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Design and Planning of PV Based DC-DC Converter Topologies for Electric Vehicles, by Using Super Capacitors

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ABSTRACT: This design and evaluation ofdifferent from one another; of different kinds or sortsDC-DC converter topologies for Battery Electric Vehicles (BEVs) and Plug-in Hybrid Electric Vehicles (PHEVs). The process of making plans for something. and evaluation ofthese converter topologies are presented, analyzed and compared in terms of output power, component count, switching frequency, electromagnetic interference (EMI), losses, effectiveness, reliability and amount of money expected. The proposed method is grid connected electric vehicle applications, When electric vehicles are connected to the piece of equipment provided for a particular purpose.grid for charging, they become grid able EVs (GEVs), A bi-directional DC-DC converter is connected continuing with the grid, which minimizes the switching losses and improves the efficiency of the system. The proposed bi-directional, capacitor less EV charger consists of grid type capacitor, resonant bi-directional converter, grid selector, load and battery. The grid type capacitor acts to some extentgrid which stores power and also supplies power whenever needed. It is connected to a bi-directional DC-DC converter, which reduces the switching losses, thereby improves the efficiency of the proposed system. However, the Sinusoidal Amplitude Converter, the Source DC-DC converter for that reasonboost DC-DC converter with resonating chamberare more suitable for low-power and PHEVs because oftheir soft switching, noise-free operation, low switching loss and high efficiency.

KEYWORDS*:* Ultrafast charging, super capacitor, Regenerative braking**.**

I. INTRODUCTION

Vehicles are shaping human civilization forcentenaryof years and expanding their horizons beyond couplet localized communities and automobiles are the most prominent in rankmodern to some extent this vehicle transportation. The increasing usage of conventional automobiles is causing harm to the environment and human life, as these automobiles burn petrol, diesel or gas and produce CO2 sulphur dioxide and oxides of nitrogen as harmful exhaust components. In the EU, the transportation sector is in charge of approximately 1 / 4 of greenhouse emission (GHG) emissions as illustrated in While GHG emissions from other sources were decreasing by GHG so as to beat the charging and therefore the range limitation problem, the corporate Better Place is proposing to quickly exchange the vehicle battery in exchange stations. this needs to style all electric vehicles during a similar manner, in order that the battery might be automatically exchanged. Also altogether vehicles an equivalent or only a really limited number of various battery types are often installed so as to limit the amount of batteries, that has got to get on hand within the exchange stations. Furthermore, to avoid an accumulation of batteries, a system for distributing the batteries between the exchange stations is important. In total more batteries are necessary since besides the batteries within the vehicles also batteries within the exchange stations, which are recharged during the vehicle batteries are used for driving, are necessary an alternative choice to beat the charging and range limitation, are ultra-fast charging stations, which permit to refill the batteries within a couple of minutes. With this idea, the vehicle battery is meant just for a limited range of in order that the quantity and weight of the battery might be reduced and therefore the golf range is extended by the short recharging process. C.Nagarajan et al [3,7,10] have developed the battery technologies supported lit It enable an ultra-fast charging of up to also as high cycle numbers within the range of several thousand They shown

