IJAREEIE

e-ISSN: 2278-8875
p-ISSN: 2320-3765

International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

Volume 10, Issue 5, May 2021

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.122

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

||Volume 10, Issue 5, May 2021||

DOI:10.15662/IJAREEIE.2021.1005033

Hybrid Charging Station of EV Vehicles

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ABSTRACT: A hybrid micro grid charging station reduces the loss of transmission and improves the power flux control of today's power system. The uncoordinated recharge of electric battery vehicles (BEVs) by the hybrid micro grid, however, leads to an ineffective use of energy sources connected to the recharge station. The project is working on (1) energy control and multi-port BEV charging from a photovoltaic source, as well as its efficient use; (2) maintenance of the DC bus voltage regardless of the grid overload that either results from local charging or the lack of photovoltaic power via its power storage unit (ESU).The charge controller also provides closed loop charging by continuous current and voltage, reducing the charge time. The aim of the strategy for energy management is to minimise the utilisation of electricity from the grid and the storage of pv when the car is not connected. The proposed system is connected to the grid via a three-phase two-way DC-AC (alternating currents) inverter in order to balance load demand. The results show that it is possible to charge electricity using the proposed renewable charging mechanism to create an environment free of pollution.

KEYWORDS : Solar, Wind, Grid , Charging Station,Ev"s

I. INTRODUCTION

The oil reserves in India are insufficient. It is therefore heavily dependent on imports of crude oil and gas. India is currently, after the United States and China, the third largest importer of oil. The total Indian crude basket comprises 82.8% crude oil and 45.3% natural gas imports. Since the consumption of petroleum products contributes to air pollution, the consumption of oil products to address the pollution problem has been greatly demanded. In addition, because of large imports of crude oil, it also creates huge economic burdens for Indian citizens.Therefore, it is necessary to switch to alternate clean fuel and clean technology to reduce dependence on petroleum products and protect the environment. Motor vehicles consume a large proportion of the petroleum products. This causes major damage to our environment by adding air pollution to the operation of these vehicles. As the Indian transport sector depends heavily on oil products.

The global warming problem and the cost of fossil fuels for internal combustion engines is increasingly using electric vehicles (EVs) throughout the globe. EVs have been used for different purposes, for example for a private car and for a public transport vehicle. The demand for electricity cannot be prevented from increasing. Electric vehicles in India have grown, leading to electric power demand. As a result, alternative electricity generation sources have to be found to reduce fuel cost, pollution. Solar PV and low-speed wind turbines are good choices for alternative energy sources.Many researchers have been interested in electrical hybrid energy to lower energy costs and develop more stable electricity distribution systems. Many researchers are also currently studying the charging station using hybrid, renewable energy sources for electricity generation. The objective of this study was to analyse and analyse the techno-economic effects of probable variations in solar radiation, wind speed, and diesel prices in the optimal configuration of the system, in terms of the solar and wind energy systems.To determine the optimal position of the charging station in the distribution system, the Particle swarm optimization algorithm will be used. Method for optimal allocation and size of regenerative sources of energy (RES) and charging stations for electric cars (EV). In this project, we developed the optimal design for a grid-integrated electrical car charging station including solar photovoltaics and wind power generators to generate power for a power station.

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II. METHODOLOGY

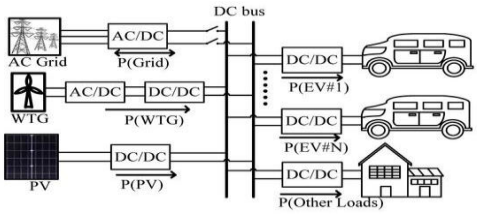

Fig. No. Block Diagram Of Hybrid Power System

III. WORKING

As you know, first of all, during the day the solar system is in operation. If the power produced by the system is sufficient to charge the vehicle, then power from all these systems is continuously supplied to the charging system. If the system cannot supply 12 volts at this condition, the power from the grid will decrease from 230 volt to 12 volt and this will be 12 volts DC power. This is given to the charging system. The arduino is all connected by the voltage sensor and the current sensor data and by comparing the data with the required value it uses for charging the vehicle voltage sensor and current sensor for sensing data from both ends. Renewable energy sources do not meet pre-charge requirements when the relay circuit is activated and delivered to the battery unit. Displaying all of this operation is done by changing 2 relays continuously by real-time input. 2 relays.If the solar and the wind supply full electricity, then the power is releases when the 16 can not fulfil the power requirement and when the 16 can gain it together, the system switches the renewable energy onto the battery charger and activates the grid power on the charge station. Charging station is made up of a voltage controller and a capacitor to charge the vehicles with a correct value for the regulated power supply.

IV. MODELING AND ANALYSIS

ARDUINO UNO

The Arduino Uno R3 is an open source ATmega328 chip-based microcontroller board. The table includes 14 digital input/output pins, 6 analogue input pins, ceramic resonator On-board16 MHz, USB port, power jack Onboard DC, ICSP header and the reset button for microcontrollers. There is everything that the microcontroller needs to be supported. The board is also easy to use, just plug it into a computer with a USB cable or power it to start with a DC adapter or battery.

