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Auto Recharge of Electrical Vehicle Battery

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Abstract: *The ever rapidly growing transportation sector consumes about 49% of oil resources. Following the current trends of oil consumption and crude oil sources, the world's oil resources are predicted to be depleted by 2038.Therefore, replacing the non-renewable energy resources with renewable energy sources and use of suitable energy-saving technologies seems to be mandatory. In the present scenario the vehicles are one of the most pollution producing agents in the nature. To overcome from this pollution electric car is the best. Electric car is an idea from 18th century, and still, it is under implementation with more advance methods. As we know that by using the MG-Set (motor generator set), we can regenerate the power dissipated in the motor. It can also be used as variable frequency ac or dc supply for any device. By mechanical energy we can produce electrical output using MG-Set principle, so this can be worked as engine in the modern electric car to replace the IC-engine (Internal combustion engine), which has the higher capacity as compared to IC-engine.*

Keywords: Electric Vehicle, Auto Recharge, Battery Supply, DC Motor, Wheel Armature

I. INTRODUCTION

The word 'Agriculture' The EVs are not familiarly utilized and the market status is not up to the mark because such vehicles are required to be recharged on one occasion in 60–70 km drive and less cost effective. The hybrid vehicles dominated the market by acquiring power from the combustion engine. In an attempt to reduce gasoline usage, the grid power used a vehicle called plug-in hybrid EVs (PHEVs) were introduced in the market. The PHEVs are still under research due to the following reasons:

1) To reduce its cost
2) Increases the life and capacity of the battery packs
3) To increase the flexibility in the grid connection

The ever rapidly growing transportation sector consumes about 49% of oil resources. Following the current trends of oil consumption and crude oil sources, the world's oil resources are predicted to be depleted by 2038.Therefore, replacing the non-renewable energy resources with renewable energy sources and use of suitable energy-saving technologies seems to be mandatory. In the present scenario the vehicles are one of the most pollution producing agents in the nature. To overcome from this pollution electric car is the best. Electric car is an idea from 18th century, and still, it is under implementation with more advance methods. As we know that by using the MG-Set (motor generator set), we can regenerate the power dissipated in the motor. It can also be used as variable frequency ac or dc supply for any device. By mechanical energy we can produce electrical output using MG-Set principle, so this can be worked as engine in the modern electric car to replace the IC-engine (Internal combustion engine), which has the higher capacity as compared to IC-engine. In present electric car, frequent charging stations are required for charging the battery to run the car. But in our proposed model, two batteries are used. Initially primary battery is charged and it is used for driving the load as well as to charge the secondary battery. This is done by utilizing conversion principle of MG-Set. If primary battery is drained out, then it will auto switch to the secondary battery to drive the load as well as to charge the primary battery, this operation is done by using the microcontroller for switching purpose, by this principle charging station can be overcome.

Nowadays, EVs are charging their battery packs through roadside units, the standard home outlets, and the park stations, etc. To recharge the battery packs of EVs a couple of hours are required and the time taken for recharging will

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vary depends on the capacity used. This is an important factor which affects the usage of EVs. To overcome this problem, Chellaswamy et al.has been introduced a new charging mechanism for EVs. This system charges the storage system automatically without driver involvement and reduces greenhouse gas emissions.

[1] To charge the traction battery packs, high-frequency AC-DC converter with an electromagnetic interference filter is used by Majid et al.

[2]. The electromagnetic interference filter is used to suppress the noise. A slip angle measurement of EVs has been studied by Yafei et al. and it has a camera with a high sampling rate accompanying a sensor.

[3]. The optimal scheduling, operating cost, and CO2 emission of a hybrid EV is estimated by linear programming under European drive train.

[4]. This control mechanism also estimates the electricity consumption of EVs. The state of charge (SOC) of the EVs NiMH battery modules has been estimated by a control algorithm by Man et al.

[5]. The SOC variation with respect to the improvement in percentage and temperature was analysed. An experimental setup is developed and test the EV through a parking garage standard outlet and the performance of SOC has been studied under different temperature condition.

II. LITERATURE SURVEY

Electric Vehicle: Literature Review of Technology Cost & Carbon Emission

This paper aims to inform the debate over how electric vehicle technology could fit into a lower-carbon 2020–2030 new vehicle fleet in Europe by collecting, analyzing, and aggregating the available research literature on the underlying technology costs and carbon emissions.

It concentrates on the three electric propulsion systems: battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), and hydrogen fuel cell electric vehicles (HFCEVs). The authors project that the costs of all will decrease significantly between 2015 and 2030:PHEVs will achieve -e about a 50% cost reduction, compared with approximate cost reductions of 60% for BEVs and 70% for HFCEVs.Greenhouse gas (GHG) emissions and energy demand for electric and conventional vehicles are presented on a well-to-wheel (WTW) basis, capturing all direct and indirect emissions of fuel & electricity production and vehicle operation. The authors find that carbon emissions of BEVs using European grid-mix electricity are about half of average European vehicle emissions, with HFCEVs and PHEVs having a lower emissions reduction potential. A lower-carbon grid and higher power train efficiency by 2020 could cut average electric vehicle emissions by another third.

