



Wireless EV Charging Station Using Solar and Wind

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Abstract: In Today's era of rapid industrialization, The need for reducing the carbon footprints and ensuring a clean environment is necessary. Vehicles play a important role in today's era however the fuel based vehicles are harmful for the environment. In this case EV come into action they don't require a fuel but work on the battery charging, the charging can be can be performed using renewable sources of energy such as solar and wind. This Sources of energy are abundant and found naturally and hence are limitless. Also there a lot more cheaper as compared to the conventional fuel sources. Thus as being advantageous and being need of the hour Wireless EV Charging Station is Second to none.

I. Introduction

The reserves of the fuels will exhaust soon in the future and hence for this purpose the mankind has invented a new technology advancement that will be beneficial for the human beings and the mankind, especially for the means of transport. As of today's, transport is dependent upon the petrol and diesel vehicles but as in future this is going to end and for such purpose there needs to be an different alternative, Thus the invention of EV occurs. The electrical vehicle or EV works on the battery and the battery works on charging. For charging the battery there are various charging station setup at various places example parking malls or residential areas too. Depending upon this, as our topic is based upon wireless Ev charging station it means the charging station does not include any sort of cable but the charging occurs wirelessly with the help of mutual induction. With the help of two coils that is a transmitting and receiving coil where the transmitting coil is located on the charging station and the receiving coil is on the vehicle and thus with the help of the mutual induction between both, the charging occurs.

For the charging, it depends mainly upon the two sources solar energy and wind energy. solar panels and wind turbine are the main sources of energy for the solar and wind respectively. In our prototype we have use a bulb in order to answer a power supply for the solar panel where as a table fan is used for giving initial start to the wind turbine so as to generate power. Both the combination of solar and the wind together help to charge the Ev vehicle. Power generate from solar panel is dc and thus it is directly fed to the vehicle as the vehicle needs DC power to get charged. Where as the wind turbine generate AC power and rectifier is required to convert the AC into DC so that the vehicle can be charged.

The charging time of the vehicle is mostly two hours. Charging is much more cheaper as compared to the other means of diesel and petrol vehicle thus it is aiding very much economically. The operational maintenance is very less as they are no cables for wires present and the function is fully wireless the

system is fully automatic answers manpower required is very less leading to being a boon for the booming EV sector.

