*Manisha Ware, et. al. International Journal of Engineering Research and Applications*
*www.ijera.com*
*ISSN: 2248-9622, Vol. 12, Issue 12, December 2022, pp. 102-104*

RESEARCH ARTICLE OPEN ACCESS

# Solar Based Movable Battery Charging Station

Manisha Ware
*Electrical Power System*
*Zeal College of Engineering and Research*
*Pune, Maharashtra, India*

Prof. Dr.M.G.Unde
*Electrical Power System*
*Zeal College of Engineering and Research*
*Pune, Maharashtra, India*

**Abstract**
Solar Energy is a smooth and RE Strength ad vaned is on its manner to high stage penetration inside the global strength basket. However, there are several demanding situations related to Solar Energy, like intermittency, restricted dispatch capacity and no storability. Non-storability in a standalone PV device can be mitigated by using incorporating strength garage gadgets like battery to store the electric strength produced with the aid of solar panel while the solar is shining and to supply energy when the sun isn't shining. Batteries are, therefore, one of the essential aspects in the standalone PV system. And regularly the weakest link in PV systems because it impacts the maintenance price and reliability of the system. This project includes solar based battery charging station, microcontroller based totally, sun powered battery charging device. The developed system includes (i) solar panel (ii) At-Mega 328 interfaces for battery control capabilities, (iii) LCD show for no of batteries connected (iv) IOT module also used. The developed sun powered battery charging station. The main aim of this project is to charge our battery smartly by using electric supply as well as solar energy for electric vehicle. In this project is to charge our battery smartly and also discharger it properly without any damage to our battery and charging circuit. For proper charging we are using balancing method and for charging of this battery we are using three different modes each mode has its own benefits.

**Keywords—**Battery, Charge controller, At-Mega 328, Solar PV Panel.

---

Date of Submission: 10-12-2022 Date of Acceptance: 25-12-2022

---

## I. INTRODUCTION

As we know that now days the main problem is fuel day by day it is getting costly. So it is necessary to use natural sources such as wind energy, solar energy in our project we are using solar energy. The life of a rechargeable battery can be extended through the use of an intelligent charging system. The charging system must incorporate the proper charging method for the appropriate battery type (according to the battery chemistry). One of the prime functions of this system is to provide the necessary monitoring and control to protect the cells from situations outside of normal operating conditions. As we know that nowadays automation is taking place everywhere so we are designing such a project which will bring automation in our battery balancing and battery charging system. In this project we are using two methods of charging one is directly from our main A.C supply and second is by using natural source of energy which is solar energy. We are using natural source of energy.

The main purpose of this project "Solar Based Charging Station using IOT" is to get the most energy out of the solar panel by changing the angle of rotation in response to the strength of light falling on it. With this process we can get a

lot of energy from the solar panel from different sides of the slope [1]. Depending on the availability of sunlight, the solar panel tilt angle is determined. An electric car charging station is a place where a line is drawn on every electric car for a charge.

These charging channels are sent to the standard separation range to make the public domain easily accessible. Just like ordinary cars like gasoline engines get fuel at a gas station, the charging stations are a place to charge electric cars. As it plays a necessary role in charging electric batteries, it is necessary to monitor its performance within and within the Internet of Things [2]. With the existing

system of scarcity lacking capability, it becomes difficult to build an E-car charging station from a remote end. And in the present system the energy produced by the solar panel is made only by one angle of inclination [3].

This startup system will only generate limited power and power that can be started at various tilt angles not used. Even more so even at a solar charging station the amount of energy produced on that sunny day and in the afternoon will be higher compared to the energy produced in the morning or evening [4]. This is mainly due to the lack of sunlight falling on the solar panel. Here there is a problem or if there is sunlight, it falls into the wrong axis and therefore the electrical energy from the solar panel is small. The proposed system uses the ARDUINO UNO microcontroller as its operating principle. It features a powerful Atmega328 8-bit microcontroller unit for its processing purposes [5]. In the proposed work the power of the photovoltaic panel is emitted on different sides of the slope which is why the energy released in this way remains higher than the traditional power generation with the solar panel on the fixed side.