However, reductions in costs and CO2 emission will not be achieved without targeted policy intervention. More stringent CO2 standards, as well as fiscal and non-fiscal incentives for electric vehicles, can help the electric vehicle market grow and costs fall. Such efforts should also be get combined with efforts to decarbonize the grid, or emission reductions will not be as great as they could be. Although the analysis is focused on Europe, similar technology, policy, and market dynamics can be observed in electric-vehicle markets throughout North America and Asia causes.

A Model for Smart agriculture using IOT

The application of renewable sources such as solar photovoltaic (PV) to charge electric vehicle (EV) is an interesting option that offers numerous technical and economic opportunities. By combining the emission-free EV with the low carbon PV power generation, the problems related to the greenhouse gases due to the internal combustion engines can be reduced. Over the years, numerous papers, include- ding several reviews works, have been published on EV charging using the grid electricity. However, there seems to be an absence of a review paper on EV charging using the PV as one of the energies sources. With growing interest in this topic, this review summarizes and updates some of the important aspects of the PV-EV charging. For the benefit of a wider audience, it provides the background on the EV fundamentals, batteries and a brief overview on the PV systems. Two types of PV-EV charging, namely the PV-grid and the PV-standalone, are comprehensively covered. Moreover, a case study is carried out in comparison to the grid-only charging to critically analyse the technical and the economical feasibilities of both types using MATLAB simulation. At the end, recommendations and future directions are presented. It is envisaged that the material gathered

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in this paper will be a valuable source of information for the researchers working on this topic.implemented the system "Real Time Bus Tracking System".

III. METHODOLOGY

The Present electric car has the variation in the battery charging and discharging, due to losses in the power supply. Thus, run time and efficiency of the electric car is reduced. Frequent battery charging station is required for charging the battery. The loading capacity of the electric car is less because of less power rating of driving motor. In the proposed project, with the batteries, MG-Set, and the control circuit as the three significant parts of the car, there are many benefits of these vehicles in comparison to the gasoline-powered cars and rechargeable electric car. In this auto recharge electric car, dual batteries are used for power supplying the motor generator set. From the motor generator set it is connected to voltage regulator circuit for supplying the constant power to driving motor as well as to battery charging. By this process the perpetual energy loop is produced. Pic microcontrollers are used for switching the dual battery by using the two-channel relay, voltage sensors are used for continuous monitoring the voltage across the dual battery. By this process the efficiency and millage of the electric car is high compared to gasoline-powered cars and rechargeable electric car. In future these will be able to soon replace the gasoline vehicles and rechargeable electric cars.

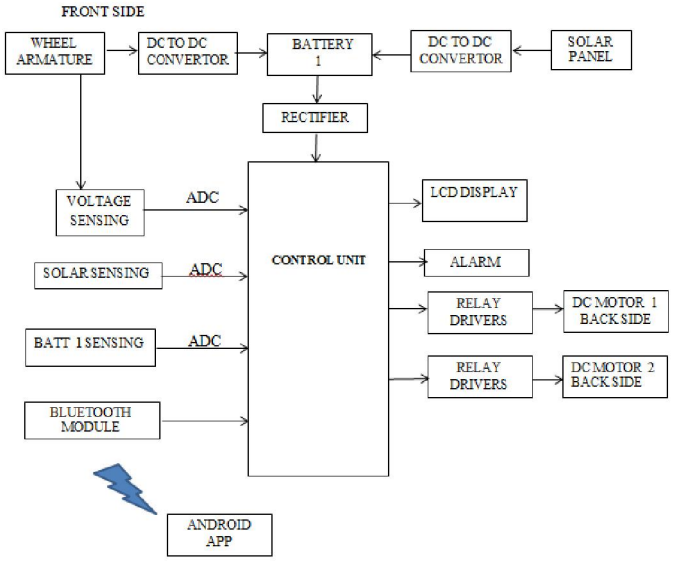

Fig. 1. Block Diagram

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PIC18f4520 Microcontroller

Data Memory up to 4k bytesn Data register map - with 12-bit address bus 000-FFF Divided into 256-byte banks.

- There are total of F banks.
- Half of bank 0 and half ofbank 15 form a virtual (oraccess) bank that is accessibleno matter which bank isselected – this selection isdone via 8-bits.
- Program memory is 16-bits wide accessed through a separate program data bus and address bus inside the PIC18.
- Program memory stores the program and also static data in the system.
- On-chip External
- On-chip program memory is either PROM or EEPROM.
- The PROM version is called OTP (one-time programmable PIC18C) The EEPROM version is called Flash memory (PIC18F).

