e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:03/March-2022 Impact Factor- 6.752 www.irjmets.com

ADVANCE SOLAR CHARGING STATION FOR EV

Ashwin Bodkhe[*1], Trivenee Bopache[*2], Avinash Walthare[*3], Abhishek Goswami[*4]

[*1,2,3]UG Student,Department Of Electrical Engineering, Madhukarrao Pandav College Of Engineering Bhandara,Maharashtra, India.

[*4]Assistant Professor ,Department Of Electrical Engineering, Madhukarrao Pandav College Of Engineering Bhandara,Maharashtra, India.

ABSTRACT

Smart grids are used to utilize information capabilities, and renewable energy is used to increase the quality, performance, and sustainability of information. Solar panels are being used to construct an e-vehicle charging station, with the maximum power availability being observed using an IoT device and the generated maximum power being recorded using a DC–DC controller. The system is controlled by a PIC microprocessor, and the battery and solar voltages are shown on an LCD. If there is a power outage in the system, the user will be notified by an IoT modem message. The webpage may be used to monitor charge availability, power transmitted from the charging station, and charging station location.

Keywords: Solar Panel, DC – DC Converter, PIC Microcontroller, Node MCU, Battery.

I. INTRODUCTION

The demand for traditional energy sources such as coal, natural gas, and oil has increased, forcing academics to focus on developing non-conventional or renewable energy sources. Apart from the deregulation of petrol and fossil fuel pricing, there has been a lot of controversy about fuel prices in recent years. In the past three decades, India has experienced tremendous economic transformation, including privatization, globalization, and reforms. The total amount of carbon dioxide emitted in 2018 climbed to 988.6 tonnes. In 2018, India placed fourth in terms of carbon emissions, indicating that we are on the approach of annihilating humanity's future. Because of these factors, solar electric car development will accelerate in the future years.

1) decrease in fossil fuel emissions through the use of renewable energy sources

2) The user can check the availability of consumed power for their electronic needs using an IoT modem.

3) Observation of the sun's radiation over time.

II. METHODOLOGY

Solar panels collect the sun's rays to generate electricity, which is used to charge and discharge lead acid batteries. The power is stepped up to 12 volts for charging batteries. Solar energy panel The voltage is monitored. The tracking signal is sent to the Pic microcontroller, which uses it to display the amount of voltage generated by the solar panel in relation to the environment and weather conditions, as well as to upload the data to a webpage via IoT. The next battery voltage is also tracked in order to readily display the battery percentage for humans, and it is also posted to the webpage by IoT.

This system has three outlet ports: 12 volts taken straight from the battery, 12 volts boosted up to 48 volts using a DC-DC Boost Converter, and 12 volts boosted up to 240 volts using a DC-DC Boost Converter. A Pic Microcontroller (16F877A) is utilized to estimate the output value as well as charge the batteries.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:03/March-2022 Impact Factor- 6.752 www.irjmets.com

