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# Solar Wireless Charging Bike

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*Abstract—*

Electrical vehicles are introduced for today world, as it is thriving to use day by day new technology everywhere. Even if electrical vehicles are use, it has its own limitations like heating while charging, charging run out, less charging stations and cost also high for installing charging stations. To rectify these limitations, wireless electrical vehicle charging station with monitoring pave, avoid over charging, monitoring the levels of battery, cost effective, eco-friendly and placing charging stations in urban areas. Wireless charging can be seen as key enabling technology to increase the adoption of electric vehicle. These can be installed in parking areas, shopping malls, remote areas as well. Wireless Power Transmission [WPT] is very reliable, efficient, noiseless and pollution free technology. It feels like a normal car while parking and no need to plug the charging cable).

## *I. INTRODUCTION*

The on-going climate condition has led to research and development of electric vehicle over the past decade. The increasing global warming has causes awareness among the people to switch to electric vehicles. The time required to wait at charging station while the battery is being charged will be reduce by the considerable amount of time when the charging will be done on road while driving the vehicle. Even though electric vehicles are an alternative, there need to be development in its charging system to make it the prime option for transport for this purpose, the charging system should be developed. Dynamic charging system are more reliable user friendly and time is efficient. Also, the battery size can be reduced and range can be improved. This charging system can also be implemented in the travel routes, traffic signal, bus station. This wireless technology charging system is based on Qi Standard which was driven by wireless power consumption. This standard is used globally for wireless charging of smartphone. However, it can also be implemented on charging of electric vehicle wireless and this wireless charging system is based on electro-magnetic induction. The transmitting coils located in the base unit act as a primary winding and when current passed through the coil, it creates a magnetic field. This field induces a current in the adjacent coil without touching it. Now, if we used this adjacent coil as secondary winding, wireless charging is obtained by connecting it to a charging unit. The electrical vehicle charging system is still in the development phase due to many aspects such as safety, cost, infrastructure etc. In this paper, we only try to describe the dynamically wireless electric vehicle charging system from solar panel as a prototype which can be beneficial and used in future. shows the block diagram of the wireless EV charger. Thus, the transformer is used to step down AC source voltage and then converted to DC using rectifier circuit. Using an inverter, this voltage is converted to AC voltage of the required frequency. The voltage of desired frequency is fed to a transmitter coil of the system which is mounted on the base unit. In the case of dynamic wireless charging this base unit will be mounted on the road. On the base of car, the receiver unit is mounted and through inductive coupling, power is transmitted from transmitter coil to receiver coil. To suit battery specification, the power is then rectified and regulated to battery specification. Through this the charging of battery takes place.India is the world's third largest producer and third largest consumer of electricity. Energy use has doubled since 2000, with 80% of demand still being met by coal, oil and solid biomass Share of Renewable energy is around 20%. According to NITI Aayog's energy policy report, India's demand for energy is expected to double by 2040, and that for electricity to potentially triple as a result of increased ownership of electric vehicles

## *II.* REVIEW OF LITERATURE

### *A. Design of Solar Operated charging bike*

Wireless charging is useful in eliminating the need of conductive wires and thus conduction losses which can takes place through wire can be completely cut out. Also, the human handling of wired during the charging process for plug in and plug out can sometimes be hazardous if not done correctly. For safety 3purpose, the human intervention can be avoided. Even through wireless charging seems to be time saving and effective, it comes with certain limitation. The development in infrastructure is the main aspect need to be done to suit the purpose. This will require a huge investment of capital during all stages of the work and hence it is costly affair. The first wireless electric vehicle charging technology to be developed was stationary, when the vehicle is not operating for an extended this system have been designed to charge any EVs at charging station or garages or public parking. Because a wire or any physical connection is not required, every person has major interest in the charging possibility of EVs while they are in transit. Dynamic EV Charging is charging EVs when they are in motion