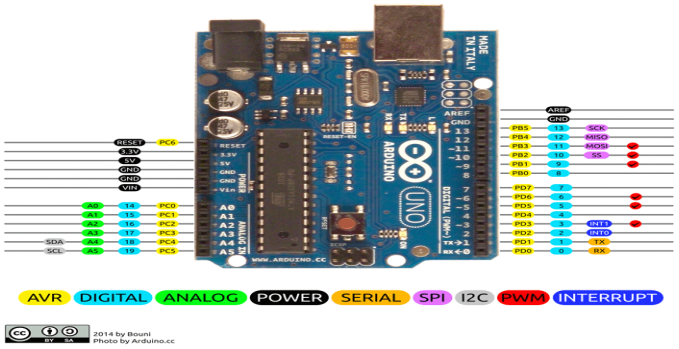

Fig. No. 2. Arduino Uno

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DC GENERATOR

An electrical machine is a DC generator whose main function is mechanical energy converting into electricity. The generation of an emf is based on the principle of the Faraday laws' electromagnetic induction when the conductor slashes magnetic flux.

Fig No. 3DC GENERATOR

DC BATTERY

Fig. No .4. DC BATTERY

The battery is a storage device in which power is stored to supply when necessary. In this modern world of electronics, there are many different types of batteries, including Lead Acid battery used for high power supplies. Batteries are generally larger in size with heavy construction, store high energy and are common to cars and inverters. Acid batteries usually have bigger size.

SOLAR PANEL

Photovoltaic cells are installed in a photovoltaic panel or photovoltaic (PV) module, and are installed within a setup. Solar panels generate electricity directly from sunlight as a source of energy. PV panels are a collection of photovoltaic modules and panels are an array of systems. Photovoltaic panels supply electrical electricity with solar power.

Fig. No. 5. SOLAR PANEL

Type :	Polycrystalline Solar Panel
Rated Power Range :	1-30 W
Watt :	5 W
Voltage at Pmax (V) :	17.3 V
Module Voltage :	12 V

AC-DC CONVERTER

AC-DC converters are electrical circuits which transform the AC input into a direct current output. They are used with a power input of a 50 Hz or a 60 Hz sinus AC voltage, where power transmission is necessary for a DC output..

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Fig No 6. AC-DC CONVERTER

CURRENT SENSORS

The current that passes through a driver causes a drop in voltage. Ohm's law provides for the relationship between current and voltage. An increase in the current quantity above its demand in electronic devices leads to overload and damage. Current measurement for the proper operation of devices is necessary. Voltage measurement is passive, and without affecting the system can be performed. In contrast, current measurement is an intrusive task not directly recognizable as voltage..

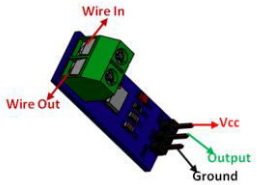

Fig. No.7. CURRENT SENSORS

VOLTAGE SENSOR

A sensor for voltage is used for computing and monitoring the voltage of an object. The AC voltage or DC voltage level can be determined by the voltage sensors. Input of this sensor is a voltage, while the output is an audible signal or an analogue voltage signal.l.

RELAY MODULE

A relay is an electromagnetic switch which electromechanically or electronically opens and closes the circuits. A relay is operated by a relay, which can activate or disable a much larger electric current.

Fig No.8. RELAY MODULE

Relaxation works like some electric products because the electric signals are received and by turning the switch on and off it sends a signal to other equipment. The relay contact is not energised, even when the contact is normally closed or normally open. Its condition will change only when the contacts are fed an electric current. In many applications, relaxation is useful. Electromagnetic relays protect different equipment for AC and DC

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LCD

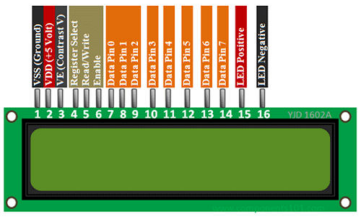

Fig No.9. RELAY MODULE

The term LCD refers to the display of liquid crystal. It is a type of electronic display module for various applications, like mobile phones, computers, TV sets, etc. This is used. It is an electronic display module. Mainly for light emitting diodes and seven segments, these displays are preferred. The main advantages of using the module are cheap, simply programmable, animations and no restrictions are attached to showing individual characters, special animations or even animations, etc.

V. ADVANTAGE

- Hybrid systems are best suited for storing solar energy and low-cost power.
- Solar energy use is made possible in peak usage times.
- It can be used to manage advanced energy.
- Enables independence of energy.
- It's an excellent way to reduce grid power usage.
- Reduce contamination

VI. RESULTS

In our testing we found that project is operating successfully and We got an Output As below.

