iJRASET
International Journal For Research in Applied Science and Engineering Technology



# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

**Volume:** 8 **Issue:** V **Month of publication:** May 2020

**DOI:** http://doi.org/10.22214/ijraset.2020.5489

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
*ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429*
*Volume 8 Issue V May 2020- Available at www.ijraset.com*

# Electric Vehicle on Road Dynamic Charging

Prajakta Chaudhari [1], Gayatri Kinholka[2], Jayashri Sonawane[3], Dr. N. N. Ghuge[4]
[1, 2, 3]*Students,* [4] *Head of Department, Department of Electrical Engineering BSIOTR, Wagholi Pune-412207, India*

***Abstract:*** ***Cross types renewable electric energy technology system becomes essential to be able to the most of electric powered networks and the stand-alone systems like the electric power vehicles systems. The green sources usually required storage space system as a result of change inside the power outputs throughout the day. Due to increase throughout demand of batteries, typically the charging means of battery program needed to be nicely managed through an adaptable controlled energy managing program. Within this paper a stand alone system using photovoltaic, Suggestions AC supply and storage space batteries are contributed throughout supplying the desired insert of electric vehicles and even the charging balance associated with batteries is achieved by simply using techniques to boost battery charging controller functionality.***

***The main goal associated with this project is in order to design and implement a great integrated smart artificial control mechanism, this controller is accountable for controlling both typically the battery charge voltage making use of the boost converter plus the other controller is definitely to control the getting current of the battery power through DC to POWER converter.***

***In this task, a hybrid system involving photovoltaic Solar Supply power generator with Input Ac in order to generation of DC plus controlling the Grid Harmonization of both supply in addition to storage batteries are put together to supply the essential load. A good battery battery charger controller is used in the following paragraphs to increase the life span of the storage electric batteries.***

***Keywords: Electric Road Systems; sustainable freight transport; life-cycle assessment; E-freight; Strategic Sustainable Development; electric vehicles ,etc.***

## I. INTRODUCTION

The particular electrified road works by simply transferring energy from the particular rail through the moveable supply on the bottom of your electric car or pick up truck. As the vehicle goes over the rail, the particular arm detects its area and moves into exposure to it.

When overtaking, the particular arm automatically raises. The particular rail is connected in order to the power company plus divided into sections which might be only powered when automobiles move over them. Power consumption of each motor vehicle passing over the track is calculated by typically the system, enabling electric expenses to be charged to be able to each user. The hot road has been trilled applying electrified trucks that have got been developed as component of the project. "Sweden is at the leading edge of this technology, which in turn we have now expect to introduce in some other aspects of the country and even the world. "The benefits of electrifying roads is the fact existing infrastructure can have got its energy consumption and even carbon emissions reduced along with minimal modification.

### *A. Objectives*

*1)* The intelligent highway that uses electrified road which recharges the batteries of vehicles driving on it.
*2)* It works by connecting the vehicles to the electrified road rails.
*3)* The road rails are powered by solar panel and power grid.
*4)* Using a movable arm that transfer the power from rails to the vehicles batteries.

## II. LITERATUR SURVEY

### *A. Background Study*

Steam powered car and gasoline car used before the electric vehicle At the 1924 automobile shows no electric car where displays in 1886 electric vehicle with battery 28 cells and small motor was introduce in England in 2013 South Korea to create electromagnetic field for wireless power transmission also china is testing intelligent highway using solar panel. The world first Electric vehicle on road dynamic charging is developed by Sweden in Dec.2017

©IJRASET: All Rights are Reserved

*B. Related Work*

Karen et al (1999) presented a simulation and modeling package developed at Texas A&M University. They also discussed the methodology for designing vehicle drive trains. The theory analysis 21 mathematical models of EV are first found out supported the vehicle dynamic characteristics, then the entire system is split into seven function blocks according to power flow, the simulation models are formed in the MATLAB language. The simulation results are verified during a PDM AC-AC converter, which shows that the suggested method is suitable for EV. He showed that the motor unit acts as generator during the regenerative braking. He used an easy power management algorithm within the power management controller he designed for the vehicle.