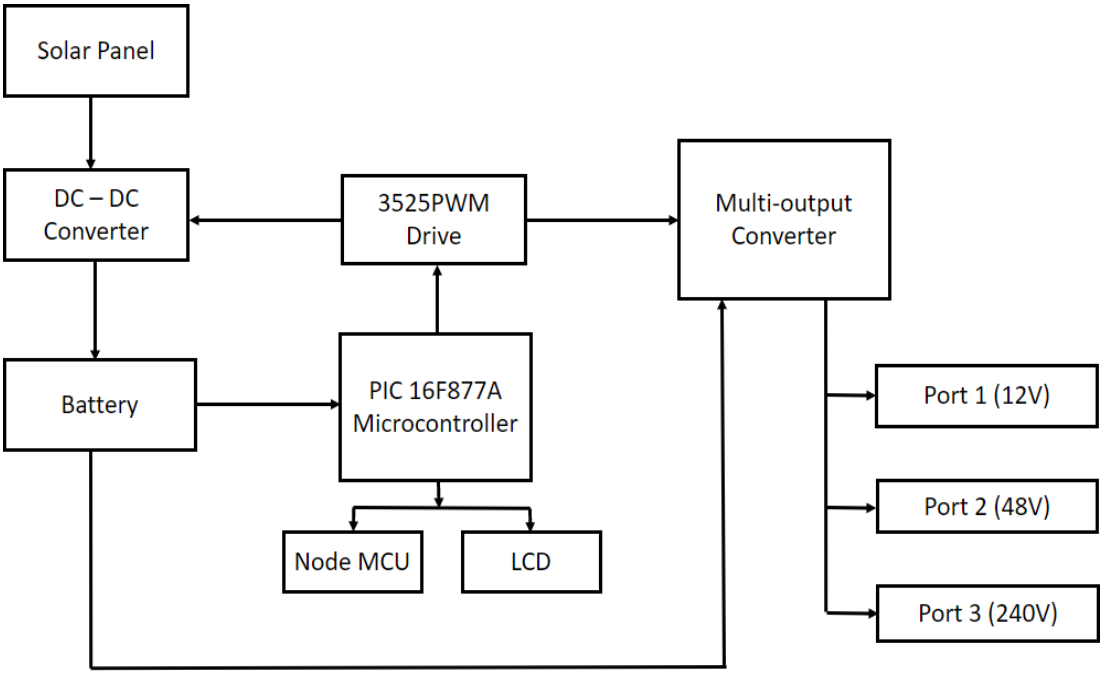

Figure 1: Block Diagram of Proposed System

The Boost Converter is a device that allows you to increase the amount of A step-up converter, also known as a boost converter, raises the input voltage and produces a boosted output. It has two semiconductor switches, a diode and a transistor, as well as a single storage element. Filters comprised of capacitors are used to minimize the output ripple voltage.

BATTERY

The lead-acid battery is an electrochemical device that produces voltage and outputs electric current. In automobiles, batteries play a critical function. The process of storing a succession of chemicals in a battery produces power. capacitor A capacitor is a storage device that stores energy as an electrical charge and generates a potential difference across plates.

DIODE

The p-n junction diode is made up of p and n-type semiconductor materials. With the help of diffusing acceptor impurities, we can create atomic-scale interaction.

SOLAR CELL PHOTOVOLTAICS

The photovoltaic effect produces electricity from light energy in a photovoltaic cell. Photovoltaic cells are built of silicon, which is a semiconductor material. In a silicon atom, there are four valence electrons.

RECTIFIER

The process of converting alternating current to direct current is known as rectification, and the electrical equipment utilized here is known as a rectifier. During the rectification process, the current direction is straightened. In a closed circuit, a resistor is an electrical component that resists the flow of electric current. All resistors in electronic components are used.

ESP8266-NodeMCU

The ESP8266 is an internet module that is used to connect to the internet for projects and is a low-cost device. With the internet of things, we can simply collect data or information and upload it.

III. MODELING AND ANALYSIS

The suggested system gathers the necessary information from the charging station and makes it available to the user via a webpage. The output of the solar voltage, the output of the battery voltage, and the graph of voltage when a fault occurs are all included on this page. Users can collect the relevant data and battery charge details via an IoT-designed webpage. To load data using a URL address, all you need is a network and a browser that is available 24 hours a day, seven days a week. The battery voltage capacity, charging time, and charging station

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:03/March-2022 Impact Factor- 6.752 www.irjmets.com

location will all be updated on a regular basis. This is open-source data, and anyone with a secure internet connection can check the status of this webpage using the link address.

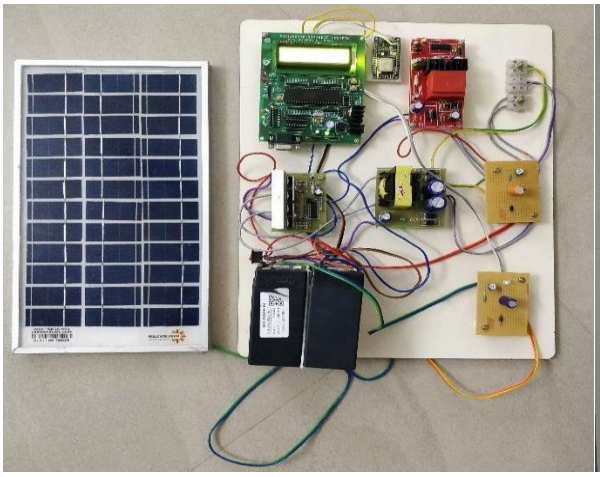

Figure 2: Prototype of Proposed System.

