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# ELECTRIC VEHICLE BATTERY BOOSTER WITH REGENERATIVE SYSTEM

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## ABSTRACT

Electric vehicle technology offers promising solutions to ensure fuel saving and emission reductions. The main disadvantages of electric bikes include their limited range and their high price. While they are more expensive than conventional bikes, they're also environmentally friendly. A DC–DC boost converter is introduced in the system in order to minimize the voltage and size of the battery source. The boost converter maintains a 24V DC voltage, at 8V DC battery. The boost converter is a DC-to-DC converter designed to perform the step-up conversion of applied DC input. In the Boost converter, the supplied fixed DC input is boosted to adjustable DC output voltage. So The vehicle traveling distance will be increasing and all so reduce the power conception in this process. Regenerative brakes work by reversing electric motors that propel a bike. It works like a generator and feeds energy back into the hybrid or electric system to help replenish a little bit of range. These small boosts in battery range can accumulate and improve efficiency over time when used regularly. In this regenerative and booster will be used in this system.

***Keywords***: Dc to Dc Buck Booster, Motor Controller, EV Motor, Battery, Alternator.

## I.INTRODUCTION

Electrical vehicle technology offers promising solutions to ensure fuel saving and emission reductions. One of the major consumers of fossil fuels is the transportation sector electric vehicle regenerative system and minimizes the battery. Electric bikes include their limited range and their high price they are negatives of electric vehicle. While they are more expensive than conventional bikes, they're also environmentally friendly. A DC–DC boost converter is introduced in the system in order to minimize the voltage and size of the battery source. The boost converter is a DC-to-DC converter designed to perform the step-up conversion of applied DC input. In the Boost converter, the supplied fixed DC input is boosted to adjustable DC output voltage. So The vehicle travelling distance will be increasing and all so reduce the power conception in this process.

## II.LITERATURE SURVEY

This paper presents solar based electric vehicle (EV) charging circuit. Incremental Conductance MPPT Algorithm is used to extract maximum power from the solar PV at STC conditions. A battery of rating 100AH is charged with the solar PV panel using a boost converter which ion according to 220 V battery requirement. The SOC characteristic is observed to be fully charged within short period. The passive parameters (filter components on the input and output) of the system are derived and appropriately used in the work. Also in the absence of solar PV energy, electric vehicle is charged from the grid. A PR (proportional plus resonant) controller is used with a corner frequency of 10rad/sec. A 400 V dc output voltage is obtained through a H-bridge rectifier and applied to a DC-DC bidirectional converter. It is observed that the battery SOC is accomplished within a small period. During charging and discharging modes the battery voltage and current is presented. It is clear that the grid voltage and current are in phase during charging. During discharging they are said to be out of phase indicating the reverse power flow. IGBT switches are considered to be operating at 10 kHz. On-board electric vehicle chargers can be utilized at homes and parking places. The work reflects the usage of EV connected to solar exhibits less dependency on the grid with clean (zero emission) and smooth movement of the vehicle. The PV array is tested under standard test conditions, the Current-Voltage and a Power- Voltage characteristic of the solar PV is obtained. Passive filter parameters design methodology is presented. The solar PV is designed to produce the output voltage of 200V which is stepped to 400 V using a boost converter. The output voltage is filtered and this filtered voltage is step down according to EV Battery charging requirements by using a buck converter.

## III.EXISTING SYSTEM

This project presents solar based electric vehicle (EV) charging circuit. Incremental Conductance MPPT Algorithm is used to extract maximum power from the solar PV at STC conditions. A battery of rating 100AH is charged with the solar PV panel using a boost converter which generates output voltage of 400V. Then the voltage is stepped down for buck operation according to 220 V battery requirements. The SOC characteristic is observed to be fully charged within short period. The passive parameters (filter components on the input and output) of the system are derived and appropriately used in the work. Also in the absence of solar PV energy, electric vehicle is charged from the grid. A PR (proportional plus resonant) controller is used with a corner frequency of 10rad/sec. A 400 V dc output voltage is obtained through a H-bridge rectifier and applied to a DC-DC bidirectional converter. It is observed that the battery SOC is accomplished within a small period. During charging and discharging modes the battery voltage and current is presented. It is clear that the grid voltage and current are in phase during charging.

Solar Energy can be utilized for electric vehicle (EV) battery charging applications in urban areas. Hence the burden on the grid gets reduced when EV's are directly integrated to the solar charging stations . Therefore, in this work, a solar power based EV charging is proposed. the electric vehicle charging with solar PV, the electric vehicle charging with grid as well as with the solar PV . In the day time the electric power generated by the solar PV is utilized to charge EV. In absence

of the solar PV power, the electric vehicle is charged with the power grid.

## IV.PROPOSED SYSTEM

Electrical vehicle technology offers promising solutions to ensure fuel saving and emission reductions. One of the major consumers of fossil fuels is the transportation sector. In recent years, the development of electric vehicles (EVs) has provided a means to reduce air pollution and Depletion of conventional carbon energy sources. Therefore, EV is more suitable for the current environment Than the conventional fuel vehicle . In this context, inter- Ests in EVs has increased in the scientific community. Most Of the existing literature focuses on the social benefit and ne Glects the benefits to the EV owner . Considering the Economic benefits of EVs to consumers are conducive to Promote the transformation of the automobile industry and To increase energy savings and environmental protection Minimize the limitations of fossil fuels and are preferred for pollution-free transportation. They Employ battery banks, power electronic converters, and controllers to drive the electric motor. Which makes them eco-friendly and zero-emission vehicles.

