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SOLAR AND WIND ENERGY BASED SMART ELECTRIC VEHICLE CHARGING STATION

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Abstract - Renewable energy and electric cars have recently received more attention in the smart grid. Charging stations in India must be able to keep up with the rapid increase of electric cars. A hybrid solar-wind charging station is created to generate electricity for electric vehicles based on wind and sun conditions. Less number of Charging Station make it difficult for electric vehicle users to charge their electric vehicles remotely. Tracking them through the a mobile application, being able to travel there with direction, knowing the availability of slots and being able to know the power available at a particular charging station would be a great help.

***Key Words*:** solar-wind energy, charging station, application

1. INTRODUCTION

Because fossil fuels are running short, people are scrambling to find new sources of energy and ways to provide them. Using electric cars might be the answer to reducing fossil fuel use while simultaneously reducing CO2 emissions, which is a distinct issue. Electric automobiles are really handy, yet they do not appear to be widely used. Because of two factors: cost and pricing. Electric vehicles (EVs) are prohibitively costly for the general public, and locating a charging station is nearly impossible. The value of the car cannot be lowered, but establishing an EV charging point reception will make charging the vehicle easier.

For many individuals, the cost is one of the most fundamental obstacles prohibiting them from using electric vehicles. The value of an electric automobile is primarily determined by its battery. Large "fuel tanks" are expensive, but the larger the battery, the longer the EV can go on a single charge. They don't require any employees or cashiers, and they take up very little space. As a result, electric cars have a brighter future than gasoline-powered automobiles.

Solar and wind power generation, as well as enhanced infrastructure for electric vehicles, are now the most realistic methods for achieving this shift. These are both critical measures towards lowering carbon emissions. Solar power may be used with charging stations to create energy, reducing fossil fuel consumption.

2. PROPOSED METHODOLOGY

Electric cars (EVs) are becoming increasingly popular, resulting in a tremendous increase in demand for electric energy around the world. The global market for electric vehicles has exploded. In 2010, there were only a few number of electric vehicles; by 2017, that number had risen to around three million, and by early 2019, it had risen to almost six million. Electric vehicles are fascinating alternatives to traditional automobiles (CVs). The EV has the potential to drastically reduce total climate effect and pollution emissions by emitting zero carbon during operation. The demand for biofuels would decrease if fossil fuels were phased out to a greater extent. EVs are also an important part of modern transportation because they combine a number of technologies.

The Solar panels and wind turbine are connected to a Charge controller which in turn is connected to the battery. The battery stores the energy produced by wind and solar. There are two batteries connected in parallel to act like one. The positive end of the batter is connected to one of the resistors connected in parallel and the negative end is connected to the other resistor. We are dividing the power of the battery using resistor and a wire is connected from between the resistors to the analog pin of the Node MCU ESP8266. The ESP8266 is connected to the 16X2 display to display the battery percentage of energy stored. The DC to DC converted is used to connect to the EV and charge it.

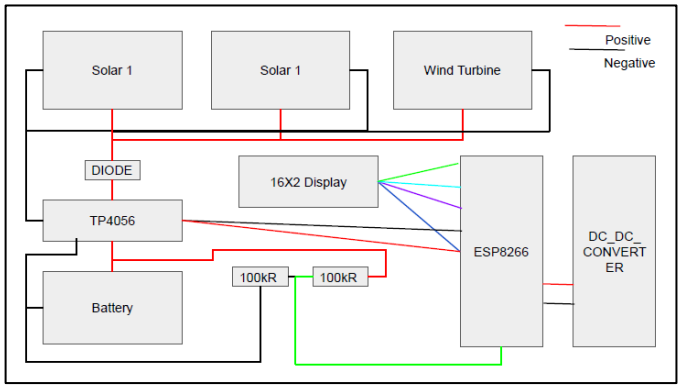

Fig -1: System Architecture

A. Node MCU ESP8266

Node MCU is a low cost open source IoT platform based on ESP8266 which can connect objects and let data transfer using the Wi-fi Protocol. Its type is Single board Microcontroller. Its Storage is 4M bytes. Its powered through USB. A0 pin is used to read external voltage. It is Bluetooth and Wi-Fi enabled.

Fig -2: Node MCU

B. Solar Panel

Electricity from sunlight of photovoltaic cells that are positioned in a framework. Solar panels produce direct current exploiting sunlight as a source of energy. Photovoltaic arrays distribute sun energy to electrical devices. The solar panels are connected to the Solar Charger Circuit.

Fig -3: Solar Panel

C. Charge Controller

Solar Charge Controller is an electronic device that manages the power going into the battery bank from the solar array. It ensures that the deep cycle batteries are not overcharged during the day and that the power doesn't run back to the solar panels overnight and drains the batteries.

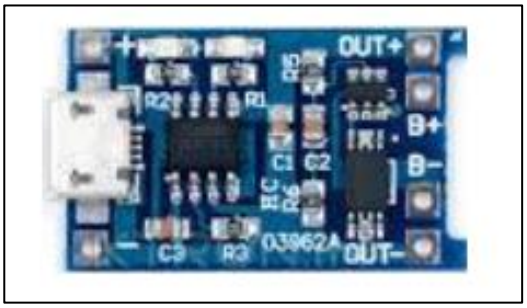

Fig -4: TP4056

D. Lithium Ion Battery

Lithium ions are transported from the negative terminal to the positive electrode while discharge and return during recharge in a battery pack. 2 Batteries are connected in parallel to form an equivalent one single cell battery with the total capacity of twice that of the individual single cells. It is High Voltage Battery.

Fig -5: Battery

E. DC to DC Converter

The name indicates the Direct Current – Direct Current converter converts a value of one voltage level to another. This is necessary to provide accurate voltage. Direct current voltage produces a constant amount of electricity. It is necessary to provide a certain value of the voltage to some devices. Unless this much of power could destroy the device.

Fig -6: Dc to Dc Converter

F. LCD 2x16 Display

Multi-segment light-emitting diodes and seven segments are the most commonly used techniques for these displays. The fundamental benefits of utilizing this module are its low cost, ease of computing, and lack of practical limits of displaying bespoke characters, among other things. It is also used to display the Battery Percentage.

Fig -7: LCD 2x16 Display

G. Resistor

As A resistor is a passive components electrical component that acts as a circuit element by generating electrical resistance. A resistor is a component that is used to handle current flow, modify signal strength, divide voltages, and revoke transmission lines. Prototyping features made use of this material. Additional current flows from the source when resistors are coupled in parallel.

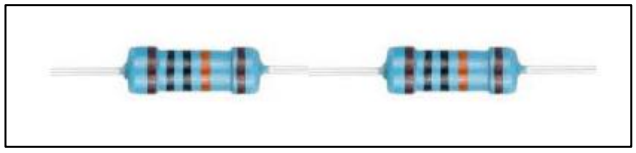

Fig -8: Resistors

H. Wind Turbine

The aerodynamic force of something like the rotor blades, which behave identically to an airplanes flap or chopper rotor blade, translates wind energy into electricity in a wind turbine.

Fig -9: Wind Turbine

3. CONCLUSIONS

In this study, we offer the concept of a solar and wind-powered charging system for an electric car. Because a single charge is insufficient for a longer-distance car, a charging station is required. Electric vehicles may be charged both during the day and at night at this hybrid charging station. In addition, the user may see how much electricity is used to charge the car. The reduction of greenhouse gas emissions and the increased use of electric vehicles through this system can help to reduce environmental pollution.

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