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- Maximum size for program memory is 2M n Program memory addresses are 21-bit address starting at location 0x000000.

Fig. 2.PIC18f4520

LCD Display

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD.

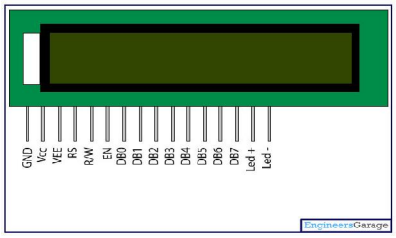

Fig. 3. LCD Display

Lead Acid Battery

These Lead acid batteries are the most common large-capacity rechargeable batteries. They are very popular because they are dependable and inexpensive on a cost-per-watt base. There are few other batteries that deliver bulk power as cheaply as lead acid, and this makes the battery cost-effective for automobiles, electrical vehicles, forklifts, marine and uninterruptible power supplies (UPS). Lead acid batteries are built with a number of individual cells containing layers of lead alloy plates immersed in an electrolyte solution, typically made of 35% sulphuric acid (H2SO4) and 65% water (Figure 1). Pure lead (Pb) is too soft and would not support itself, so small quantities of other metals are added to get the mechanical strength and improve electrical properties. The most common additives are antimony (Sb), calcium (Ca), tin (Sn) and selenium (Se). When the sulphuric acid comes into contact with the lead plate, a chemical reaction is occurring and energy is produced.

Fig. 4.Lead Acid Battery

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Relay Board

Relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism mechanically, but other operating principles are also used. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal. A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and most have double throw (changeover) switch contacts as Shown in diagram.

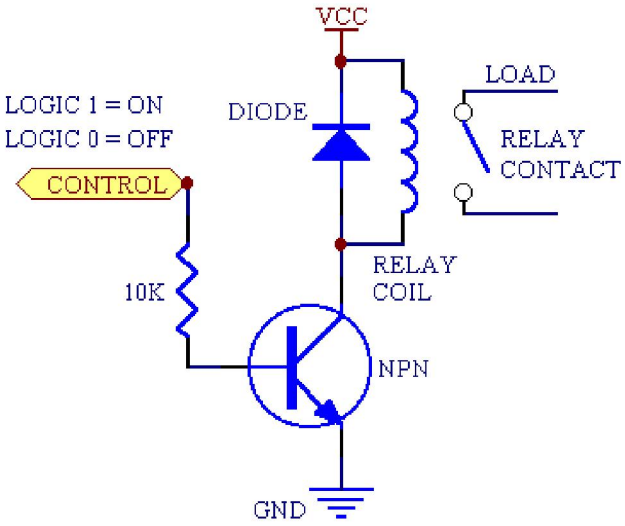

Fig. 5.Relay Driver Circuit

Armature

The armature is the winding (or set of windings) of an electric machine which carries alternating AC current.[1] The armature windings conduct AC even on DC machines, due to the commutator action (which periodically reverses current direction) or due to electronic commutation, as in brushless DC motors. The armature can be on either the rotor (rotating part) or the stator (stationary part), depending on the type of electric machine. The armature windings interact with the magnetic field (magnetic flux) in the air-gap; the magnetic field is generated either by permanent magnets, or electromagnets formed by a conducting coil.

The armature must carry current, so it is always a conductor or a conductive coil, oriented normal to both the field and to the direction of motion, torque (rotating machine), or force (linear machine).The armature's role is twofold. The first is to carry current across the field, thus creating shaft torque in a rotating machine or force in a linear machine. The second role is to generate an electromotive force (EMF).

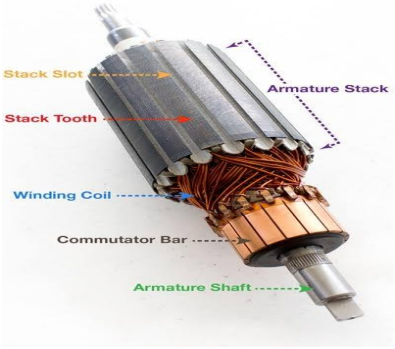

Fig. 6.Armature

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IV. CONCLUSION

In the proposed project, with the batteries, MG-Set, and the control circuit as the three significant parts of the car, there are many benefits of these vehicles in comparison to the gasoline-powered cars and rechargeable electric car.Hybrid recharging mechanism based on renewable energy sources (both solar and wind) is proposed for electric vehicles. The current charging mechanism directly affects the wide usage of EVs. To overcome this difficulty a new hybrid renewable charging mechanism is proposed for EVs. Lastly, we conclude that this system decreases the complete time for travelling and increases the EVs usage thus creates an unpolluted environment. It is cleaner and more efficient.

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