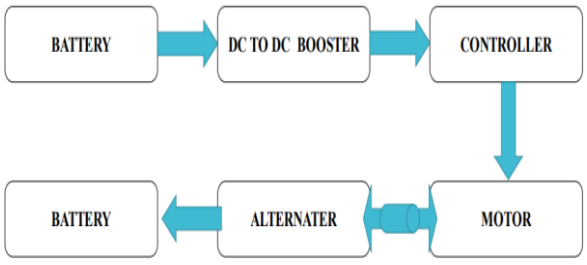


**Figure1.1 Proposed system**

### A.Using Buck Booster

The dc to dc buck booster introduced in this paper. A boost converter is a DC-to-DC power converter that steps up voltage from its input to its output. The DC-DC buck booster using to increasing battery voltage at 12 volt to 85 volt. A buck-boost converter is commonly used to create a constant DC output voltage and boost the input voltage. A DC–DC converter is employed to boost the battery voltage in order to minimize the voltage rating and size of the source battery. In a boost converter, the output voltage is always higher than the input voltage. The overall efficiency of the system is 93% can be achieved through the dc to dc converter. A buck-boost converter produces a DC output voltage that can be either bigger or smaller in magnitude than its DC input voltage. As its name suggests, it combines the functions of a buck converter and a boost converter.

### B. Low Power Battery

In this system minimize the battery size, minimize the weight, minimize the cost, increase travel distance, save the electricity and all so minimize the battery voltage. The electric vehicle commonly runs at 48V battery pack, but in this method using only at 12V battery pack.

The advantage of these rechargeable batteries is there are very lightweight batteries. Time for a 18650 cell is typically about 4 hours but can vary with different voltage and amperage of the charger you're using. Most modern 18650 batteries have a typical cycle life of 300 – 500 (charge, discharge cycles).

### C. Using Regenerative System

Regenerative braking energy and sending it right back to EV's battery pack can extend your driving range. The 12 Volt dc alternators will be using this system. The alternator couple the electric vehicle motor .the power will be producing. The power will be storing. Both brushed and brushless DC motors can be operated as generators. These 12V DC Motors can also be designed for applications that require different voltages, such as 24 Volts, 36 Volts, and others up to 180 Volts. A brushed DC motor is appropriate for generator applications requiring a DC voltage output, while a brushless DC motor is suitable for AC voltage applications.

## V. Working principle of regenerative

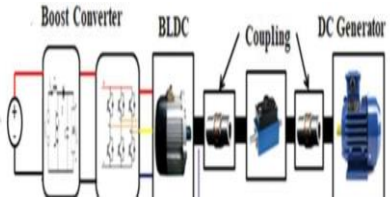


**Figure1.2: Motor and alternator couple**

In this system the battery output will be connect the dc to dc buck booster input , the dc to dc buck booster increasing the battery voltage higher then input voltage . the dc to dc buck booster to get the output the booster output will be provide in dc motor controller. The controller provide the power to the motor and always control the speed. The motor will couple the alternator . the motor will be run the alternator produce the power . the power will be store the battery are otherwise the power using on the time for electric vehicle lights, mobile charging, and using another purpose.

## VI. RESULT AND ANALYSIS

### A. Buck booster system

A DC–DC boost converter is introduced in the system. The dc to dc booster main concept has been order to minimize the size of the battery source. The boost converter maintains a 24V DC voltage, at 8V DC battery. The boost converter is a DC-to-DC converter designed to perform the step-up conversion of applied DC input. In the Boost converter, the supplied fixed DC input is boosted to adjustable DC output voltage. So The vehicle travelling distance will be increasing and all so reduce the power conception in this process. In this system minimize the battery size, minimize the weight, minimize the cost, increase travel distance, save the electricity and all so boost or increase the battery voltage. The electric vehicle commonly runs at 48V battery pack and above 48V battery pack, but in this method using only at 12V battery pack. The purpose of this project is electric vehicle running at low battery pack, low battery size , travelling distance high, electricity bills. Reliability, affordability, driving range, range prediction, charging station availability, overall trip time and especially convenience of long range travel and comfort. A DC–DC converter with a low-voltage battery is a good choice for EV applications.

## B.Regenerative System

Regenerative braking is a mechanism found on most hybrid and full-electric vehicles. It captures the kinetic energy from braking and converts it into the electrical power that charges the vehicle's high voltage battery. Regenerative braking also slows the car down, which assists the use of traditional brakes. Regenerative brakes are becoming a more

common Some of the advantages they are Improved electric range – by retaining, converting and repurposing kinetic energy into charging the battery, fuel usage is reduced and range extended.

4.Regenerative braking is a mechanism found on most hybrid and full-electric vehicles

## VII. CONCLUSION

This project is based on electric vehicle regenerative system and minimizes the battery. Electric bikes include their limited range and their high price they are negatives of electric vehicle. While they are more expensive than conventional bikes, they‘re also environmentally friendly. A DC–DC boost converter is introduced in the system in order to minimize the voltage and size of the battery source. The boost converter maintains a 24V DC voltage, at 8V DC battery . The boost converter is a DC-to-DC converter designed to perform the step-up conversion of applied DC input. In the Boost converter, the supplied fixed DC input is boosted to adjustable DC output voltage. So The vehicle travelling distance will be increasing and all so reduce the power conception in this process.

## FUTURE SCOPE

The new system become useful if the below enhancement are made in future

1.Improve battery safety for electric vehicles

2.a lithium-air battery that increase the range of electric vehicles. The new design could replace lithium-ion (Li-ion) batteries they will good.

3.The inductive wireless charging system. The wireless transmission is possible by mutual induction and creating the magnetic field between the receiver coil and the transmitter coil.

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