## III.PROPOSED SYSTEM

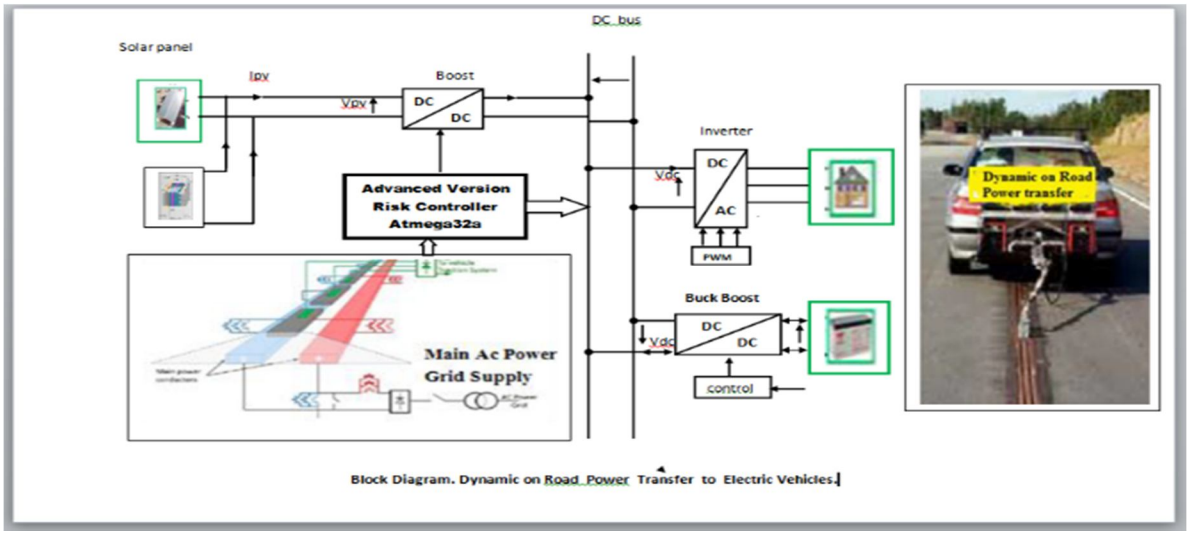



Fig.1 Proposed System

## IV.WORKING PRINCIPLE

Typically the hybrid energy system offered in this article is made up of three renewable sources solar, wind generation and gasoline cell with storage battery pack system. Its concluded of which the coupling of the pv system and wind electrical generator with fuel cell is definitely well interesting to assure the production of electric powered energy throughout the season. The studied configuration associated with the product is architecture together with a DC bus. This kind of model is to preserve the state of cost of the battery standard bank (SOC) constant as you can to be able to prevent blackout and in order to extend the life period of batteries regardless the particular variations in solar irradiance and wind speeds. Typically the hybrid power system beneath study in this content is represented in Fig.

The particular rule of control would be to keep up the eco friendly voltage sources to get equivalent to the ac electricity at the DC shuttle bus even in case associated with different types of sunlight irradiance and even wind speed. And furthermore to control the process associated with battery charging considering typically the charging current for growing its lifetime. Various numerical models of photovoltaic generator that developed to signify the is nonlinear behavior.

The particular electrified road is split up into 50m sections, with a good individual section powered simply when an automobile is above this. Every time a vehicle stops, the particular current is disconnected. The particular system is able to be able to calculate the vehicle's vitality consumption, which enables electric power costs to get debited for every vehicle and user. Typically the "dynamic charging" - because opposed to the work with of roadside charging content - means the vehicle's batteries could be smaller, together with their manufacturing fees. A former diesel-fuelled vehicle owned by the strategies firm, Post Nord, is definitely the first to work with typically the road. Hans all, chief executive of the particular Road Arlanda holding behind the project, explained both current vehicles in addition to roadways could possibly be adapted to be able to take advantage of the particular technology.

In Sweden there are roughly half 1,000,000 kilometers of roadway, of which 20,000km are highways, “If we electrify 20,000km of highways which will definitely be enough,” he added. “The distance between two highways isn't quite 45km and electric cars can already travel that distance without having to be recharged. Some believe it would be enough to electrify 5,000km.”

On the cost of electrification is definitely said to be 55 times lower than that will needed to construct an city tram line.

©IJRASET: All Rights are Reserved



Fig.2 Working discretion of studied system

## V. MAIN ELEMENT OF INDUCTIVE POWER TRANSFER SYSTEM

The illustration identifying the major components of a system with regard to dynamic inductive power move to an Electric automobile is shown in Fig.