## II. METHODOLOGY

Electric vehicles require electricity for charging the batteries. This involves the increment of operational costs hence replacing this system with solar energy would nullify the high operational costs. So in order to convert the normal electric vehicles into hybrid electric vehicles, some solar panels and a specialized charge controller is necessary. Solar panels help in trapping and converting the solar energy into electrical energy while the charge controller regulates and selects the source for charging. A specific combination of electric vehicles with photovoltaic systems was reported which are mainly used for home to work or home to education transports operated from a grid connected photovoltaic system.

### *A. Working*

Solar charging for electrical vehicles is a basic and viable application of using solar energy to achieve sustainable energy development. The solar charging is based on the utilization of solar PV panels for converting solar energy to DC voltage. The DC voltage can be stored in the battery bank by a charge controller. An inverter is employed to convert the DC voltage from the battery bank to 110 volt AC at 60 Hz frequency that is identical to the power from the electric outlet. This paper will address the fundamental concepts of designing and developing solar PV systems for charging electrical vehicles. Solar and power from grid will charge the battery. Battery voltage and current will be displayed on LCD display. LCD display will display the number of connected batteries i.e. only one battery will connected. If battery removed from voltage and current the number of batteries connected will show zero. After switch on project name will be shown on LCD Display. We will use SMPS as grid, main power source to charge battery.

