

# Hybrid Mode Of Wireless Power Transmission in E.V

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**Abstract:** Now a days Electric Vehicle have the major problem of charging time that they spend on the charging station, the range of E.V and the use of renewable source of energy ( about 70% of the electricity generated in India is from coal) if we are using the electricity which is generated by coal then there is not so much effective use of these E.V vehicle for the betterment of the environment. Charging time that require to charge individual E.V bike can also be reduce by charging various E.V bike together in the same time. So that their charging time can be reduce.

**Keywords:** Solar Electric Vehicle , Renewable energy resources, Photovoltaic cell, Electromagnetic Induction, Lenz Law

## 1. Introduction

Well, this project is an answer to the issue. The system acts as an intermediate which used the concept of both the electrical power which is taken from solar as well as regular power supply so that the name of the project is Hybrid Mode Of Wireless Power Transmission.

In this task, a transform which is step down is used which lower the voltage which is present in the grid power supply. After that it passes through high frequency oscillator which is used to increase the frequency.

After that it passes to a rectifier circuit through which the rectification action is perform . Then it is passes through the induction coil which produce induce EMF when flux linkage between coil changes.

According to this project when we are placing a large number of coil in a track like structure in which the overlapping of two inductive coil is possible then the change in flux linkage induce in the coil is responsible for wireless transmission of the power and in this way a large number of E.V can be charge at a same time.

We can utilize the power of solar energy in that and made a charging station which is used to charged E.V by using solar panel along with ac power supply.

## 2. Methodology

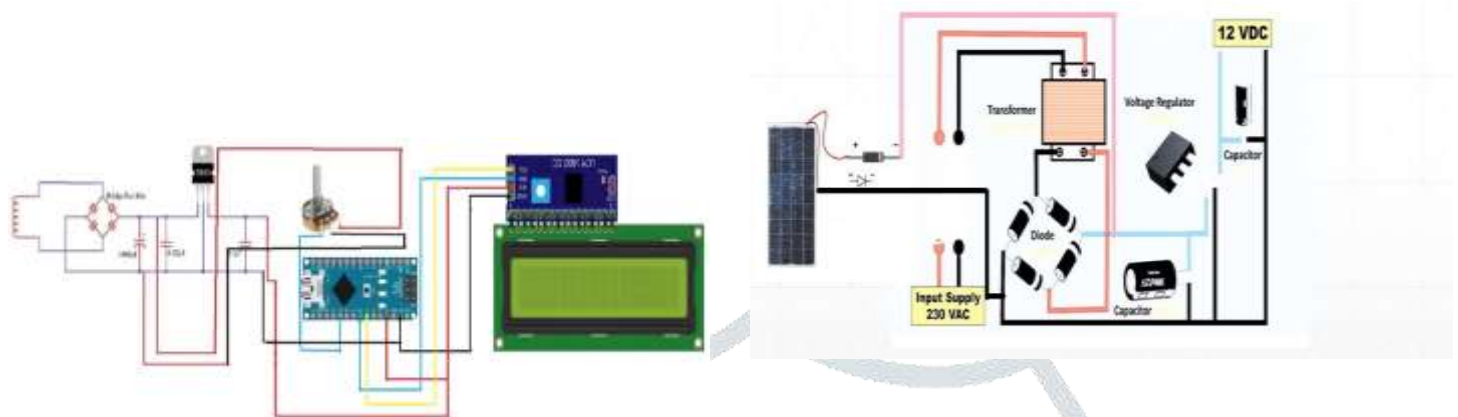
When an individual riding his/her EV bike want to charge it then he can go to a EV charging station or in the nearest vehicle parking such as in the malls. Their such a system is proposed so that the individual have to park their vehicle in the parking slot so that they do not have to wait for their number to charge the bike as their are multiple vehicle which can be charge at the same time.

In this task, we will use Lenz law which is basically its third law which state when a : The current induced in a circuit due to a change in a magnetic field is directed to oppose the change in flux and to exert a mechanical force which opposes the motion.

According to Faraday law of electromagnetic induction which consist three laws state that First law: It states that whenever there is a change in magnetic flux associated with a coil, EMF is induced in that coil. Second law: It states that the magnitude of EMF induced in the coil is directly proportional to the rate of change of magnetic flux associated with that coil. .

According to this project when a vehicle travel on the road then the induction coil placed beneath the road align with the induction coil placed beneath the vehicle so that according to Farady law of electromagnetic induction and lenz law the transfer of the electrical power takes place and vehicle can be get charged while travelling on the road. So in this way the range of the vehicle can be increase and battery cost can be decrease. The infrastructure of the project is very large put the implication and the motive of smart India can be achieved and it also solved out the problem of environment pollution and leads to betterment of the life by introducing technology in that.

## 2.1. Technical Specification Of System



The solar panel supplies electrical energy which is stored in a rechargeable battery of 12v via charge controller and Voltage regulator maintains constant power. 16\*2 LCD displays are used to indicate solar panel & battery status.