Condition	Renewable Charging	Grid Charging	Stored Battery Power
Solar And Wind Produce Maximum Power	ON	OFF	OFF
Solar And Wind Produce Low Power	OFF	ON	OFF
Grid Supply And Renewable Power Both Low	OFF	OFF	ON

VII. FUTURE SCOPE

In future full computer measurement and control bus will be added to the system. Computer controlled relays will be added to allow all the major elements of the system to be switched in and out of the system through PLC. The measurement bus will be connected and control .computerizes data acquisition simultaneously of all the major signals in the system. These improvements will allow for the study of more complex issues like power faults caused by sudden breakdown . These improvements will also allow the same benefits to instruction realized in electricity and electronics classes to be extended to control and instrumentation classes.

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VIII. CONCLUSION

The optimal design of charging station electric vehicles integrated with Grid include wind power, and solar PV we developed in this project . The results show a potential of hybrid renewable energy sources. Using renewable energy integrated with electricity distribution systems can provide the system more reliable and suitable electrical vehicles charging areas. The developed idea can be applied to optimize the charging stations for electric vehicles in rural areas, and it would be a good topic for future studies.

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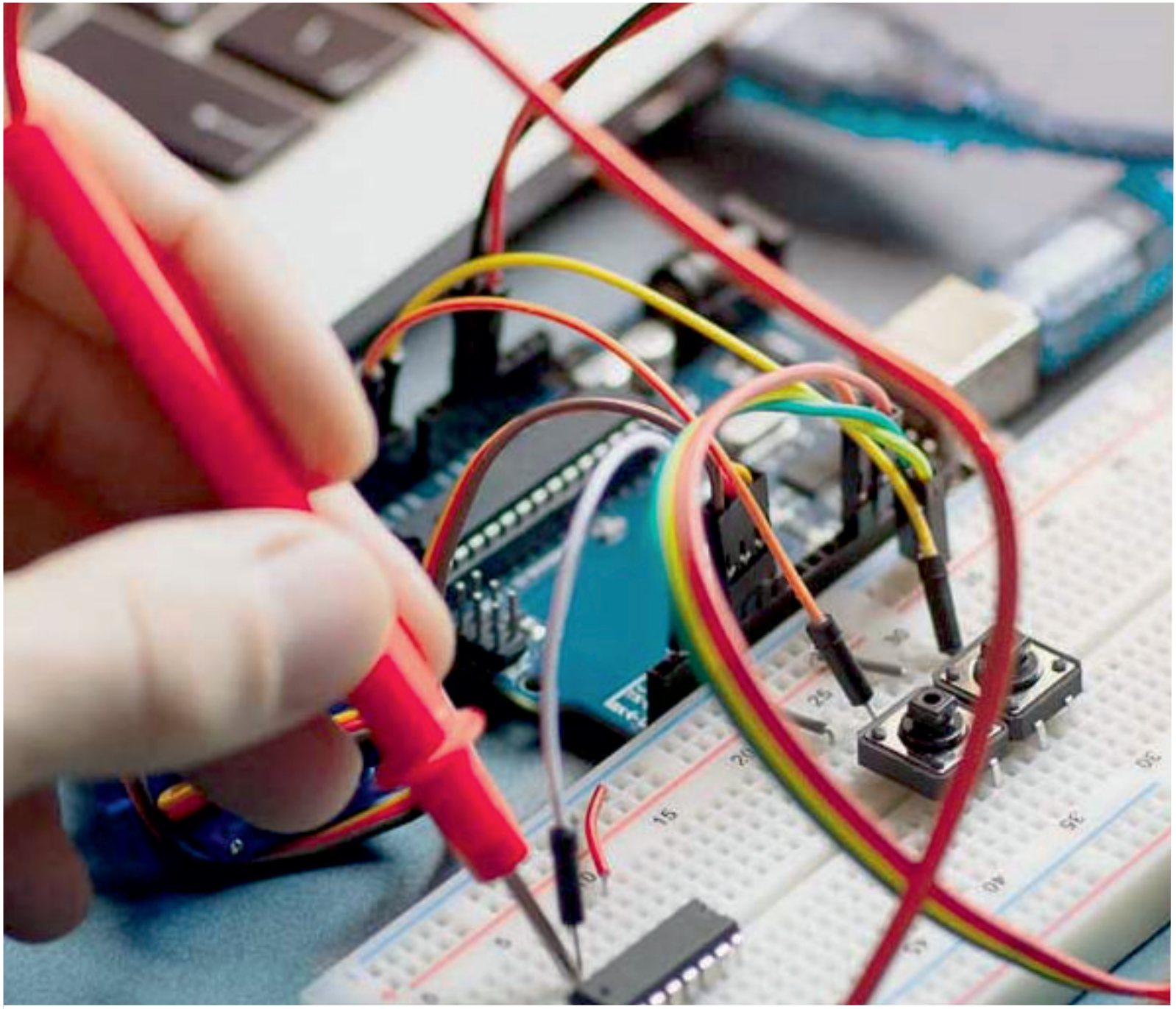

INNO SPACE
SJIF Scientific Journal Impact Factor

Impact Factor:
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ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

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in Electrical, Electronics and Instrumentation Engineering

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