ii. PROPOSED SYSTEM

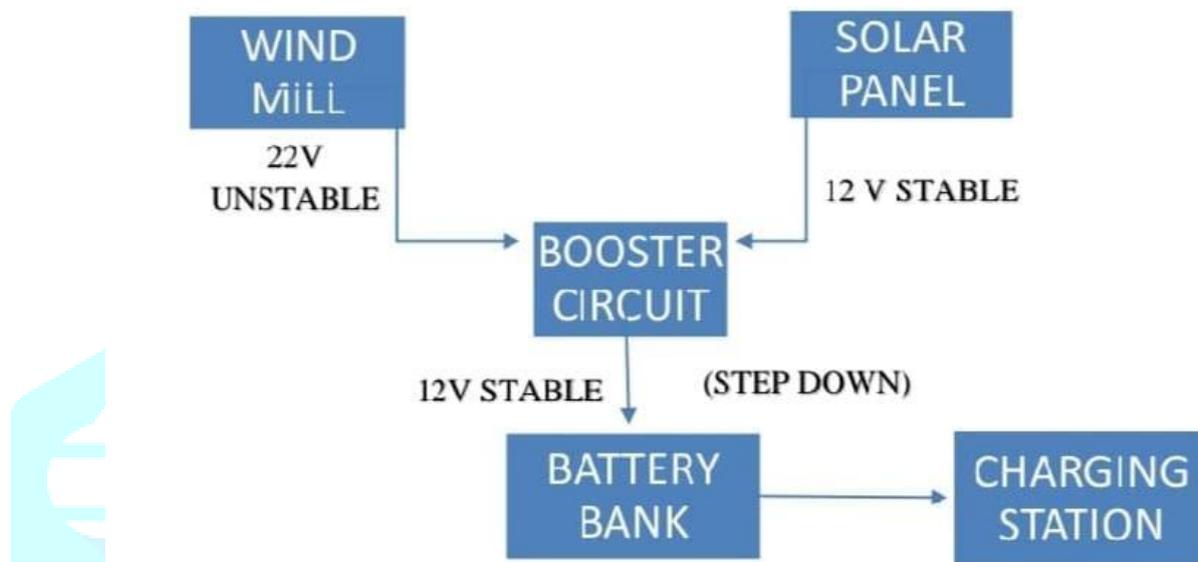


Fig 2.1 Block diagram

The provided block diagram illustrates an Wireless Ev Charging Station Using Solar and Wind . The system uses a Solar panel through which we will receive dc power via solar energy , wind turbine through which we will receive ac power via wind energy. From the solar panel we receive a 12 volt stable voltage where as from the wind mill we receive a 22 volt unstable voltage . The voltage from the wind is AC but the car for charging requires DC , it is achieved with the help of rectifier circuit .both the voltage received are fed to the booster circuit for the voltage received from both the wind as well as the solar are step down to 12 volt stable voltage. This voltage is for the transfer to the battery bank where the power is stored. And when the electrical vehicles need to be charged the battery bank transfers the energy to the charging station through which the transmitting coil is connected and from the transmitting coil on charger to the receiving coil on vehicle with the help of mutual induction the power is transferred and thus the EV get's charged.

III. HARDWARE DETAIL

3.1) Solar panel



Fig 3.1 Solar panel

The above fig 3.1 shows the solar panel . It is made of silicon. It absorbs the solar energy from the sun and converts it into DC . It is used widely in Residential commercial as well as industrial area as it is non conventional source of energy and thus aids in controlling carbon footprints.

3.2) Wind Turbine



Fig 3.2 Wind Turbine

Wind turbines convert the kinetic energy of wind into electricity using large propeller-like blades that turn a rotor, spinning an internal generator. Primarily utilizing horizontal-axis designs with three blades, these renewable energy systems typically feature a nacelle housing the gearbox, generator, and a tower for optimal wind capture.

3.3) Transmitting and Receiving coil

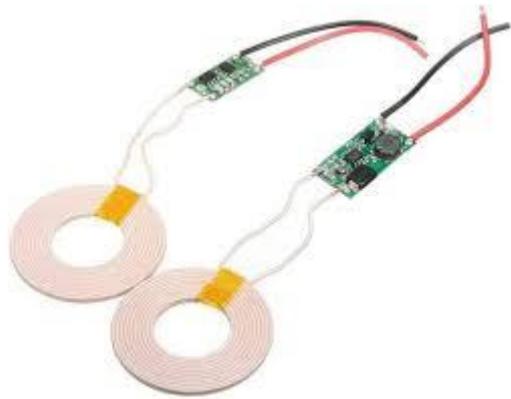


Fig 3.3 Transmitting and Receiving coil

A transmitting coil is an insulated, conductive wire loop that generates a time-varying magnetic field when fed with AC, enabling wireless power transfer via induction to a nearby receiver coil. Typically used in charging pads. A receiver coil is a component in wireless power transfer and communication systems that captures magnetic flux, inducing a voltage to power devices like electric vehicles or to receive signals.

3.4) Boost Converter

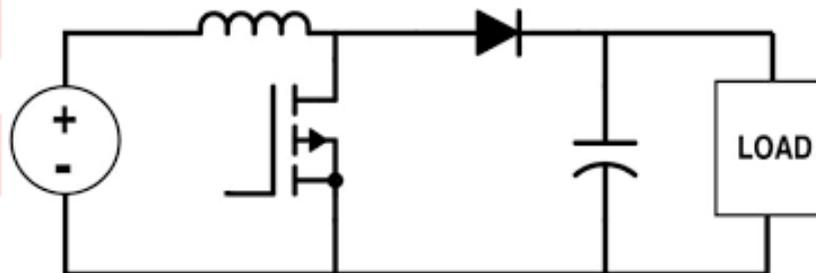


Fig 3.4 Boost Converter

A boost converter is a DC-to-DC power converter that increases a low input voltage to a higher output voltage. It uses an inductor, switch (typically a MOSFET) diode, and capacitor to store and transfer energy.

