

# Design & Development of Solar Bottle Bulb & Mobile Charger

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**Abstract:** Electricity is a worldwide know source of made light. Electricity is a form of energy that is produced by the movement of electrons. Another way of receiving electricity would be solar electricity. Only recently, in the last two decades, have many people taken advantage of the sun's light and energy to build or install solar products. Solar products are more beneficial to the earth and can save you money in the long run. Solar products include a variety of options like solar panels, photovoltaic systems, solar water heaters, etc.

In Manila, Philippines, electricity and solar was both put to use in making a solar bottle bulb. These solar bottle bulbs are starting to become a popular installation. Since the houses in places in the Philippines are located so close together, "they have no windows or natural light." We wanted to do a project on solar and compare the difference between solar and regular electricity. In this project, we are going to be testing a regular light bulb and a solar bottle bulb that we will be creating. We are going compare and see whether a regular light bulb or a solar bottle bulb is brighter, at the different times of day. We will be finding the average brightness of the solar bottle bulb and compare the results to the regular light bulb. We wanted compare the two because solar energy can be very useful and can save people a lot of money. Branching off this project, we would like to do a project in the future also on the comparing of brightness. We would like to apply what we have learned and try to experiment the difference and effect of different colors of rooms. By doing this experiment, we have learned much about brightness and we are hopefully able to direct a better experiment in the future.

**Keywords:** Solar products, Bottle Bulb & Mobile Charger, Electricity.

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## 1. INTRODUCTION

The energy extracted from solar radiation by solar cells is vital to expanding our source of energy. We all know importance of Solar Energy in today life. It is ultra clean, natural and sustainable source of energy that can be utilize in use of making solar electricity, solar heating appliances, solar lighting appliances and many more. In developing countries there isn't much source of electricity. Hence to use solar as largest source of energy one can build own solar based light bulb without any electricity cost. Many people do not have access to light or cannot cover the cost for electricity. Thus, they do not have light in their homes, even during the day

Solar based bulb and Mobile charger project uses solar panel, a circuit that convert voltage from solar panel to charge rechargeable battery, 1 watt high power led light fitted inside waste plastic bottle and mobile charging circuit to charge mobile phone via USB cable. This project is very helpful in rural areas where electricity source are less. Solar power as a renewable energy source, is gaining wide spread acceptance due to the availability of technical know-how and solar resources. Like all other renewable energy sources, it evidently has numerous benefits over non-renewable energy sources, such as coal, oil nod nuclear energy etc. s an environmental friendly option of power generation it is no-polluting, reliable and can produce energy anywhere that there is sunlight. Another major advantage is that solar resources are not going to run out any time soon. When compare with other sources of res, it has some technical and environmental advantages. Solar power is generated using solar panels, which do not require any major mechanical parts, such as wind turbines

### PROBLEM STATEMENT:

Development of solar power based lighting system is very much essential in rural and hilly areas where electricity is not easily available. As earlier stated the need for rural resident to light and charge phones during the hours of the day when sunlight is available and the need to cut down the level of carbon emission is major concern. In order to achieve this solar powered to a bulb light and mobile phone charger will be needed. As against this background, with the help of solar bottle bulb this problem can be tackled.

### OBJECTIVES:

- [1] Study of solar power based lighting system for development of solar bottle bulb and solar mobile charger.
- [2] Design of efficient solar bottle bulb and solar mobile charger by using methodology.
- [3] Field test evaluation.
- [4] Comparison of brightness of regular bulb and solar water bulb.
- [5] Experimental analysis of solar based mobile charger.

### SCOPE:

We all know importance of Solar Energy in today life. It is ultra clean, natural and sustainable source of energy that can be utilize in use of making solar electricity, solar heating appliances, solar lighting appliances and many more. The benefit to the local community above all is access. The second is livelihood creation. Once a seeding program of a few hundred bulbs is put in a village, the effect is immediate, as neighbors get to see how the bulbs are made by the organization and volunteers and the improvement of internal living conditions in the household.

