ISSN: 2395-7852

International Journal of Advanced Research in Arts, Science, Engineering & Management (IJARASEM)

Volume 11, Issue 2, March 2024

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

IMPACT FACTOR: 7.583

| www.ijarasem.com | ijarasem@gmail.com | +91-9940572462 |

International Journal of Advanced Research in Arts, Science, Engineering & Management (IJARASEM)

| ISSN: 2395-7852 | www.ijarasem.com | Impact Factor: 7.583 | Bimonthly, Peer Reviewed & Referred Journal|

| Volume 11, Issue 2, March 2024 |

Solar, Wind and Grid Based Charging Station for Electric Vehicles

B. Praveen Kumar, K. Suhas, M. Sanjay, D. Vamshi

U.G Student, Department of Electrical & Electronics Engineering, Anurag Univeristy, Hyderabad, India

ABSTRACT: This project describes the solar, wind and grid-based charging mechanism to generate the power for charging the battery of electric vehicles. The renewable charging station consists of both the solar photo voltaic modules and wind generator. The SWCM immensely reduce the requirement of fossil fuels to generate electricity which results in greatly reduce CO2 and CO related emission. The grid supply is used as a backup source due to seasonal effects for continuity supply of battery charging. The obtained results show that the proposed renewable charging mechanism is suitable for EV charging and creates pollution free environment. In this project microcontroller will generate the PWM signals to the mosfets

I. INTRODUCTION

The project aims at developing a charging system for electric vehicles which makes use of hybrid power such as wind, solar and grid. Wind and solar energy are treated as renewable source of energy. The grid supply is used as a backup source due to seasonal effects for continuity supply of battery charging.

Wind and solar energy has been used since the earliest civilization to grind grain, pump water from deep wells, and power sailboats. Wind-mills in pre-industrial Europe were used for many things, including irrigation or drainage pumping, grain-grinding, saw-milling of timber, and the processing of other commodities such as spices, cocoa, paints and dyes, and tobacco. Before the U.S. installed an infrastructure of electricity wires, both water-pumping windmills and small wind electric turbines ("wind chargers") were vital to farming and developing the American Great Plains and west. In recent decades, the industry has been perfecting the wind turbine to convert the power of the wind into electricity

The wind turbine has many advantages that make it an attractive energy source, especially in parts of the world where the transmission infrastructure is not fully developed. It is modular and can be installed relatively quickly, so it is easy to match electricity supply and demand. The fuel – the wind – is free and plentiful, which eliminates or reduces the need to purchase, ship, and store expensive fuels. It is flexible – with the power generated, households use can use appliances, such as lighting and refrigeration, schools can use computers and televisions, and industries can access a reliable power source. Perhaps most importantly, the generator does not produce any harmful emissions in the process of generating the electricity, unlike many other generation sources.

Features of this project:

1. Using renewable energies solar, wind.
2. Storing wind, piezo and solar energy into the battery.
3. Monitoring voltage and current value of solar, wind and piezo on LCD.

Usage of wind, piezo and solar energy for switching electrical appliance.

II. LITERATURE SURVEY

Niranjana. S.J [1] Inquired to generate power by fixing the vertical axis wind turbine on the highways. This paper indicates that the vertical axis wind turbine can be able to generate 1KW of power when it moves at 25m/s.

Abhijit N Roy [2] et al. tried to design and fabricate and economical vertical axis wind turbine. In this experiment, the shaft of the rotor is connected vertically to the wind turbine with the generator. It uses a gearbox that can be fixed near to the ground..

Nikam [3] et al. reviewed the literature and development of the blade of the vertical axis wind turbine. This paper indicates the characteristics and advantages of both HAWT and VAWT. The experimental outcome of this paper tells that design of the blade plays an essential role in the performance of the turbine. A modified blade can improve the efficiency of the wind turbine.

Altab Hossain [4] et al showed a design that investigated the development of vertical axis wind turbines. The blade and the drag devices are designed in such a way that they are at a ratio of 1:3 to the wind turbine. The

calculated output if this experiment is it produces 567W and 709W power when the wind speeds are 20m/s and 25m/s, respectively.