For that 12v supply is divided into 3 to 5 volts for the Arduino controller by using the resistor divider network.. Serial communication logic is used for giving input to Arduino.

Here, we used the Arduino controller for providing switching pulses to the MOSFET inverter. The output from the inverter is given to the transmitter coil. Energy transfers by electromagnetic induction to the receivers are via inductive coupling. The inductive coupling is used because the antenna to wireless power is brought from the transmitting to the input of a receiver.

The receiver unit, the bridge rectifier is used to transform ac voltage to dc voltage and convey dc output. A capacitor is covered in a circuit to behave as a filter out to reduce ripple voltage .wireless energy transmission is the transmission of electrical energy from a power source into electric load in absence of man- made conductors. WPT transmission the usage of solar power is WPT is inconvenient, no hazardous and inexperienced technology.

A WPT electricity transmitter emits a magnetic area with assistance of the coil with the same frequency emitted through the wireless power receiver. For finest impedance, cable reels are used on each aspect. PWM (pulse width modulation) is a way by means of which we definitely manage a virtual output sign by using switching it on and stale right away, with the aid of varying the width of the on/off period, it's going to supply the effect of various the output voltage.

There have been massive studies on non direct contact power transmission within the previous decade. it can be classified into radiative and non-radiative based on power transfer mechanisms. Radiative energy is transmitted through an antenna in the shape of an electromagnetic wave. but considering electromagnetic waves tour in all directions, the electricity performance is low. Non-radiative electricity is primarily based mostly on the magnetic coupling of the carrying out loops. Non-radiative strength transmission can be similarly divided into the short-variety and mid- range wherein the mid-variety WPT approach transmission distance is extra than the resonant.

### 2.1.1 Microcontroller

Arduino uno is a single-board microcontroller meant to make the utility extra on hand, which might be interactive gadgets and its surroundings. it's far primarily based on the microchip ATmega328P microcontroller and evolved by using Arduino.cc. cutting-edge models include a USB interface, 6 analog enter pins and 14 virtual I/O pins that permit the person to connect various extension forums.

**Parameters :-**

- Power Supply: 5V
- Analog Pins: 6 Pins (A0-A5)
- Input/Output Pins: 14 Digital Pins (0-13)
- Serial Pins: 2 Pins (0 Rx, 1 Tx)
- PWM Pins: 6 Pins (3, 5, 6, 9,10, 11)



Fig. 4. Arduino NANO

### 2.2 I2C component

. The I2C lcd aspect is utilized in packages that require a visual or textual display. This aspect is also used wherein a man or woman display is wanted but seven consecutive GPIOs on a one GPIO port are not feasibles.

**Parameters: -**

- Dual-Band: 900/ 1800 MHz
- Supply voltage range: 3.4V ~ 4.5V
- Operation temperature: -40°C to +85 °



Fig. 5. I2C Component

### 2.3 LCD(16\*2)

A A 16x2 lcd display is a liquid crystal display which could show 16 characters in each of its two rows, supplying a complete of 32 characters of records. it is generally used to show alphanumeric facts in numerous electronic devices. display extra characters by way of scrolling the texts separately. The I2C Module is used to reduce the no. of pins needed for the show

**Parameters: -**

- Serial baud rate: 4800, 9600(default), 19200, 38400, 57600, 115200, 230400
- Operating temperature: -40°C ~ 85°C
- Operating voltage: 1V~5.0V