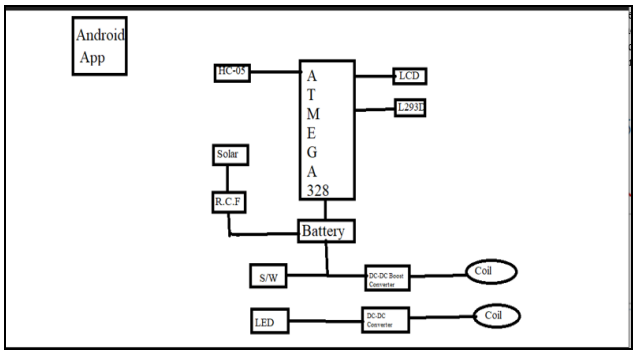

Fig.1. Block Diagram

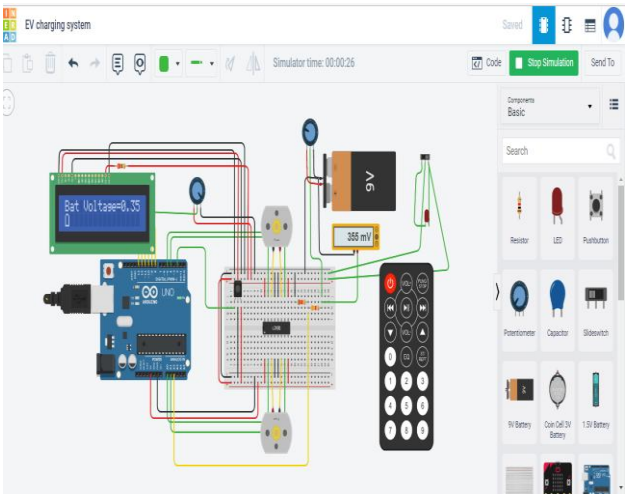

Fig.2. Circuit Diagram

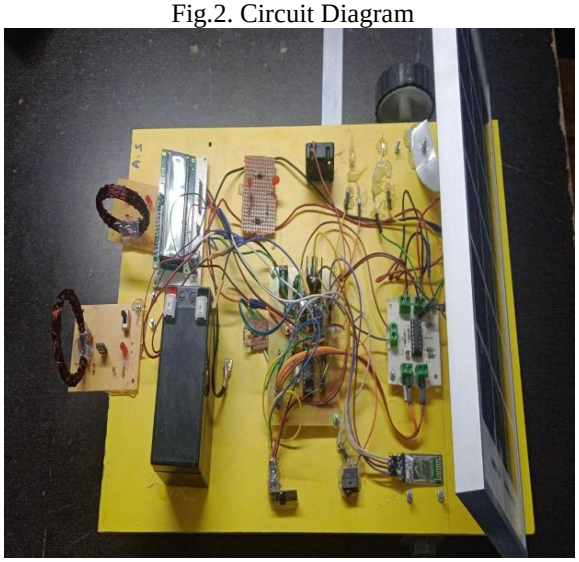
Fig.3. Hardware Setup

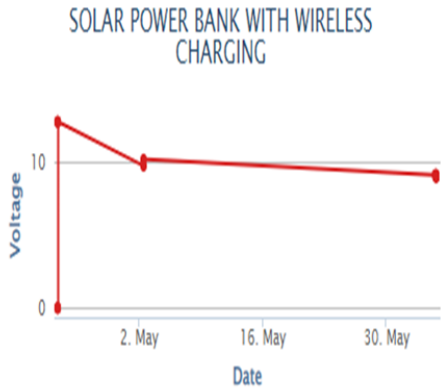


Fig.4. Graph

## III. CONCLUSION

The development of the Solar Charging system for batteries project comprised of various disciplines like electrical, electronics, and mechanical engineering technologies. This project attempted to provide a framework for the solar powered battery charging station. The proposed solar charging system will be one of the initiatives taken to achieve a Green campus. The economic analysis of the proposed system reveals that the payback period of the project is 3.5 years. It is clearly evident that the proposed solar-based battery charging system is better than the existing electrical charging system both in terms of operation and economical aspects. Researchers work on this project get a basic idea of the design and building of Solar PV systems for several useful applications such as electrical vehicle system..

## REFERENCE

[1]. Capasso, C. and Veneri O. 2015. Experimental study of a DC charging station for full electric and plug in hybrid vehicles. J. Applied Energy, 152: 131-42.

[2]. Chandra Mouli, G.R., Bauer, P. and Zeman, M. 2016. System design for a solar powered electric vehicle charging station for workplaces. J. Applied Energy, 168(15): 434-443. doi.org/10.1016/j.apenergy.2016.01.110

[3]. Choe, G.Y., Kim, J.S. and Lee, B.K. 2010. A Bi-directional battery charger for electric vehicles using photovoltaic PCS systems. In: IEEE Vehicle Power Propuls Conf., IEEE, pp. 1-6.

[4]. Unde M. G. and Tathe V. L. ,"Soil Resistivity Measurement and Interpretation Technique" , International Journal of Engineering Research and Application vol- 10(5), pp.25-26,May 2020.

[5]. Unde M. G. Maske R. N. and Kushare B. E. , "Safety Evalutation of Live operators of 1200 Kv UHV AC Exposed ton Electric and Magnetic Fields" , International Journal of Electrical and Power Engineering vol- 4(3), pp 26-32, Nov 2013.

[6]. Mesentean, S., Feucht, W., Mittnacht, A. and Frank, H. 2011. Scheduling methods for smart charging of electric bikes from a grid-connected photovoltaic-system. In: UKSim 5th Eur Symp Computer Modeling Simulation, IEEE; p. 299-304.

[7]. Singh, M., Thirugnanam, K., Kumar, P. and Kar, I. 2015. Real-time coordination of electric vehicles to support the grid at the distribution substation level. J. IEEE Syst., 9: 1000-10. doi.org/10.1109/ JSYST.2013.2280821.

[8]. Thirugnanam, K., Ezhil Reena, JTP., Singh, M. and Kumar, P. 2014. Mathematical modelling of Li-ion battery using genetic algorithm approach for V2G applications. IEEE Trans. Energy Convers., 29: 332-43.