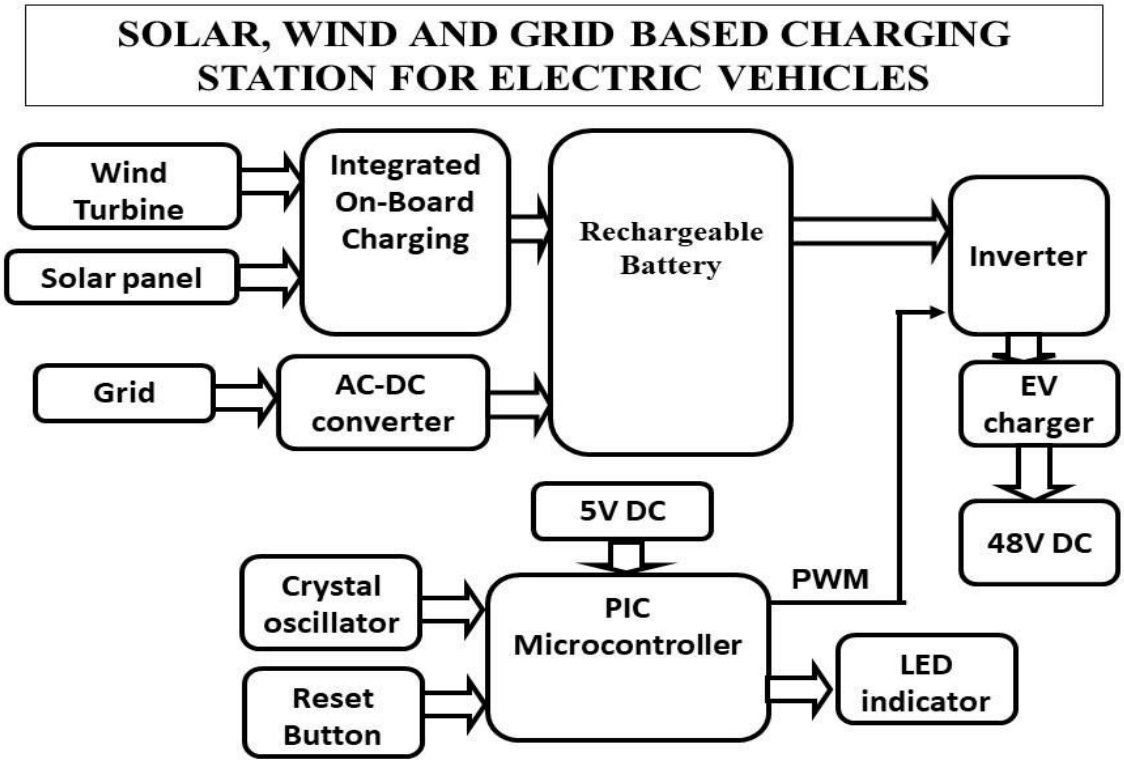
Parth Rathod [5] et al. analyzed the efficiency of a vertical axis wind turbine by combining their rotor. In this experiment, higher efficiency is achieved compared to the single savonious and darries rotor. The outcome of this paper shows that turbine efficiency depends on wind speed and environmental conditions.