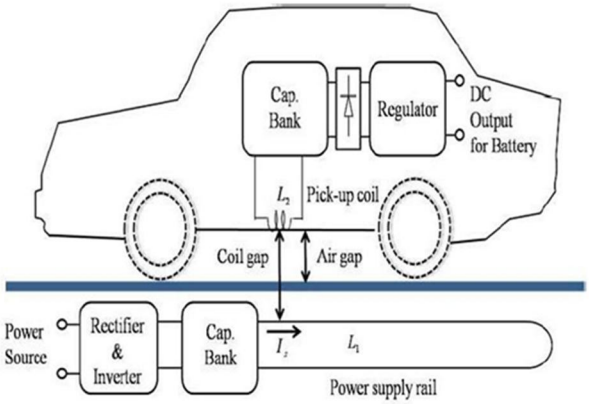



Fig.3 Power transfer to electrical vehicle

Typically the capacitor banks indicated within Figure usually are necessary in systems intended for contactless inductive power move due to the big air gap between your transmitting plus receiving coils. Because the big air gap causes a fairly low magnetic coupling between coils, only a portion of the magnetic discipline generated by a coils can contribute to the particular power transfer. Compared in order to a traditional transformer, this means that the magnetizing inductance becomes relatively low in addition to the leakage inductance turns into high. Consequently, the initiatory power transfer between the particular coils will consume a new significant amount of reactive power, which corresponds to be able to a significant phase switch between the voltage on the terminals of the shelves along with the current flowing within the coils. The reactive power required by the particular coils, and the equivalent reactive current, must become given by the origin and/or the load-side to be able to support the power move through the air gap. If this particular reactive power should become supplied by the strength converters on the sending and/or receiving sides, typically the required current rating and even resulting cost of the particular converters would increase correspondingly. Thus, the reactive strength is usually supplied by simply capacitors.

The capacitors are usually designed according to the equivalent inductance of the coils on each side of the system to obtain a specific resonance frequency, where the reactive power supplied. By the capacitors is equal to the reactive power consumed by the coils for inductive power Transfer. When the system is operated at this frequency, the resonance in the system will ensure that the currents at each side of the system can be kept in phase with the voltage (i.e. unity power factor operation), which eliminates the need for supplying reactive power from the converters in the system. The resonance between the coil inductance and the capacitors also reduces the equivalent impedance between the sending and receiving sides of the system, which is also helping to increase the power transfer capability compared to an un- compensated system.

©IJRASET: All Rights are Reserved

## VI. ADVANTAGES AND DISADVANTAGES

*A. Advantages*

*1)* Main advantages is that to reduces battery size.
*2)* Save charging time.
*3)* Ecofriendly to environment.
*4)* Reduction in fossil fuel usage.
*5)* Use of renewable energy.
*6)* Reduces carbon dioxide emission up to 90%.
*7)* It is a driver support system.
*8)* It is flexible, safe, and cost-effective.
*9)* The Driver can Sure to it goes long distance and it will reach to destination.
*10)* This system increases the life and efficiency of vehicle.

*B. Disadvantages*

*1)* The implementation of this project is difficult.
*2)* We should choose appropriate components to match different size of vehicles.

## VII. CONCLUSION

This paper has presented a general introduction to the electro-technical aspects of technologies for dynamic power transfer to moving vehicles. Thus, two general types of technologies have been reviewed and evaluated, based on:

