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***Research Article***

# HYBRID POWER GENERATION WITH WIRELESS POWER CHARGING FOR E VEHICLE

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## ABSTRACT
This project is tied in with working up a device to charge Electrical vehicles on Solar and wireless power transmission based influence framework and support remote monitoring using IOT. The purpose behind the endeavor is to decide the issues glanced in charging issues of electric vehicles transportation divisions.WPT is useful to power electrical devices where physical wiring is not possible or inconvenient. One of the future applications finds in automotive sector especially in Electric Vehicles. This project deals with research and development of wireless charging systems for Electric vehicles using wireless transmission.It uses solar energy and wind energy to produce electric voltage and EV vehicle controlled through IOT Wireless communication technology.The application of IOT has been emerging as a new platform in wireless technologies primarily in the field of designing electric vehicles. To overcome all issues in existing vehicles and for protecting the environment, electric vehicles should be introduced by integrating an intellectual device called sensor all over the body of electric vehicle with less cost.

***Keywords:*** *WPT wireless power transmission, solar energy, IOT -Internet of Things*

## INTRODUCTION
Electrical vehicle is commonly used in the contemporary world. More than 200000 electrical vehicles will be used in India (2022). Manufactures have designed two versions: the hybrid model and the totally electrical vehicle. Each model is distinguished by its interior composition. In recent days there are more changes in vehicle manufacturing, where all companies have advancement in production of vehicles and they are moving towards a smart vehicle environment. .Electric vehicles, on the other hand, must be charged often because of their restricted range.So In this project we concentrate on charging the e-vehicle batteries on different modes. Charging of an electric vehicle can be performed by either conductive (or wired) charging or wireless charging. Wired charging uses connection means between electric supply and charge inlet of the vehicle. Even though wired charging is popular, the problems with messy wires and safety matter in wet environment are a major drawback of this charging. Since a few years, a large interest is growing for the supply of the electric loads through a field to dispense from any wired connection with the grid. The apparatuses that actuate the throughthe-field supply are termed as wireless power transfer systems (WPTS).The electromagnetic induction technology is used to charge accumulated batteries through wireless electro power transfer. Wireless power transmission systems that use electromagnetic inductance and a long distance between their transmitting and receiving transformer winding's might benefit from the resonance inductive power transfer technology. These WPT transformer's also charged through Wind mill Energy.

## REVIEW THE CLASSIFICATION OF WPT
For onboard battery chargers, electricity is delivered via one of three WPT energy transfer methods: an electromagnetic field, an electric field, or a mechanical force. The physical mechanisms that WPT 300tilizes are often used to classify it.

**Table 1. WPT Classification of Different Energy-carrying medium**

| Energy-carrying medium | Technology | | Power | Range | Efficiency | Comments |
|---|---|---|---|---|---|---|
| Electromagnetic field | Near field | Traditional IPT | High | Low | High | Range is too small for EV charging. |
| | | Coupled Magnetic Resonance | High | Medium | High | Capable for EV charging |
| | Far field | Laser, Microwave, | High | High | High | Need direct line-of-sight transmission path large antennas, and complex tracking mechanisms. |
| | | Radio wave | High | High | Low | Efficiency is too low for EV charging. |
| Electric field | Capacitive power transfer | | Low | Low | High | Both power and range are too small for EV charging. |
| Mechanical force | Magnetic gear | | High | Medium | High | Capable for EV charging |

## WIND POWER

Wind turbines can be used to harness the energy available in airflows. Current day turbines range from around 600 kW to 5 MW of rated power. Since the power output is a function of the cube of wind speed, it increases rapidly with an increase in available wind velocity.