III. Objectives

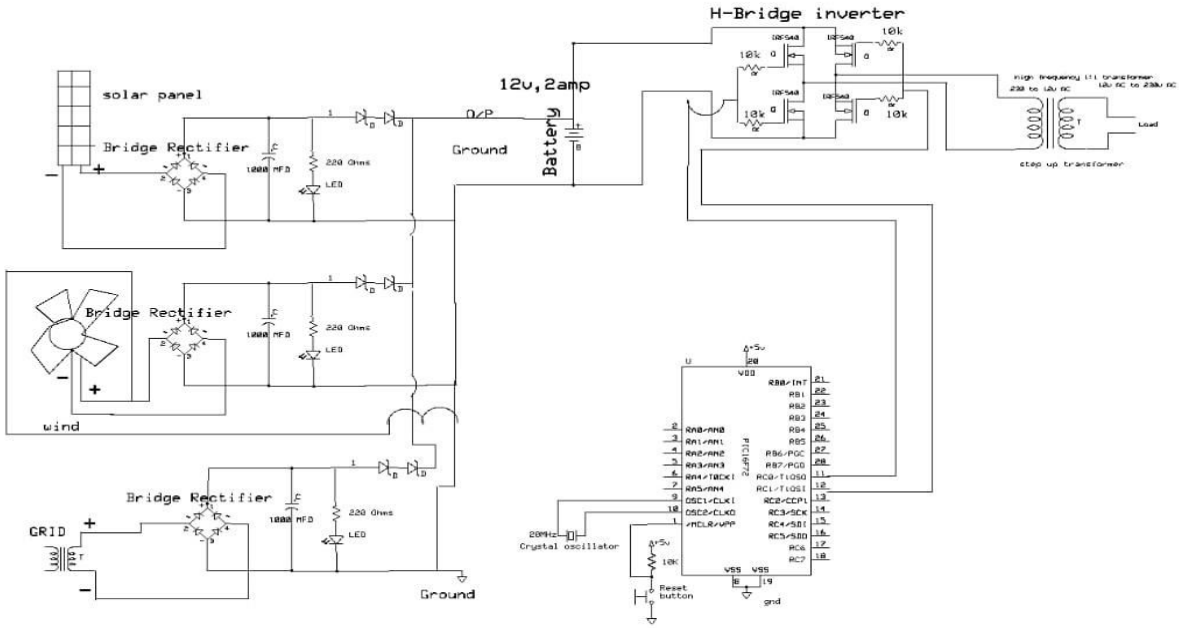
To establish an integrated network of solar, wind, and grid-based charging stations for electric vehicles (EVs) to promote sustainable transportation and reduce carbon emissions.

1. Increase Accessibility: Enhance the availability and accessibility of charging infrastructure for EV owners by deploying a combination of solar, wind, and grid-based charging stations across urban, suburban, and rural areas.
2. Sustainability: Promote renewable energy adoption and reduce reliance on fossil fuels by incorporating solar and wind energy into the charging infrastructure, thereby minimizing environmental impact and contributing to the transition towards a greener transportation system.
3. Reliability and Resilience: Improve the reliability and resilience of EV charging infrastructure by diversifying energy sources, ensuring continuous charging capabilities even during grid outages or fluctuations, and enhancing the overall stability of the electricity supply for EV users.

IV. BLOCK DIAGRAM



V. CIRCUIT DIAGRAM



VI. CONCLUSION

In conclusion, the integration of solar, wind, and grid-based charging stations for electric vehicles has yielded substantial benefits, including increased EV adoption, reduced environmental impact, enhanced grid stability, and economic growth. This initiative has not only provided convenient and sustainable charging options for users but has also contributed to broader sustainability goals. Moving forward, continued investment and expansion of such infrastructure will be vital for accelerating the transition to a cleaner and more resilient transportation system.