### 3. Working Principle

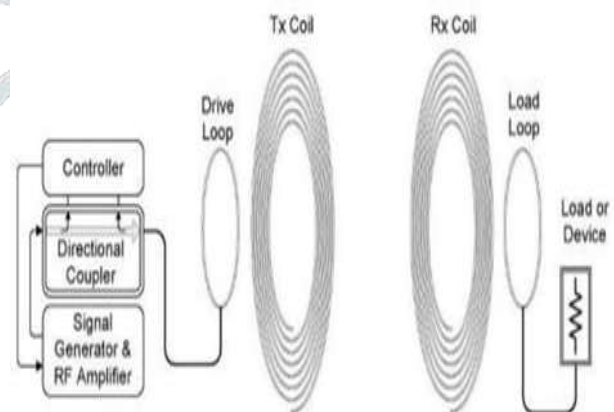
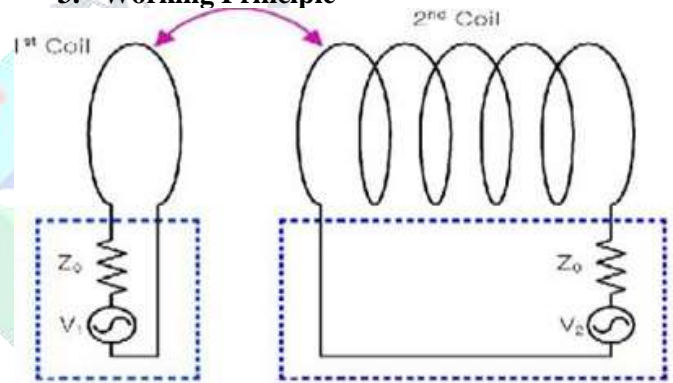
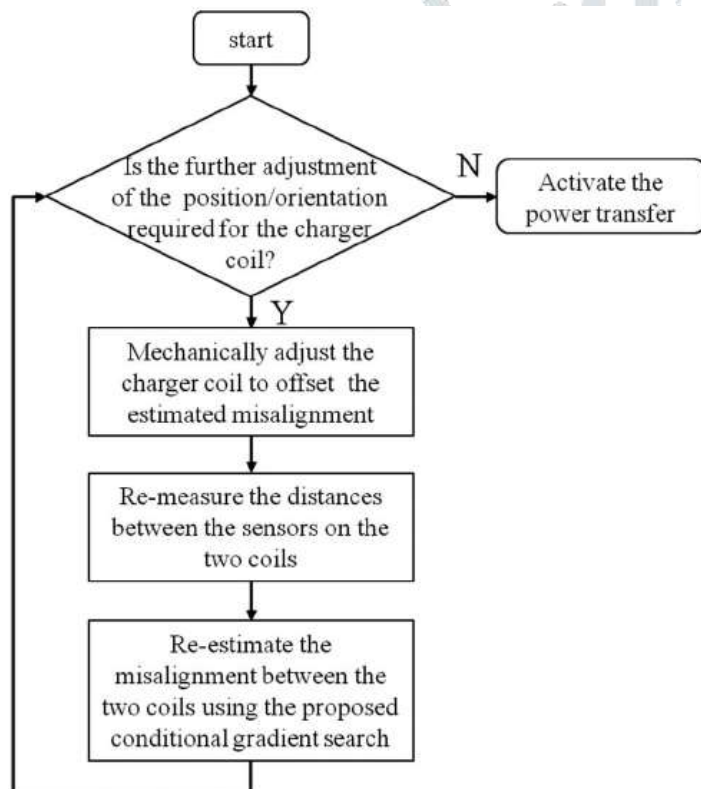


Fig. 6. General Structure of proposed project



The Tx coil gets excited because of the magnetic oscillating location produced thru the RF amplifier which offers strength to the power loop[7]. The Tx coil is a multi-turn spiral coil subsequent to the unmarried-turn power loop. This system acts as a step-up transformer. at the receiving aspect, a similar arrangement now acts as a step-down transformer because of the unmarried turn load loop associated with the tool[5]. The Tx coil and the Rx coil percentage mutual inductance that may be a function of the gap among them and their geometry. power can be transmitted through big air gaps while the transmitting and the receiving coil are in resonance and feature the equal resonant frequency

#### 4. Flowchart



#### 5. Advantages

The main advantage of “Hybrid Mode Of Wireless Power Transmission in EV” is that it solve out the problem related to EV charging and effective use of green energy ( renewable energy) so that the main problem of EV which is EV charging while moving and in static condition can be solve and to provide a better way so that the space and the energy can be conserve and it also does not involve wire and it have no negative effect on body.

As this system is fully automated, it does not require any human interaction. This system receives the longitude and latitude and sends SMS automatically after a period interval of time.

#### 6. Disadvantages

We cannot implement in each and every parking of vehicles, it will lead to be expensive.

It is not as much efficient as wire charging due to its power loss but provide a better solution for charging of EV.

#### 7. Future Development

This can also be bettered by implementing this system in each and every home of citizen so they can charge the EV of others and generate revenue .

Battery of cars can be used to provide power to home (v2h).

The whole EV can be act as power suppliers which can be used to supply power to various location when needed such as in filed of agriculture.

#### 8. Conclusion

This innovative system offers an optimal solution This EV charging system has no wires, no need to stop charging, vehicle charges while moving, solar power to keep the charging system running, and no external power supply is required.

The system demonstrates how electric vehicles can be charged while moving on the road, eliminating the need to stop charging.

## 9. References

- [1] Elena Paul, Nimmy Paulson, Rijo Bijoy, Benny K.K, “Wireless Charging Of Electric Vehicles”, International Research Journal of Engineering Technology , Vol.6, Issue 6, June 2019 .
- [2] P.Magudeswaran, G Pradeeba, S. Priyadarshini, M. Sherline Flora,“Dynamic Wireless Electric Vehicle Charging System” International Research Journal of Engineering and Technology, Vol.6, Issue 3, March 2019.
- [3] Review of static and dynamic wireless electric vehicle charging system Chirag Panchal Sascha Stegen, JunweiLu Griffith School of Engineering Griffith University, Nathan Campus, Brisbane 4111, Australia.
- [4] M. Cederl. 2012. Inductive Charging of Electrical Vehicles, Master Thesis, Stockholm, Sweden.
- [5] S. Chopra, “Contactless Power Transfer For Electric Vehicle Charging Application,” Delft University of Technology, the Netherlands, 2011.