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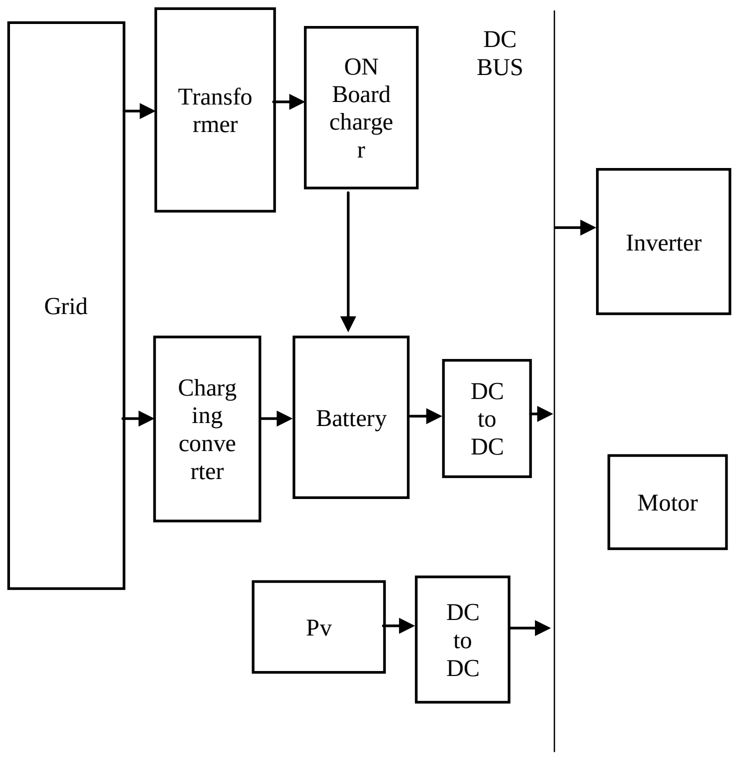
system consists of a bidirectional isolated AC-DC input stage, which allows to charge the stationary storage system also on feedback energy to the grid, and a unidirectional high power DC-DC converter system for ultra-fast charging of EV's. With the intermediate battery storage system, the energy necessary for the ultra-fast charging is provided, in order that power pulsations of the grid are avoided. Furthermore, the intermediate accumulator are often utilized in the context of smart grid applications also on connect and buffer energy gained for instance by PV elements. thanks to the upper energy capacity of the intermediate accumulator compared to the vehicle battery, also the ultrafast charging process of the vehicle battery doesn't exceed a maximum discharge current of per cell of the intermediate accumulator. during this way, an extended life time of the stationary battery might be achieved. The efficiency can further be increased by reducing the specified blocking voltage of the semiconductor devices. There are several strategies to scale back the voltage stresses of the semiconductor devices. Different sorts of three level converters just like the neutral point clamped and therefore the flying capacitor converter are presented during a novel strategy by introducing a splitting of the input voltages as for instance shown in figure is proposed. The reduced operating voltage enables to use MOSFETs with a lower blocking voltage. This leads to a discount of the conduction and switching losses, in order that the facility density might be increased.

II. BLOCK DIAGRAM



C.BLOCK DIAGRAM EXPLANATION

Energy source might require a selected dc-dc converter to be integrated into the high voltage (HV) dc link of the powertrain. For bidirectional electric sources like SCs and batteries, bidirectional dc-dc converters are essential to soak up the regenerative braking energy, which maximizes the general efficiency of the system. However, these bidirectional sources even have different requirements for the connected DC-DC converters. for instance, thanks to the fast charging and discharging capability of (SCs), a fast-dynamic controlled converter is required to avoid incompatible operations. A DC-DC converter with alittle number of passive components is preferable when the energy source is, to

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reduce transition intervals between the charging mode and therefore the discharging mode, which is usually around a couple of microseconds.

D.FAST CHARGING CONVERTER:
The charging station consists of a converter connecting grid to a DC bus where EVs get connected through battery chargers. The control of individual vehicle charging process is decentralized and a separate control is provided to affect the facility transfer from DC grid to the DC bus. An energy management strategy supported optimal power flow is additionally proposed by integrating A battery generation system with charging station to alleviate the impact of fast charging on the grid. The combined system along side the facility output of EV fleet batteries available at the charging station reduces internet energy provided by the grid, thereby decreasing the general load on the grid also as minimizing the conversion.

E.BATTERY: A constant voltage charger is essentially a DC power supply which in its simplest form may contains a step down transformer from the mains with a rectifier to supply the DC voltage to charge the battery. Such simple designs are often found in cheap automobile battery chargers. The lead-acid cells used for cars and backup power systems typically use constant voltage chargers. additionally, lithium-ion cells often use constant voltage systems, although these usually are more complex with added circuitry to guard both the batteries and therefore the user safety. Electric vehicles (EVs) are alleviated by the introduction hybrids (HEVs) and connect hybrids (PHEVs) and therefore the development of upper energy density batteries capable of storing more energy within the same space. With the increasing popularity of electrical vehicles, "range anxiety" is now being replaced by "charging anxiety". This page addresses the problems related to providing suitable chargers and therefore the charging infrastructure necessary to support the growing population of EVs.
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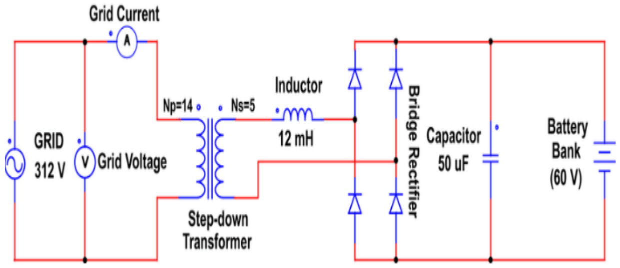