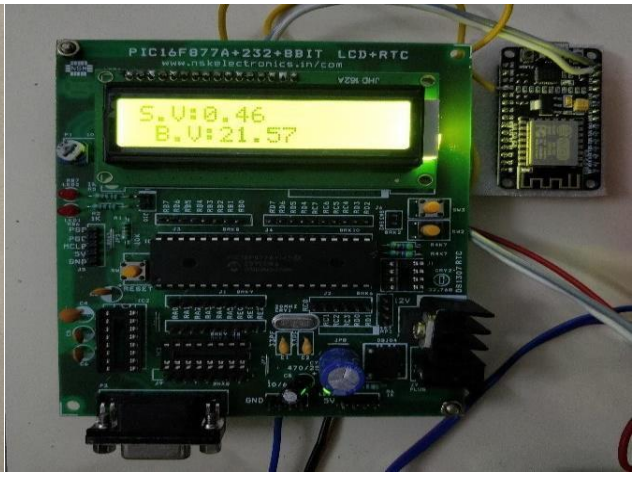

Figure 3: Output Display

IV. RESULT AND DISCUSSION

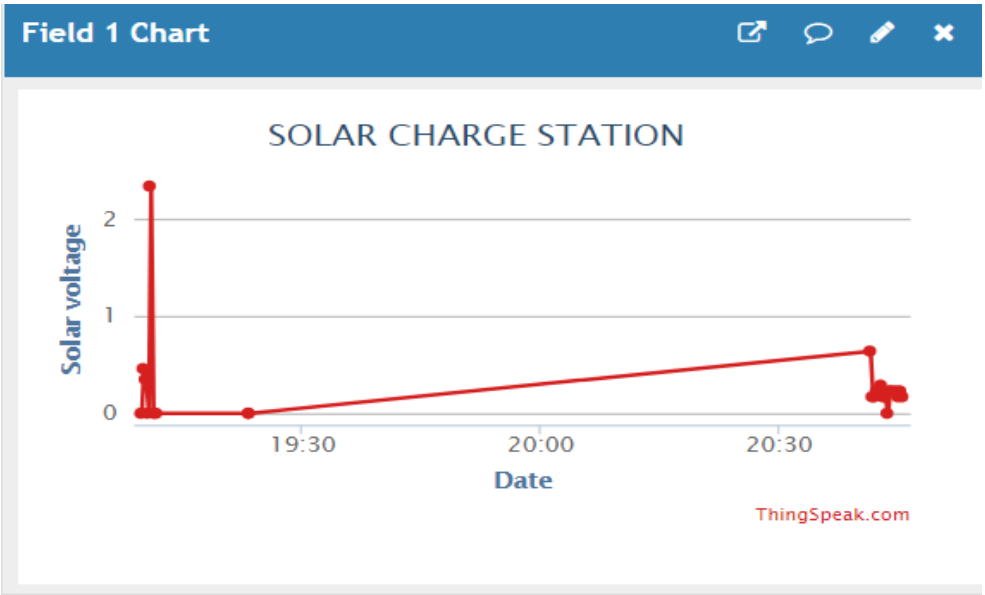

Figure 4: Output Solar Voltage

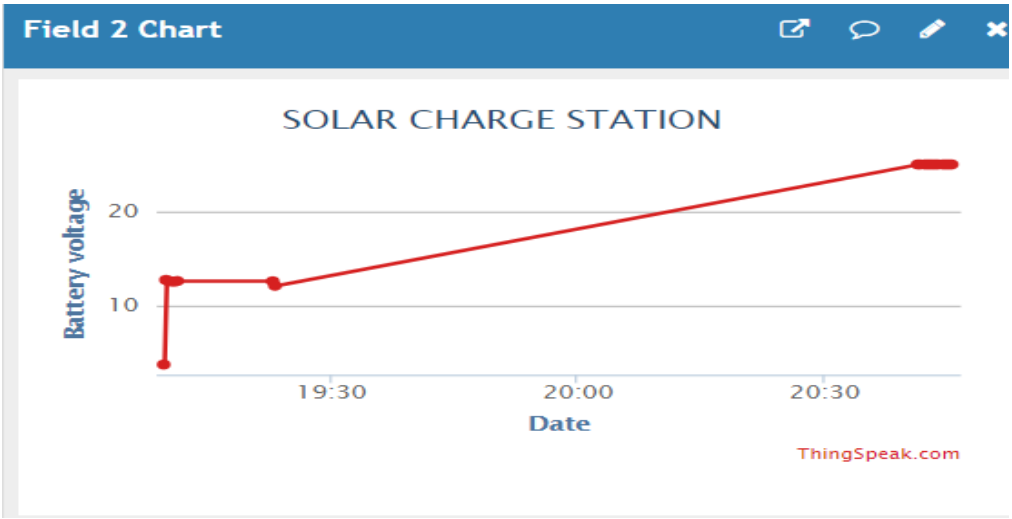

Figure 5: output of Charging station

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:03/March-2022 Impact Factor- 6.752 www.irjmets.com