A. DWCS (dynamic wireless charging system) is the system in which EV is charged when they are in motion. The development in power and range is the main concern for charging the electric vehicle. It will be beneficial if we try to improve the range for wireless charging of an electric vehicle. “On road charging” is also termed as dynamic wireless electric vehicle charging. A large capacity of battery is not required, if the charging is done in proper interval and this make the vehicle more reliable, economical and lighter. DWCS provide a better option for the charging of electrical vehicle to improve its range. The base unit will be placed below the road on predefined route and the car will have the battery bank. When the car is in motion, the car will pass over the road and charging will be done.. This will require a lot of investment and infrastructure modification at the initial stage but slowly the system will help in gaining market for electric vehicle making better option over company conventional means of transport. It is the latest technique for charging and discharging the electric vehicle without any wire or any physical contact between load and source. WPT transfer electrical energy through electromagnetic they are several advantages of WPT such as- (1) The physical connection requirement is avoided which lead to less fault in charging equipment. Also, it help to start the charging using the software interface (mobile phone, tablet in vehicle application). (2) The charging equipment is installed under the ground, which helps to facilitate high number of EV charging simultaneously in the same size station. In additional, charging equipment is protected from environmental hazard. In united states many winds and solar power plant are built along the highways in which the dynamic WPT technology can be integrated with the renewable energy technology. For such situation, the electric energy used for the charging EVs mainly comes from the wind turbine (during the night) and solar photovoltaic array (during the day) on both side of road, the power from the main grid can be used as a reserve. This system provides an electric energy source of EVs right close to where the electricity is generated, which help to reduce the transmission network congestion, reduce power transmission losses, improve the utilization rate of renewable energies, improve power system control and management, and greatly reduce carbon emission from the transportation system. This diagrammatic representation of the DWCS.

B. Static Wireless Charging System (SWCS) Wireless charging system creates an different way to provide a eco-friendly environment for user and when plug-in charging system it prevent from safety related problems. The SWCS can easily replace the plug-in charging system with driver application and at the time of trip and electric shock it is able to solve all the safety issues. The primary coil is usually installed below the electric vehicles front, back or centre. The energy received from the electric vehicle is first converted from AC to DC by using a power converter and then it is transferred and store in the battery bank. Power control and battery management system are link with a wireless communication network to receive any feedback from the primary side, thus it is able to overcome any safety issues. The charging time of the electric vehicle depends upon the charging level of the source, size of the charging pad and air-gap distance between the two winding. In lightweight vehicles the average air gap distance between the two coil is about 150-300 mm. Through the mechanism it is found that the distance between coils can be reduced to applicable level.

## *III. PROPOSED SYSTEM/PROBLEM DEFINITION*

A. Problem Statement

One important goal of the climate commitment is to reduce primary energy demand in the transport sector and increase the use of renewables, since around33% of primary energy is consumed in this sector. As the world's resources become more and more depleted, so does the government. agencies and NGOs advocate a greener solution through the use of renewable energy sources, as electric power must become less dependent on fossil fuels and transportation must become more electric to reduce carbon emissions and mitigate climate change..

B. Project Scope

1. Sustainable Transportation: To provide an eco-friendly and sustainable mode of transportation by harnessing solar energy to power an electric bike. Energy Efficiency: To maximize energy efficiency by using solar panels to charge the bike's battery and increase its range.

2. Zero Emissions: To reduce carbon emissions and air pollution by operating the bike with clean, solar-generated electricity.

3. Increased Range: To extend the bike's range by incorporating solar charging, allowing for longer journeys without the need for external charging.

4. Off-Grid Mobility: To enable off-grid mobility in remote areas where traditional charging infrastructure is unavailable.

5. Cost Savings: To save on electricity costs by using solar power for recharging the bike's battery.

6. Innovative Technology: To showcase and promote innovative, sustainable technologies in the field of electric transportation.

The specific objectives may vary depending on the manufacturer's or designer's goals and the target market for the solar wireless electric bike.

