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Wireless Charging of an Electric Vehicle using Solar and Wind

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Abstract: *Day by day new technologies are making our life simpler also WPT (Wireless Power Transmission) has been attracting a wide range of subjects in various fields and also becoming a highly active research area because of their potential in providing high technology to our daily lives. WPT will be mandatory to use in the near future because these technologies enables the transmission of electrical energy from a power source to an electrical load across an air gap without interconnecting wires. As the Non-renewable resources on our planet are drastically decreasing even as we speak, our future will be completely dependent on the Renewable resources such as Wind, Solar, Tidal energies, etc. Here we make use of hybrid power generation which is wind and solar power generation for generating DC power. So we worked on a project by combining these two concepts, Hybrid Power Generation and Wireless Power Transmission. Hence the title for the project is "Wireless Charging of an electrical vehicle using solar and wind". In this paper, we expose and discuss the importance of application of recharge systems to an electrical vehicle. In addition to its vital role in supplying vehicle with the required power recharge system has many type the most important of then is wireless charge system that transmits power from transmitter to receiver without any contact. It is obvious that this power is variable in relation to the speed and has a main function which is loading the battery. In this work our main objective is to focus on the change of state of charge (SOC).ext.*

Keywords: Wireless Charging

I. INTRODUCTION

The wireless charging of electric vehicles is based on the inductive power transfer between two mutually coupled coils, one is "primary" connected to charging station with solar, wind and main supply and the other "secondary" connected to the battery of electrical vehicle. The advantages provided by the wireless charging are in terms of safety and comfort, as the driver can avoid danger by using power cord and he needs to park the vehicle without the need of plug-in operation to start charging the battery. The wireless power transfer can also occur in reverse direction, so that the power could again be send from the vehicle battery to the grid in times of need. Thus the wireless power transfer also fit for bi-directional power flow.

This paper mainly keen on the concepts of Wirelessly charging the electric vehicle. The wired charging can be mainly four types and all are explained in. The charging can be done through solar wind grid connected system. The use of solar and wind is pollution free and eco-friendly in use. However the battery charging need to be taken care and an algorithm is also developed for solar-wind system. The various configurations for hybrid solar wind systems has been presented. Models of a horizontal axis wind turbine and a PV array and their MPPT power tracking controllers and adaptive voltage controllers and supervisory controller and Standalone hybrid solar-wind system is studied. The charging stations for electric vehicle using solar-pv is given.

The concept of wireless power transfer was realized by Nikola Tesla. Wireless Power transfer can make a remarkable change in the field of the electrical engineering which eliminates the use of conventional copper cables and current carrying wires. Day by day new technologies are making our life simpler also WPT (Wireless Power Transmission) has been attracting a wide range of subjects in various fields.

II. METHODOLOGY

The Methodology used in the system is divided into three stages of operation

- INPUT STAGE: Generation of power

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- INTERMEDIATE SATGE: Converting required voltage using buck boost converter.
- OUTPUT STAGE: Power transfer wirelessly.

2.1 Input Stage

The input stage involves generation of power which is done through both wind and solar Using wind energy, Wind first hits a turbine's blades, causing them to rotate and turn the turbine connected to them. That changes the kinetic energy to rotational energy, by moving a shaft which is connected to a generator, and thereby producing electrical energy through electromagnetism. The output of wind turbine is connected to rectifier to convert AC to DC which is further fed to battery. Using solar photovoltaic cells which uses sun as a source of energy for generation of power. The generated power is connected to charge controller which is further fed to battery to empower the further operation of the system.

2.2 Intermediate Stage

The battery output is connected to buck boost converter the use of buck boost converter is a type of DC to DC converter is an electronic circuit or electromechanical device that converts a source of direct current (DC) from one voltage level to another. Then output is connected to boost converter to produce required voltage and it is connected to primary coil.

2.3 Output Stage

The power transfer from primary coil to secondary coil through wirelessly by inductive power transfer. A current flow through the source coil produces a magnetic flux which induces a current flow in the load coil and the power is stored in electrical vehicle battery.

III. CONCLUSION

The future of the automotive industry depends majorly on Electric Vehicles due to the main factor of reducing polluting gases that is emitted from the IC (Internal Combustion) Engine Vehicles. But the main drawback of those Electric Vehicles is that the range of operation is very less when compared with those of the IC Engine Vehicles and another important drawback is the charging of those huge capacity batteries. The battery charging time is very high and these reasons are being an obstacle for implementation of these non-polluting Electric Vehicles in operation. Thus, with the employment of this proposed battery charging system in the Electric Vehicles, the range of operation of those vehicles could be increased.