In developing countries there isn't much source of electricity. Hence to use solar as largest source of energy one can build own solar based light bulb without any electricity cost

## 2. LITERATURE SURVEY

ACIM – Asia. (N. d) Retrieved November 20, 2011 He Explain, Energy has an established positive correlation with economic growth. Providing adequate, affordable and clean energy is a prerequisite for eradicating poverty and improving productivity. The inevitable increase in the use of fossil fuels alongside a country's economic growth presents associated side effects of threat to the nation's energy security, as well as environmental degradation through climate change. A feasible alternative to the indiscriminate burning of fossil fuels lies in the accelerated use of renewable energy. In tropical countries, which have sunshine almost throughout the year in most parts, solar energy is one of the most viable options [1]. Agawam, S. G., Barnes, D. F., and Cabal, R. A. (2005, November) said project in the future also on the comparing of brightness. We would like to apply what we have learned and try to experiment the difference and effect of different colors of rooms. By doing this experiment, we have learned much about brightness and we are hopefully able to direct a better experiment in the future [2]. Alma, M., Mwakasonda S., Rahman, A., Rovere, E., Simoes, A., and Winkler, H. (2011, June). It describe the aim of the work was to find out the functionality of LED lighting combined with solar Panels in developing countries and to find out the availability of solar energy in different Geographical locations. Another aim of the work was to understand the advantages and Disadvantages of photovoltaic systems and the optimum combination of PV systems for Lighting [3].Li Tianhua, Pan Zhengkun and Yang sha, (2014) It explain, LED (Light Emitting Diode) pest control light is an electronic device using the photo taxis and chemo taxis to induce pests to touch the high-voltage power grid, thus killing them. It has become one of the primary means to control the insect attack. The LED pest control lights could effectively reduce the dosage of pesticides as well as their pollution on the agricultural products, soil and water. The solar LED light is easy to use and can be applied to various crops, thus, it has been wide applied in tea plantation, orchards, vegetable, cotton fields which are far away from the power grid or unsuited for stringing. [1] The solar LED pest control light is mainly composed by solar panels, batteries, control circuit, control keyboard, LED lamps, boost circuit, high-voltage grid, sensor and bracket and other components. During the day, energy from the solar panels will be stored in the storage batteries; at night, the electrical energy from the battery could drive circuit of LED light to control pest [4].

C. Hemalatha, A. Arcana , B.Jayaprakash, Parvathi Jaykrishna, (4 April,2014) It describes the Solar Energy (SE) is a key resource for the future of the world. The utilization of SE could cover a significant part of the energy demand in the countries. Using of SE in its various aspects, therefore, is very attractive in this part of the world. A comprehensive review of the different designs, details of construction of the wide diversity of practically designs of SE systems reported previously is presented. Therefore, in this review paper, an attempt has been taken to summarize the past and current

research in the field of SE technology. The main objectives of this research are to present the current status and future aspects of SE in the world by comprehensively reviewing various SE related studies conducted up to date and to highlight some corresponding available sustainable energy methods towards establishing energy policies [5]. Smaila, A.Divya and S.Bulomine Regi,(march 2014) "It's a divine light. God gave the sun to everyone, and light is for everyone. Whoever wants it saves money. You can't get an electric shock from it, and it doesn't cost a penny." (4). This simple invention lights up dark rooms during the day and a proper installation can last for about five years. Once Moser figured out the magic recipe, he placed the lamps in his neighbor's home and his town's supermarket. This way, the idea of solar bottle bulbs attracted attention and started to spread by word of mouth [6]. Rachel Maillet(Nov. 2011)It describe the success of this experiment will result in very practical uses. Accessible and affordable light will be provided to a numerous amounts of households in developing countries. There will also be another use for recycled bottles that will benefit many different people who are struggling to perform everyday tasks without indoor lighting [7].