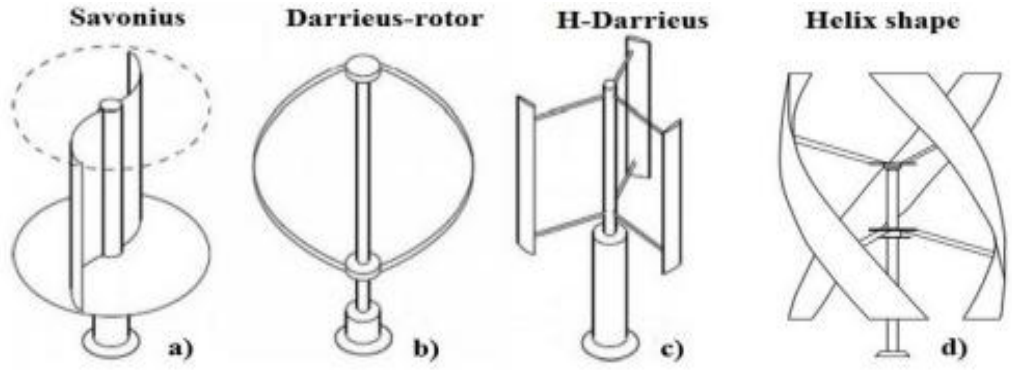


**Fig-1., Different types of vertical Axis wind Turbines.**

## SOLAR POWER

Solar energy can be utilized in two major ways. Firstly, the captured heat can be used as solar thermal energy, with applications in space heating. Another alternative is the conversion of incident solar radiation to electrical energy, which is the most usable form of energy. This can be achieved with the help of solar photovoltaic cells or with concentrating solar power plants.

## PROPOSED SYSTEM

This project proposes a new analysis concept for power flow in WPT The tuned primary and secondary provides a frequency selection. It resemblance to power transmission network having reactive power

voltage control. It provides dynamic wireless charging, charging while the vehicle is moving Battery in our E-vehicle will be charged automatically using power obtained from the solar panel, wind energy and wireless power transmission kit.This project proposes a new analysis concept for power flow in WPT The tuned primary and secondary provides a frequency selection. It resemblance to power transmission network having reactive power voltage control. It provides dynamic wireless charging, charging while the vehicle is moving.In our project we use iot app/webpage to control the E-vehicle. Through cayenne mobile app we can able to control the movement of the E-vehicle.Battery voltage will be continuously monitored and displayed in the LCD and updated in the IOT app.Temperature sensor is used to monitor the heat around the battery , this temperature value is continuously monitored and displayed in the LCD module.In our project WPT kit is charged from the supply obtained from the Wind Energy that will be placed as side of the Roads. Once the vehicle parked near the WPT kit then the battery in the vehicle will be charged automatically.