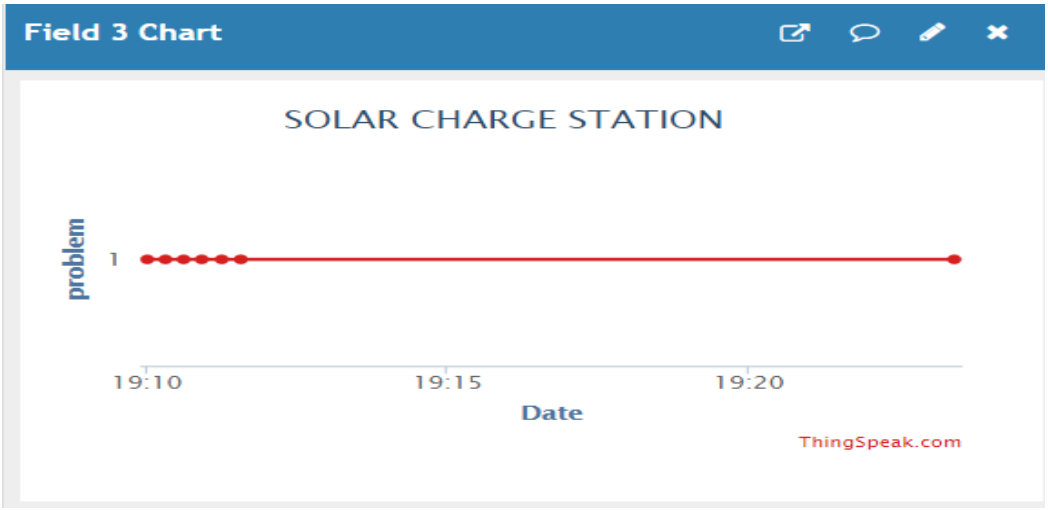

Figure 6: Fault Indication

V. CONCLUSION

The Internet of Things can be used to monitor the battery's status as an energy storage management system in real time (IoT). The graph of solar voltage output and battery voltage output can be found on the web page. Using the webpage, the IoT-built user can collect the relevant data on battery charge details. The battery voltage capacity data is updated on a regular basis. Because this data is open source, it can be utilized by anybody. The user may simply verify the user's destination upon reaching the station as well as the battery voltage withdrawal.

VI. REFERENCE

[1] Saroj Mondal and Roy Paily, "On-Chip Photovoltaic Power Harvesting System with Low-Overhead Adaptive MPPT for IoT Nodes," October 2017.

[2] Cluster Computing, vol. 20, no. 2, pp. 1505–1515, March 2017. [2] H. Anandakumar and K. Umamaheswari, "Supervised machine learning techniques in cognitive radio networks during cooperative spectrum handovers," Cluster Computing, vol. 20, no. 2, pp. 1505–1515, March 2017.

[3] "Hierarchical cost-effective leach for heterogeneous wireless sensor networks," 2015 International Conference on Advanced Computing and Communication Systems, Jan. 2015.

[4] H. Anandakumar and K. Umamaheswari, "An Efficient Optimized Handover in Cognitive Radio Networks Using Cooperative Spectrum Sensing," Intelligent Automation & Soft Computing, vol. 1, no. 1, pp. 1–8, September 2017.

[5] Handover-based spectrum allocation in cognitive radio networks, M. Suganya and H. Anandakumar, 2013 International Conference on Green Computing, Communication, and Conservation of Energy (ICGCE), Dec. 2013.

[6] H. Anandakumar and K. Umamaheswari, "A bioinspired swarm intelligence technique for social-aware cognitive radio handovers," Computers & Electrical Engineering, vol. 71, no. 10, October 2018, pp. 925–937, October 2018.

[7] Anandakumar, "Energy Efficient Network Selection Using 802.16g Based GSM Technology," May 2014, Journal of Computer Science, vol. 10, no. 5, pp. 745–754.