Battery Charging Circuit Diagram

F. DC TO DC CONVERTER:
Power semiconductor and energy efficiency technologies are continually developing and dealing on the simplest solutions for your applications. We are creating new system architectures using state-of-the-art IC and power semiconductors. As a DC-DC converter manufacturer, switch mode power supply (SMPS) has been our business for many years, including the fine regulation of DC, also referred to as DC-DC (or DC to DC) conversion. within the area of DC-DC power supply we provide different DC-DC converters and solutions. Bi-directional converters using coupled inductor were introduced for soft-switching technique with hysteresis current controller For minimizing switching losses and to enhance reliability, zero-voltage-switched (ZVS) technique and zero-current-switched (ZCS) technique were introduced for Bi-directional converter A multiphase Bi-directional converter is suitable for top power application. to realize high voltage rating or current rating more number of converters are often connected serial or parallel with low switching frequency .A unified current controller was introduced for Bi-directional dc-dc converter which employs complementary switching between upper and lower switches.

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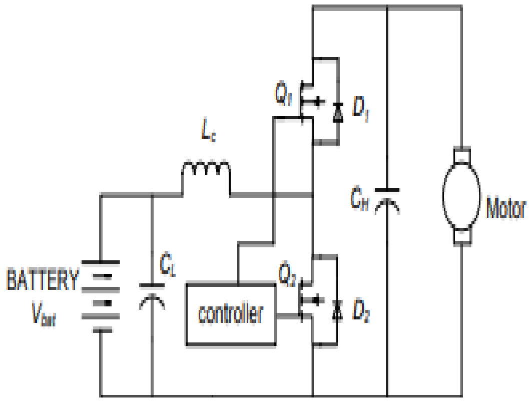
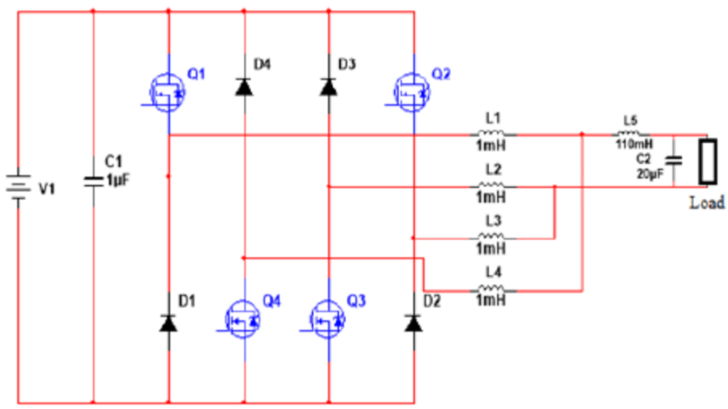


Bidirectional DC to DC Converter

G INVERTER:

DC battery and someone taps you on the shoulder and asks you to supply AC instead. How would you are doing it if all the present you produce flows call at one direction, what about adding an easy switch to your output lead? Switching your current on and off, very rapidly, would give pulses of DC which might do a minimum of half the work. to form proper AC, you'd need a switch that allowed you to reverse the present completely and roll in the hay about times every second. Visualize yourself as a person's battery swapping your contacts back and forth over 3000 times a moment. In essence, an old-fashioned mechanical inverter boils right down to a switching unit connected to an electricity transformer



Inverter Circuit Diagram

If you've studied our article on transformers, you'll know that they are electromagnetic devices that change low-voltage AC to high-voltage AC, or vice-versa, using two coils of wire (called the first and secondary) wound around a standard iron core. during a mechanical inverter, either an electrical motor or another quite automated switching