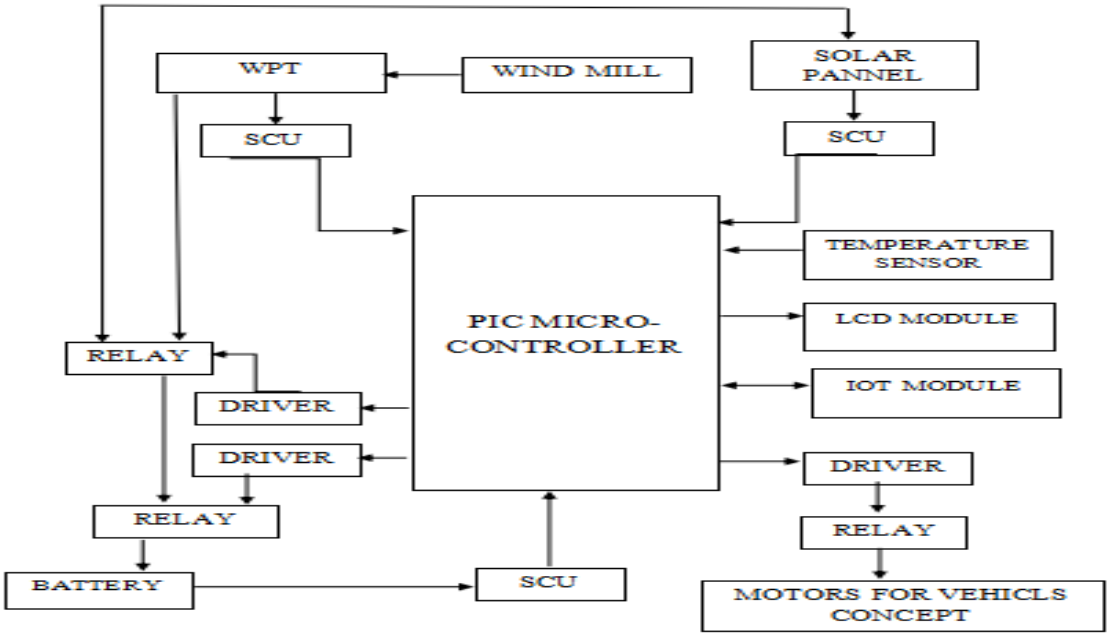


**Fig-2, Proposed Block Diagram**

**PIC16F877A**

Various micro-controllers offer different kinds of memories. EEPROM, EPROM, FLASH etc. are some of the memories of which FLASH is the most recently developed. Technology that is used in PIC 16877 is flash technology, so that data is retained even when the power is switched off. Easy programming and erasing are other features of PIC 16F877. PIC16F877A micro-controller is used in the project. The following are some of the important features of the controller. As a main controller of our project we use PIC16F877A micro-controller where we have connected all the inputs and outputs that is sensors and actuators. This PIC16F877A controller is programmed in the MP-LAB ide software using Embedded -C language for our project.

**VOLAGE SENSING CIRCUIT**

Basic and the most popular individual battery monitoring technique using micro controllers in practice is voltage divider circuit. In voltage divider circuit two resistors are connected in series and source (battery) voltage is applied across its ends. Voltage is divided against the two resistors according to the resistor ohmic values. In our project we use voltage sensing circuit to monitor the voltage available in the batteries also available voltage in Solar and WPT kit .

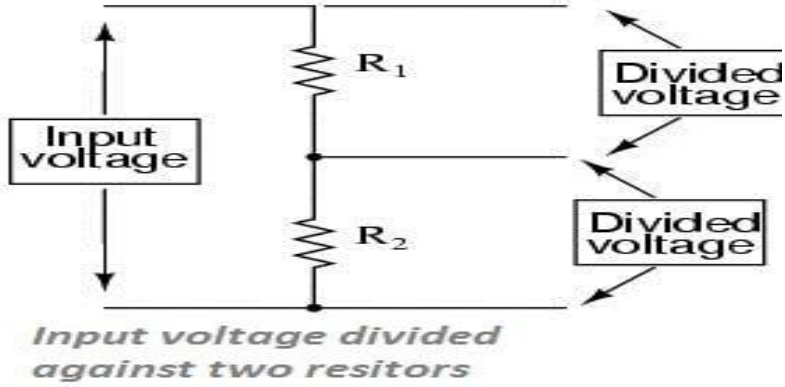


Fig-3., voltage dividing circuit.

**RELAY & DRIVER CIRCUIT-** basically relay is used to switch the high voltage devices using the available low voltage dc. In our project we use relay to switch the different types of charging mode. For this we use 12v-Electromagnetic relay for switching purpose. In order to turn on the relay we use darlington transistor driver circuit which switches the high voltage dc using low voltage dc.

**IOT-NODE MCU-** The application of Internet of Things (IoT) has been emerging as a new platform in wireless technologies primarily in the field of designing electric vehicles. To proceed with IOT technology we use Node-MCU controller which is programmed in the sketch IDE software. In our project we use cayenne software for using IOT technology which available for free source that works on MQTT protocol. In this software every persons will have the unique ID for the data tranformation. This IOT software is used to monitor and control the device from the remote place.