## *IV. OBJECTIVE OF PROPOSED SYSTEM*

1. Sustainable Transportation: To provide an eco-friendly and sustainable mode of transportation by harnessing solar energy to power an electric bike.

2. Energy Efficiency: To maximize energy efficiency by using solar panels to charge the bike's battery and increase its range.

3. Zero Emissions: To reduce carbon emissions and air pollution by operating the bike with clean, solar-generated electricity.

4. Off-Grid Mobility: To enable off-grid mobility in remote areas where traditional charging infrastructure is unavailable

## *V. METHODOLOGY*

During the conversion of solar energy into electrical energy there are multiple process involved. Due to complex system, there are many losses involved during conversion. The solar energy received by the PV panel is much higher than the electrical energy we get as an output. Due to multiple components involved in the PV System most of the energy in the solar power system is either lost as the conversion loss within the components or as a transfer loss through wires. As we know we cannot fully convert one form of energy into another due to the number of system complexity and due to the presence of losses. We cannot convert an equal amount of one form into the equal amount of the other form. For example, Conversion loss. As we know that no system on the planet is fully efficient, i.e., it cannot convert a certain fraction of the energy as we gave as input into the useful energy and the remaining energy is lost in the environment

### A. Solar Panel

Solar energy is transformed into electrical energy by solar panels. They make advantage of the photoelectric effect theory, which states that when light strikes a solar panel, electrons are emitted. Silicon cells are used to make solar panels. Since silicon has an atomic number of 14, when light strikes a silicon cell, two of its outermost electrons are present. This starts the flow of electricity that I started. Two separate sales structures exist for silicon. both single-crystalline and multicrystalline Monocrystalline solar panels are produced in silicon wafer format from the final silicon block. In the same way that monocrystalline silicon cells are more effective but more expensive than polycrystalline ones, polycrystalline silicon cells are likewise silicon cells made through melting many of the silicon crystals together.

### B. Batteries (Power Supply)

Batteries are particularly useful as a power supply in situations where a stable source of power is not available or where mobility is important. To use a battery as a power supply, the device being powered must be designed to use the specific type of battery being used. The device must also be designed to operate within the voltage range and current output capabilities of the battery. When using batteries as a power supply, it is important to monitor the battery level and recharge or replace the battery when necessary. Over time, batteries can lose their capacity to hold a charge and may need to be replaced. Overall, batteries are a versatile and convenient way to provide power in a wide range of applications where a portable or backup power source is needed.