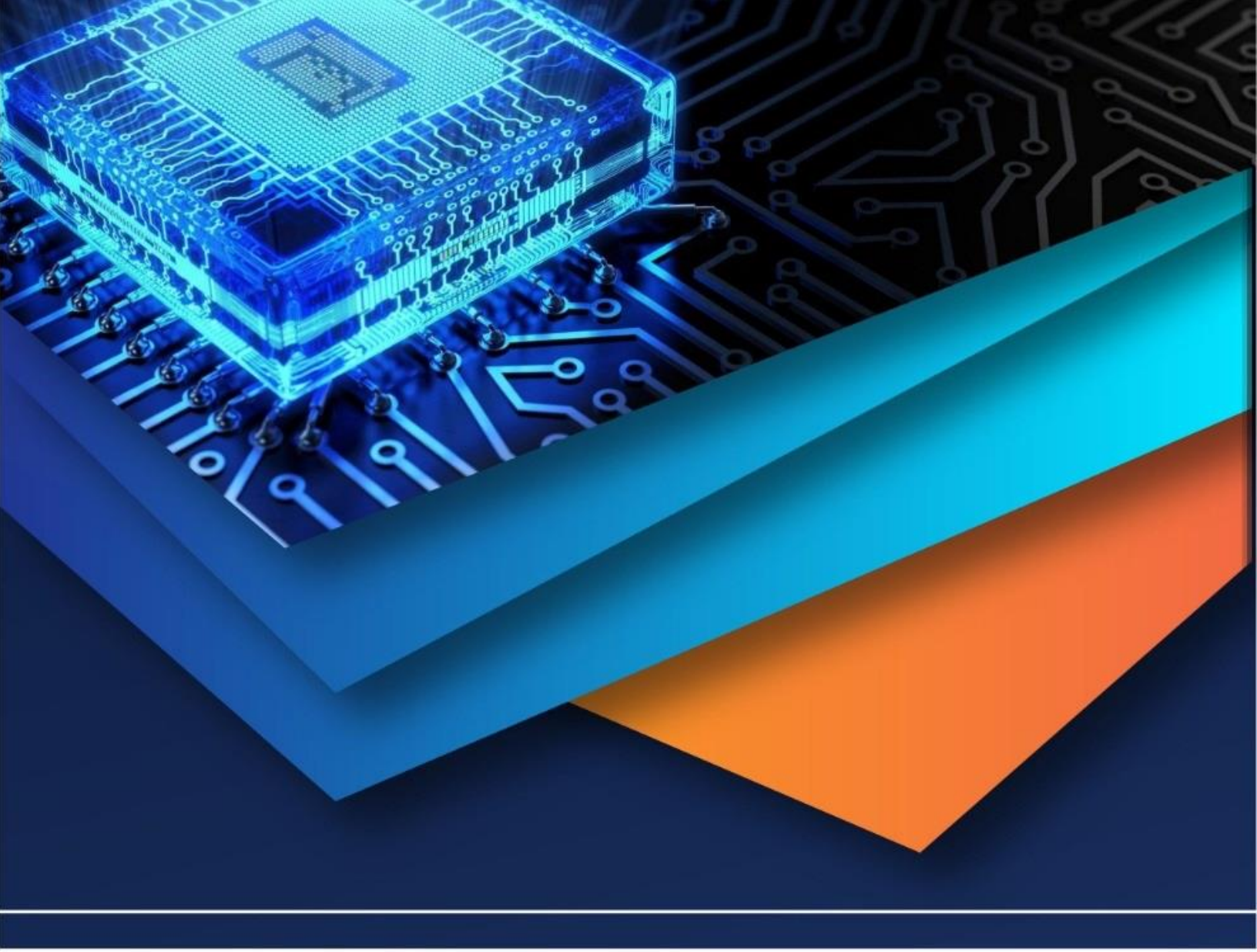
*A.* Conductive power transfer by sliding contacts
*B.* Contactless inductive power transfer by electromagnetic field
*C.* For conductive power transfer, three different concepts have been evaluated based on:
*D.* Overhead lines
*E.* Sliding contacts in the road surface
*F.* Sliding contacts at the side of the road

The power transfer capability to moving vehicles has been demonstrated in relevant environments for all these three concepts, and there are no concerns regarding the technical feasibility of transferring the power levels required for heavy duty freight transportation. Since power transfer from overhead lines is well established for trains and trolley busses, this concept is considered to have high technical maturity. Therefore from this project we using renewable energy sources, we reduce the carbon emission up to 90% in transportation sector

## REFERENCES

[1] Y.Liu, Z.Hu, Z.Zhang,J.Suoand K.Liang,“Research on the Three-Phase Photovoltaic Grid-Connected Control Strategy”, Energy and Power Engineering,2013,5,31-35
[2] C.Benachaibaa,Ahmed M.A.Haidarb, M.Hababa,O.Abdelkhaleka,“Smart Control of UPCQ with in Micro grid Energy System”, Energy Procedia,Elsevier6(2011),pp503–512
[3] S.kumar ,G .ravikumar, “A Seven-Level Grid Connected Inverter for Photovoltaic system”, International Journal of Computer Engineering in research trends volume1,issue6,December2014.
[4] J.Kimand O.Yang,“Design of a High-Efficient Grid-Connected Three-Phase Three-Level T- Type PV Power System”, International Journal of Control and Automation Vol.7,No.10(2014),pp.65-78
[5] ISO.ISO14040:2006: Environmental Management, Life Cycle Assessment Principlesand Framework; ISO:Geneva, Switzerland, 2006.

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)