**SIMULATION RESULT :**

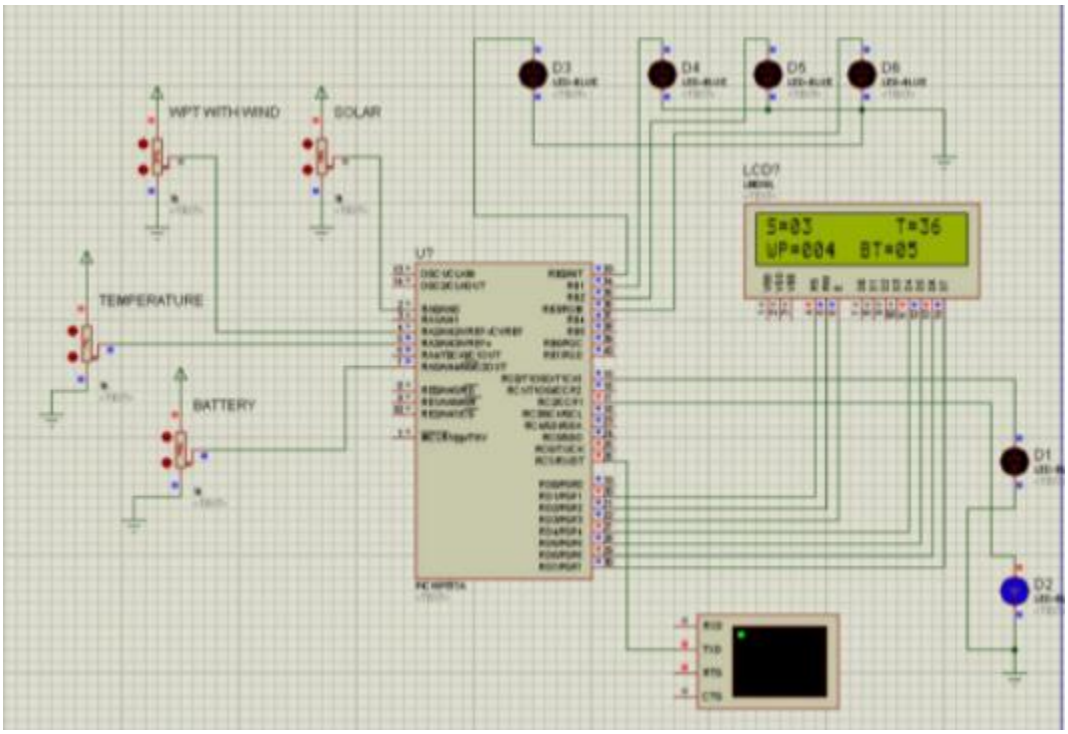


Fig-4., Simulation output result

The above image shows the simulation result designed for our project using Proteus software. For this simulation components like PIC16F877A, LCD module , Potentiometer , virtual terminal and Led's . once the connected is designed then the program is diffused in the controller. Instead of solar, WPT and battery voltage monitoring we used potentiometer for simulation. All the connections were given properly and output values were displayed in the Lcd module and also monitored in the virtual terminal.

## RESULT & CONCLUSION

The proposed concept on charging electric vehicles using IOT has been monitored using Cayenne software, an online monitoring and control system.. our project setup is designed in vehicle -robo mechanism and this vehicle is controlled through the IOT cayenne app designed for our project. In this part we will try to expose the results related to the state of charge of the batteries into the vehicle according to the car speed. For obtaining these results we have supposed .In EV wireless charging area, great achievements have been made on various pre-commercial demonstrations and some ready commercial kits. The very short term development will be focused on mass adoption of existing stationary or semi-dynamic charging techniques into market available EVs. High power, high efficiency, misalignment tolerance and optimized charging control will still be emphasized issues.

In this paper, different wireless power transfer techniques and renewable energy are developed on the perspective of EV charging application. A classification is made first by energy carrying mediums and then by technologies. From this project we are getting some results which are showed below.

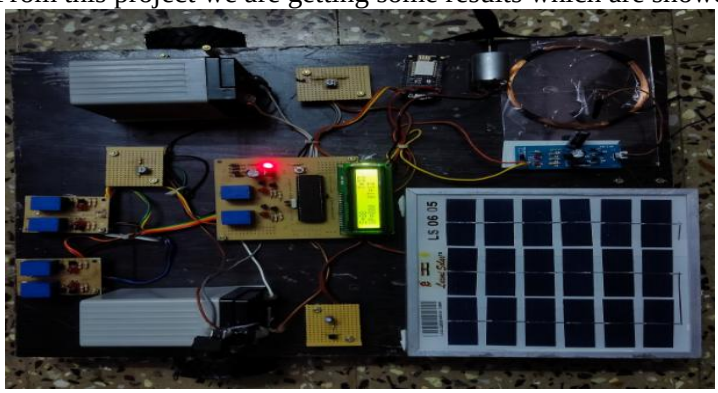

Fig-5., hardware setup for our project

The above figure shows the hardware constructed and output obtained for our project. LCD module shows the voltage values of solar , WPT and Battery. Output voltage obtained from the solar, WPT and battery is connected to the PIC micro-controller through voltage divider circuit.


Fig-6., IOT web page.

The above figure shows the cayenne page created for our project. All the voltage values and temperature values will be monitored in this app from the remote place. Buttons created in this page were used to control the vehicle forward , reverse , left , right and stop. According to the switch pressed in the app the relevant data will be sent to the controller through cayenne cloud and vehicle kit will move according to that. Thus our project simulation , hardware and software setup and IOT page were created and executed successfully.

## APPLICATIONS

a. It is used as power charging station.
b. It can also be used as fast charging station.
c. It can be used for solar harvesting based charging d. It can be more portable

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