly and also renewable. One wind mill can develop enough energy to power a house. However the electrical energy that is produced from the turbines is not plenty compared to the energy produced from the fossil fuels. The disadvantage is that it is high priced and not completely renewable; therefore a better way needs to be discovered to produce energy completely clean and eco friendly. As the wind does not blow at a constant speed and there is no sure about the wind direction and therefore the output is not efficient as it should be. Also, the wind mills subjected to a severe damage when struck by heavy rains and lightning storms can be dependent to heavy damage. The second is the biomass.



Charging requirements of mobile phones

APPLICATIONS:

- To charge mobile phone and camera (digital as well as CC cameras).
- MP3, CD and MD players can be charged.
- This device can also be used to charge batteries of portable DVD, smart card readers, etc.
- To charge laptop, I-pods, tablets, blue-tooth devices etc.
- To power 2W bulbs in hut, bed-lamps, low-watt lights, etc.

S.No	Mobile Type	Maximum Charging Voltage (V)	Maximum Charging Current (mAh)
1	Samsung	5.7	3400
2	Sony Ericson	4.8	900
3	Nokia	4.8	1500
4	LG	5.5	2100
5	Panasonic	3.7	1200
6	HTC	5.5	1800
7	Blackberry	3.7	1300

ADVANTAGES

Cost Effective: Compared to the other mobile chargers, the solar chargers are cost effective as it absorbs power from the sun. It does not require electric power.

Versatile: It is also known to be versatile as it can be used for all types of mobile phones.

Uninterrupted Power Supply: One of the superlative advantages of solar mobile phone charger is that it can be used to charge mobiles even during power outages.

Emergency Purposes: Another benefit is that it hardly requires any electrical outlet. It can therefore be used during emergencies and outdoor purposes.

LIMITATIONS

Quite expensive: One of the most important quantity of being a hindrance is its price compared to the ordinary mobile phone chargers, it is quite expensive as it utilizes solar energy captivators.

Charging time large: Another significant drawback is the time frame required by the chargers to charge mobile phones. It can take six to eight hours to charge mobile phones compared to the other.

CONCLUSION:

Solar act as good power supplies in bright sunlight. The only problem is the unregulated voltage due to the variation in intensity of light. Voltage regulator is used

to solve this problem by regulating the output voltage. The charge so obtained is stored in the battery and is given to the respective loads. The charge present in this battery is analyzed and displayed on an LCD using a micro-controller.

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