REFERENCES

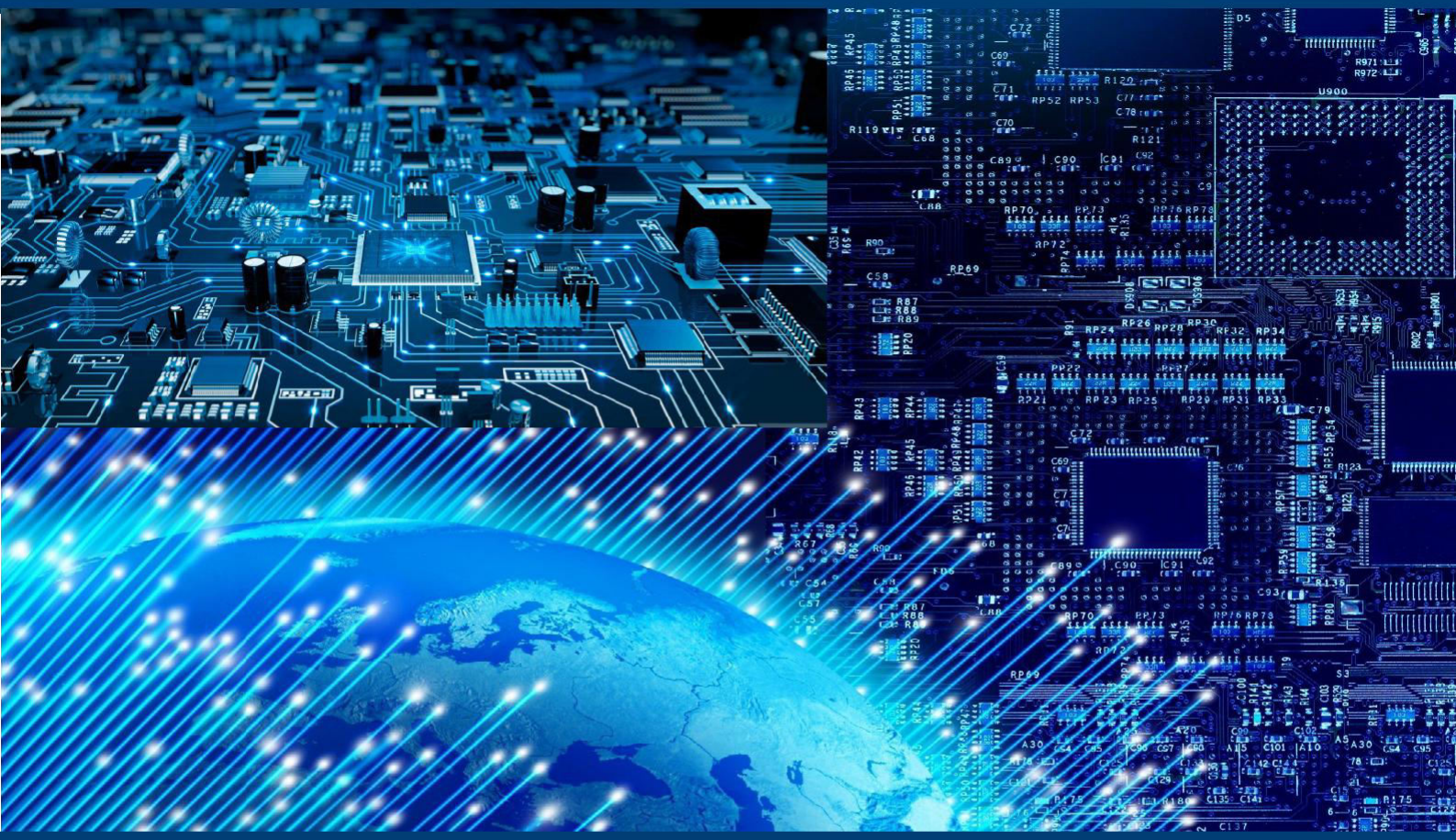
[1]. Wireless Communication Using HC-05 Bluetooth Module Interface with Arduino, ISSN: 2278 – 7798, International Journal of Science, Engineering and Technology Research (IJSETR) Volume 5, Issue 4, April 2016.

[2]. Development of rapid charging system for EV battery, International Journal of Recent Technology and Engineering (IJRTE), ISSN: 2277-3878, Volume-7, Issue-6S, March 2019.

[3]. Review on Electric Vehicle, Battery Charger, Charging Station and Standards Research Journal of Applied Sciences, Engineering and Technology 7(2): 364-373, 2014 DOI:10.19026/rjaset.7.263 ISSN: 2040-7459; eISSN: 2040-7467 © 2014 Maxwell Scientific Publication Corp.

[4]. Real-Time Vehicle Tracking System Using Arduino, GPS, GSM, and Web-Based Technologies, International Journal of Science and Engineering Applications Volume 7–Issue 11,433-436, 2018, ISSN: -2319–7560.

[5]. Real-Time Vehicle Tracking System Using Arduino, GPS, GSM, and Web-Based Technologies, International Journal of Science and Engineering Applications Volume 7–Issue 11,433-436, 2018, ISSN: -2319–7560



International Journal of Advanced Research in Arts, Science, Engineering & Management (IJARASEM)

| Mobile No: +91-9940572462 | Whatsapp: +91-9940572462 | ijarasem@gmail.com |