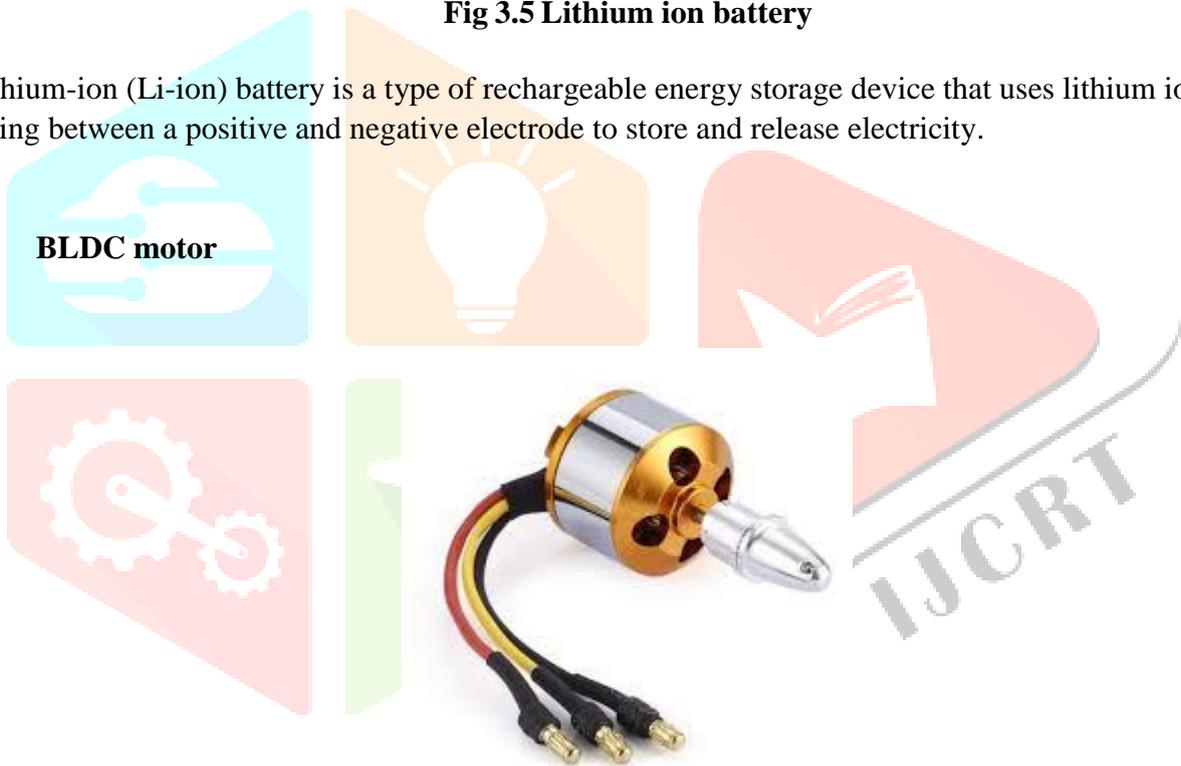
3.5) Lithium ion battery



Fig 3.5 Lithium ion battery

A lithium-ion (Li-ion) battery is a type of rechargeable energy storage device that uses lithium ions moving between a positive and negative electrode to store and release electricity.

3.6) BLDC motor



A Brushless DC (BLDC) motor is a high-efficiency, durable, and low-maintenance electric motor that replaces mechanical brushes with electronic commutation to switch current to stator windings.

IV.RESULTS

Wireless EV charging using solar and wind leads to successful charging of EVs .Experimental Observations from the prototype display that when the solar panel is fed with solar light or any source similar to it and the wind turbine is provided with the wind source such as a table fan the wind turbine rotates and the solar panel generates DC were as the wind turbined generates AC, together they are sent to a converter through which a stable 12V supply is obtained and the charging occurs because of the mutual induction between the transmitting and receiving coil and this output can be displayed upon the voltmeter used and also there is a charging light indication on the car ensuring that charging takes place. It imposes efficiency of almost 85% which is pretty good considering todays norms. Eradicating the flowers of the conventional fuel sources which was leading to increase carbon footprints and being hazard to the mankind as well as the environment , which wireless EV charging station by passes this and ensures a clean energy generation ensuring limited or no carbon footprints conserving environment. The cost of charging is also less compared to the prices of the fuels like petrol and diesels also this charging stations can be set up at home that i.e residential which is not possible for traditional fuel cars as the petrol pump cannot be set up at home or at commercial areas whereas the EV charging station can be set up at home and be utilize efficiently .

One can charge the car or the vehicle overnight when asleep and when he gets up in the morning he can find the car charged fully and cover several distances with help of this.

Parameters	Outputs
Solar panels	12V, 1A
Wind mill	21V, 1A
Voltage required for charging station	12V
Total time required for charging station	Around 2 Hours



Fig 4.1 Hardware

CONCLUSION

In conclusion, our project on the wireless evil charging system using solar and wind has been as success. By making the electrical vehicle charge wirelessly proving to be advanced technological invention which is beneficial for the future generation. Smart meter in devices and management systems help in achieving a developed and technologically advanced system , for charging the vehicles.

The charging being of two types static and dynamic charging the static charging maybe available at many places nowadays where as the dynamic charging is still being research upon to develop more and meet the future needs.

V. REFERENCE

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