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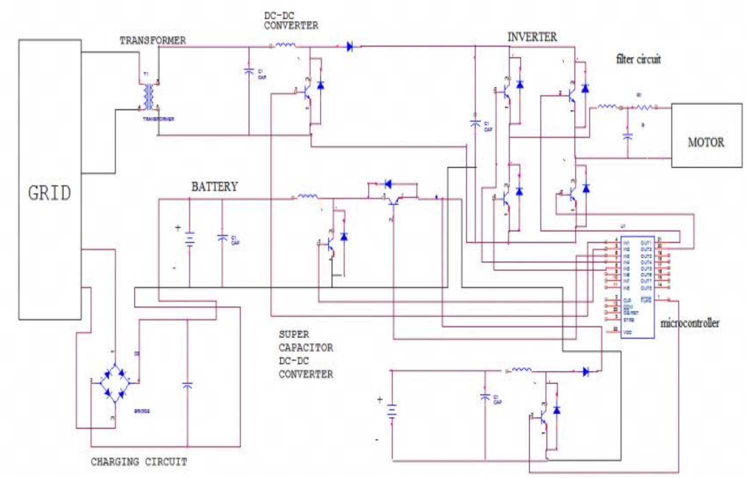
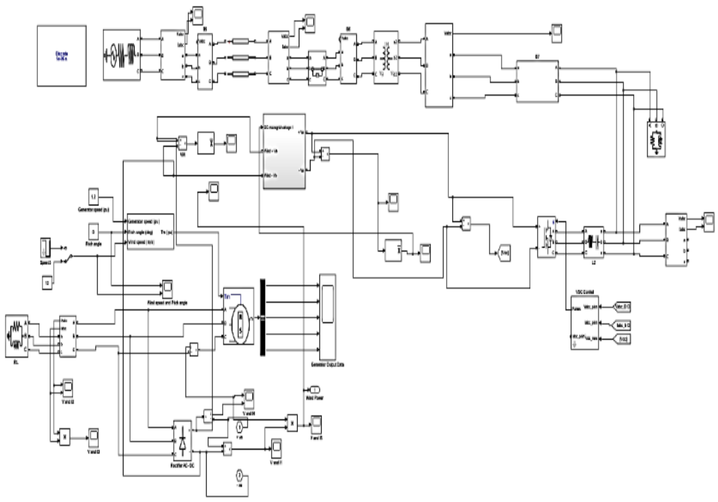
H.CIRCUIT DIAGRAM



The modified voltage is converted to the AC with the usage of the rectifier circuit. The voltage analyzer circuit is varied the output for stability of output load. Finally, the inverter converts the voltage for consumer load purposes. It also compensation is predicated on DQ analysis. This system efficiently transfers the facility from high efficiency with none losses.

III. MATALB SIMULATION OUTPUT OF DC-DC CONVERTER TOPOLOGIES FOR ELECTRIC VEHICLES, PLUG-IN HYBRID ELECTRIC VEHICLES AND FAST CHARGING STATIONS



The present modeling approach of a Mat lab-based toolbox for developing and testing the Control technique under various operational conditions. The proposed model is development in mat lab environment

J.LOAD WAVEFORM Represent the load side voltage and current for the renewable energy generation. The synchronous grid voltage is with reference to time.

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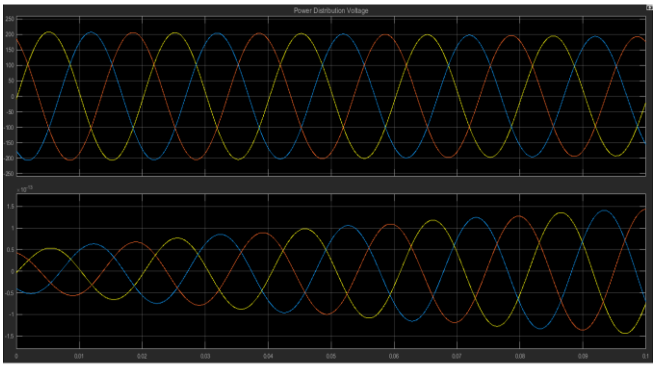
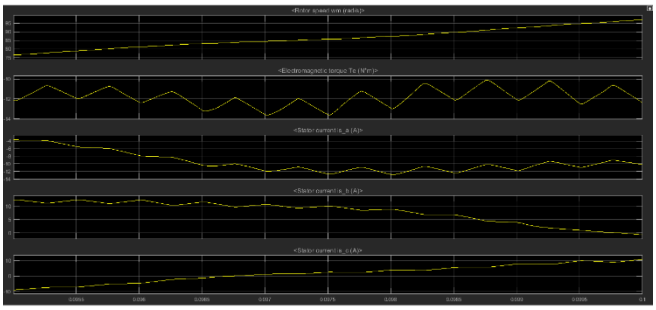


K.MOTOR WAVEFORM



IV. CONCLUSION

very first time, this method presents the state of art reviews of the design and evaluation of DC-DC converter topologies for BEV and PHEV powertrains and converter topologies for FCHARs, including future trends of research. This review has given a focus on multiple performance features, such as output power, component count, switching frequency, electromagnetic interference (EMI),losses activeness, cost and reliability which directly influence the selection of a particular DC-DC converter for respective BEV and PHEV powertrains. This method will also guide automotive engineers and PE converter designers to select passive components precisely based on powertrains demand. DC-DC boost converters face switching loss problems. To overcome that, soft switching DC-DC converter topologies are utilized. In general, boost converter lossesoccur due to hard switching, but in soft switching configuration, switching losses are eliminated by forcing voltage or current to zero during the switching transition

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