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Electrical Vehicle Charging Station Using Renewable Sources

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Abstract – As global warming increases day by day and carbon emission by a vehicle one of the most effective reason So we are switching on EV's we need charging infrastructure for these EV's this paper represent the Electrical Vehicle charging station model using some basic components. Model is focusing on the low cost & renewable source EV charging station. Which is the need of today's generation. An any individual can make this EV charging station with low budget so charging station network in India can increasing and more people can motivate to use of electrical vehicle. This project solving the problem of lack of charging station, high cost of EV charging station infrastructure. It also open a new source of small scale business for an individual. So the poverty issue can decrease and income per capita of India can increase.

***Key Words*:** EV charging, Arduino Uno, components.

1. INTRODUCTION

In modern era, carbon emission increasing very fast and one of the big source is conventional vehicle in market. For limiting this carbon emission Electrical vehicle is the proposed system and it is most useful but due to lack of EV charging station people show less interest to buy EV. To solve this problem we need charging infrastructure in market, so maximum people can buy electrical vehicle and they can use for long range of transportation.

For opening a new EV charging station is not easy to everyone, this needs to invest lots of money and due to less number of EV in market, generate revenue take long time so we proposed a cost effective EV charging station model.

This EV charging station model is low budget and efficient so any individual can open an EV charging station. We use Arduino Uno as a main controller for controlling operations, relay module for handle the on/off switching of charging supply. LCD 16*2 display for the showing current operation running and price display. This components have very low cost of price as compared to commercial charging station components.

2. OBJECTIVE

The aim of this project is to develop Electrical vehicle charging station with some basic components. So EV charging station network can increase and EV owner can find easily to charge and travel on long route. This system also a cost effective and efficient for the business owner.

3. BLOCK DIAGRAM

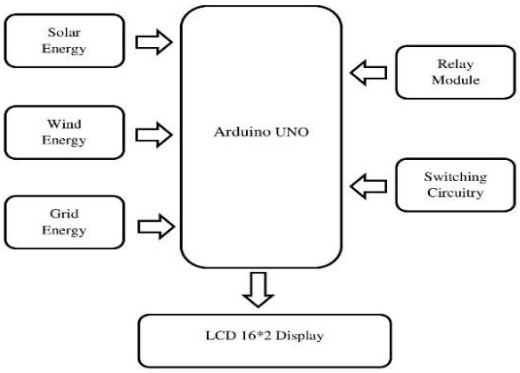

Fig 1.1

4. HARDWARE USED

A. ARDUINO UNO

An Arduino Uno is an ATmega328p based microcontroller board. It has 6 analog input pins and 14 digital output pins, operating supply voltage of Arduino is 6-20V DC.

It has simple operation just connect a USB pin to computer and other end to Arduino board. Install and open Arduino IDE and starts with example code for trial.

You can do your custom coding and connection after good practicing in order to create new project. We can interface number of sensors, most of the sensor interfacing code is available in the example file of Arduino IDE.

Just follow the instruction given in the code comments make connections upload the code and you can see project is running.

B. SINGLE CHANNEL RELAY MODULE

A relay module have a input terminal along with biasing supply and also have pole, NO, NC terminal for output. Pole is switch over NC to NO when input is feed to relay module else it will remain on NC.A relay module is a most significant component of this project because it switch ON/OFF the dc charging supply according to controller operation.

C. LCD 16*2 DISPLAY

LCD 16*2 display is a 16 pin display used to show 32 alphanumeric character at a time it very easy to interface and use. It has 8 data pins, R/W (Read/Write) pins, en (Enable), RS (Register Select), VE (Contrast), Vdd (+5V), Vss (Ground), LED +5V and LED - Ground.

5. WORKING

The projects working is pretty simple this is divided in two main points, power management and operation of charging station.

Power management: as we know solar can generate max of its rating output between 10 am to 4 pm and wind energy generation depends on the flow of wind, by taking this in consideration hybrid path of power management is comes in a role. We can take grid energy for the operation of charging station and we can sell the energy generated by renewable sources to the MSEB so at the end of month selling cost of renewable energy and used cost of grid energy nullify each other, it will save our expenses on energy storage as well.

Operation of charging station: when the vehicle arrives at a Charging station Display shows

Firstly we need to plug a charge connector in to a vehicle charging socket then press the start button. It will start counting price of power used in charging,

Once a charge complete then press the button again it will stop the charging and display a price of power consume by you for charging a vehicle.

Cost of charging/unite		
	Slow/moderate charging	Fast charging
Service charge	₹14	₹21
GST 18%	₹2.5	₹3.8
Electricity charge	₹7.60	₹7.60
Lease rent	₹2	₹4
Total	₹26.1	₹36.4

Table -1: Cost of charging Unite

6. CONCLUSION

In this paper we proposed an EV charging station model which is very low cost and efficient. Which helps to establish EV charging infrastructure. Some countries actively adopting new technology related to build infrastructure to boost EV. EV can establish major impact on climate changes. For creating interest of citizen in use of EV's government need to build strong infrastructure and adopting new technology in charging stations. This type of system really helpful for increasing density of EV charging station.

A. ADVANTAGES

1. Low cost of charging infrastructure.
2. Accurate and low maintenance.
3. Clean and renewable source of energy for EV.
4. Lower cost of transportation.
5. Helps to reduce carbon emission.

B. APPLICATION

1. Society
In society low budget and less maintenance charging station helps you to charge your vehicle easily in your parking.

2. Offices
In offices charge Employees vehicle when they are working it can help to save time of employees.

3. Retail
It will help to attract customers in your shop. And they can charge EV while shopping,

4. Hospitality
It attracts more guests, increase reservation, enhance your brand with sustainable energy source.

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