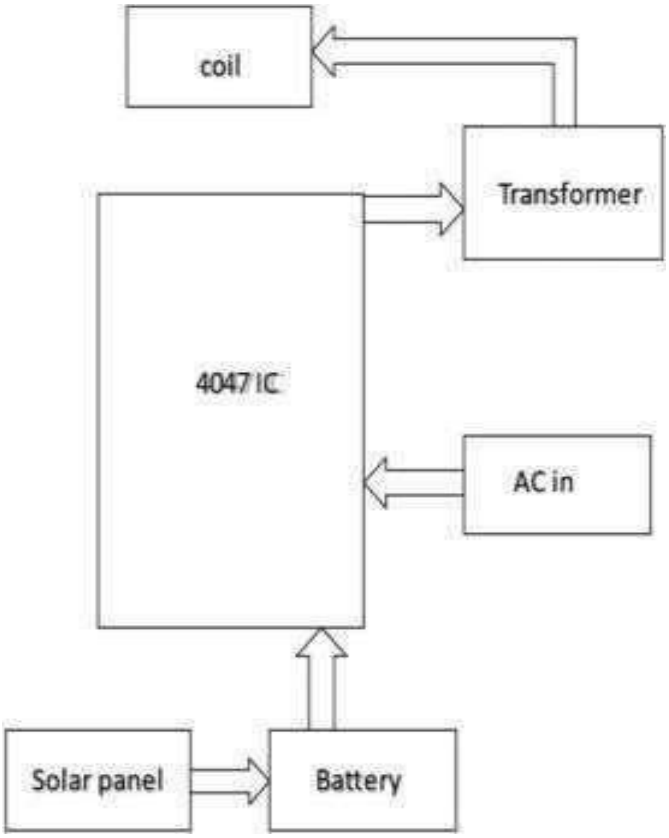
### C. Step Up Transformer

The low voltage (LV) and high current from the primary side of the transformer are converted to the high voltage (HV) and low current value on the secondary side of the transformer by a step-up transformer. Known as a step down transformer, this is how it works in reverse. The transformer in daily definition is a piece of stationary electrical machinery which can converts electrical energy from primary side windings to magnetic energy which is located in the magnetic core of the transformer and then back to electrical energy (on secondary side). There are numerous uses for step-up transformers in transmission lines and electrical systems. Although the voltage and current numbers are typically different, the operating frequency and nominal power are roughly identical on the primary and secondary transformer sides due to the transformer's high efficiency.

D. MOSFET

The metal–oxide–semiconductor field-effect transistor. Multiple outputs and overcurrent and overvoltage features are possible with an AC/DC converter. The majority of high frequency transformers are used in machinery or equipment that needs a certain level of voltage or current. The transformer's original design called for it to be coupled to an H bridge, which delivers high frequency voltage pulses to the primary coil for conversion into higher voltages and transport to rectifier units. In addition to the traction battery specialist systems used for commercial (or recreational) vehicles, an electric vehicle battery (EVB) is a battery intended to power abattery electric vehicle (BEV) system. Usually secondary (rechargeable) batteries, these batteries are. Batteries used in electricvehicles, commonly referred to as traction batteries, power the electric motors

Flow Chart Diagram




## *VI. REQUIREMENTS*

Following material/facilities is required for project

1. Solar panel
2. Batteries
3. Step up transformer
4. MOSFET
5. Computer/ Laptop

1.ADVANTAGES

1) Environment-Friendly - The biggest and best reason to use an electric vehicle is that it is environment-friendly. Vicious gases are not release that leads to pollution in air as against the fossil fuel powered bike.
2) No Fuel or Gas Cost - Since electric vehicle need no fuel or gas to power them, and user can steep rise in price of these commodities. Mainly all we need to plugged-in and ready to go for another 100 miles
3) Convenient – The wireless electric vehicle is easy to recharge. From this, we have no longer need to run for the fuel station for charging the car. Even we can use regular electric socket for charging an electric bike.

2.Disadvantage

1) Quieter – Electric car cut noise pollution as they have fewer moving part than a conventional vehicle. They are much quieter when in operation. An electric car is very quiet and very smooth compared to a petroleum powered internal com bustion engine vehicle.
2) Dynamic – The electric car will charge while moving there is no need to stop the car, it saves our time.

## *VII. CONCLISION*

The above study effectively demonstrated about the construction of wireless electric vehicle charging system using solar panel. The electric vehicle charging wirelessly reduces the need of transmission wire and reduces the fuel consumption, making it a simple and more practical way. This method reduces the rid of hardware components wear and tear. This wireless charging system can be implementing through dynamic electrical vehicle charging system.

## *VIII. FUTURE SCOPE*

Today, electric vehicle stockpiles around the world are growing rapidly .How to guarantee a sustainable rise of EV ownership and how to allow full play of scalable development are two potential orientations in WEVC under the trend of industrial prosperity. Furthermore, developing technologies, materials, and theories can help WEVC become even more competitive. Additionally, power electronics can gain by using modern materials. For one reason, switching loss is a significant cause of energy waste in a WEVC system, alongside flux leakage. Though static WEVC can free up operators' hands, it does little to improve charging station adaptability. Here, the benefits of dynamic WEVC become clear. Broadly speaking, trambased and on-road varieties of this technology exist.

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