Adarsh Mohan Dixit he said, the bottle bulb was brighter and shined more luminously compared to the regular bulb which was dimmer during the brighter times of the day. Our hypothesis was proven, and we conclude that both the solar bottle bulb and the regular light bulb played a brighter role but was dependent on many factors. The regular light bulb was brighter at most parts of the day but while the sun was out, the bottle bulb shined a bright light. In doing this experiment we learned that the sun can give a really bright\_and useful light, which can save a lot of money and electricity. The disadvantage is if it rains, if the clouds block the sun, or if the sun is only out for a short portion of the day [8]. Md. Mussabir Hossen, (March 2015) This research involves designing a LED solar bulb and mobile charger which is power by solar panel and that is capable of charging multiple multiple mobile mobile simultaneously. The project also requires research to the different solar panel available for the small scale system being design, as well as into larger solar panels that may be implemented into a building design [9]. Rishi Raj Borah, (Dec. 2013) the design is such that the solar panel will be installed on the galvanized pole considering some specifications like angle of tilt and direction of sunlight. The 12V dc battery that will power the LED bulbs will be connected to the solar panel via the charge controller for charging purpose. The pole will be constructed such that it will be able to hold the LED bulb or lamp [10]. Dr. N. Pal (Feb.2013) it explained, rural electrification was not considered as a basic human need like water and food in these past. A number of recent studies provide insight into how rural electrification helps in the betterment of rural society in various ways [11]. Dr. Prabhu, (March 2015) I describe, the system presented in this paper will be an efficient method to use the solar energy in remote areas. This system consumes very low power and high efficient lightning. We employ the auto sun tracking system; this can improve the energy stored in battery. This system does not affect the environment because it is pollution free. Our system also consisting of automatic ON, OFF control of the LED lamp, so there is no manual operation and it is not required operators [12].

Abhinandan Sharma, Hari sing (Oct.2014) In this paper he explain, studding the convectional led light of renewable energy of electrification. Now the India has been using the remote control of energy in solar power. Solar electrification is the most important part of the developing in India As it is urban area or rural area. In this paper, we are focusing the optimization of solar electrification to charge of power, cost efficient and efficiency effect. Also discuss the how LED light is more efficiently as compare to the CFL light in solar street light. We will discuss the study of LED light and CFL light about access the energy in solar project [13]. Okay O. “, Adigun A., (sap 2013) this project focus on the design and construction of solar powered mobile phone charger. This charge ensures continuous supply of power to the load (phone) with the aid of a regulating circuit. The solar panel supplying the curcuit has a maximum output voltage [14]. A.H. Tirmare, V.V.khandare, P.S. Mali,(June,2015) He said, Rural electrification was not considered as a basic human need like water and food in the past. A number of recent studies provide insight into how rural electrification helps in the betterment of rural society in various ways. A study the World Bank for 11 countries reveals that rural electrification results great benefits such as improvements of health facilities, better health from cleaner air as household reduce use of polluting fuels for cooking, lighting and heating, improved knowledge through increase access to television and better nutrition from improved knowledge and storage facilities from refrigerator [15]. Dhanil Vira, Mandeep Singh (, March 2015) In this paper, he is explain the testing over the embedded System and the rapid consumption of battery for mobile phones is done. The mobile phones referred to be phones using advanced operating system like android and are therefore referred to as smart phones too. Testing the usage of services provided by the smart phones like WiFi, and other services which consume the battery much more drastically than simple calls or messaged from the phone is done. The monitoring of battery at stand-by time and with usage is done and similarly the analysis result is produced [16]. Rohit Kamble, Samir Yerolkar, Dinesh Shrinath, Bharat Kulkarni,(July-2014) In this project is explain we are using the concept of energy harvesting by using solar energy for battery charging purpose. By using this we can charge our mobile battery in remote areas where there is a problem of electricity. Cost of this circuitry can be reduced to certain extend so that common man can easily purchase that and get benefit from that [17].

### 3. CONCLUSIONS

The solar bulb is an innovative solution to the problem of lighting houses and provides a simple demonstration of physics which will help motivate students to engage with the topic. It also provides an excellent opportunity for inter disciplinary work. Throughout the experiments, the children practice teamwork and the allocation of responsibilities, thus enhancing their social skills. Apart from the content focus, the lesson's emphasis could also be placed on the scientific method by introducing test protocols, which will be beneficial for future work in other natural science-subjects. The approach of including the solar bottle bulb into teaching has already been implemented in many schools as part of projects on light or alternative energy, so your pupils should be given the chance to experience light refraction from a practical point of view as well

### 4. FUTURE SCOPE

The purpose and overall goal for this modified soda bottle solar light are very much similar. These soda bottle solar lights can improve the lives of over 3 million people living in households surrounding Manila, the Philippines without generated power. The availability of light in developing countries will increase and improve the educational and medical needs. The use of these lights will also greatly improve the lives of struggling families. The success of this experiment will result in very practical uses. Accessible and affordable light will be provided to a numerous amounts of households in developing countries. There will also be another use for recycled bottles that will benefit many different people who are struggling to perform everyday tasks without indoor lighting.

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