

IJEAST

INTERNATIONAL JOURNAL
OF ENGINEERING APPLIED SCIENCE
AND TECHNOLOGY

VOLUME : 6 ISSUE : 11 Print / Issue Publication Date: 11-May-2022

ISSN : 2455-2143

DOI : 10.33564/IJEAST.2022.v06i11.021

Indexed In

Google SCHOLAR OPEN ACCESS doi Crossref

WWW.IJEAST.COM

editor@ijeast.com

International Journal of Engineering Applied Sciences and Technology, 2022
Vol. 6, Issue 11, ISSN No. 2455-2143, Pages 102-105
Published Online March 2022 in IJEAST (http://www.ijeast.com)

ELECTRIC ROAD

Sanjay Kumar N[1], Venkatashwarra S[2]
II yr Mechatronics Engineering
SNS College of Technology, Coimbatore -641 035

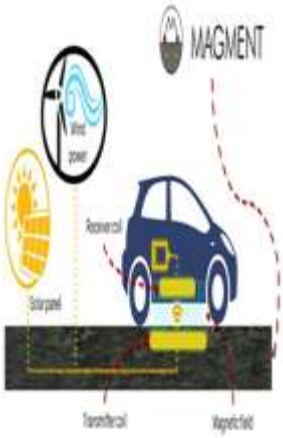
ABSTRACT: **An electric road, eroad, or electric road system (ERS) is a road which supplies electric power to vehicles travelling on it. Common implementations are overhead power lines above the road and ground-level power supply through conductive rails or inductive coils embedded in the road. Overhead power lines are limited to commercial vehicles while ground-level power can be used by any vehicle, which allows for public charging through power metering and billing systems.10–11 Korea was the first to implement a public electric road with a commercial bus line in 2013 after testing an experimental shuttle service in 2009. Sweden has been performing assessments of various electric road technologies. . since 2013 and expects to start formulating a national electric road system in 2022 and finish planning by2033 Furthermore, the technology is more expensive, as inductive charging requires drive electronics and coils in both device and charger, thus, it increases the complexity and cost of manufacturing.**

Keywords: **Resonant inductive power transfer (ript),inductive power transfer (ipt) ,capacitive wireless power transfer (cwpt).**

I. INTRODUCTION

EVs offer multiple advantages such as reduced fuel (petrol, diesel, and gas) consumption and decreased emissions from tailpipes, which significantly boost their demand across the globe. This in turn is expected to escalate the need for wireless charging for electric or plug-in hybrid vehicles during the forecast period. In addition, key players operating in the wireless electric vehicle charging market are adopting various strategic moves such as product development and collaboration, to tap the business potential. For instance, Nichicon Corporation and Qualcomm entered into a strategic agreement. Based on the agreement, Nichicon Corporation is expected to include Qualcomm Halo wireless electric vehicle charging (WEVC) technology in its product portfolio and focus on commercializing Qualcomm Halo wireless electric vehicle charging WEVC technology for hybrid and electric vehicles.Furthermore, several EV manufacturers are deploying wireless charging systems in their products. For instance, in Germany, on May 28, 2018, BMW launched its wireless electric car charging system. This system allows vehicles to park over the inductive charging station followed by a simple push of the start/stop button to initiate charging. Once the battery is completely charges,system switchoff automatically. French mobility together developed a wireless charging system called GroundPad. This system can be installed in a garage or outside to connect to the vehicle's charging system over eight centimeters through a magnetic field. In addition, the demonstration is carried out on an electric vehicle with the use of wirelessly charged inductive device in Satory Versailles, France Ground Pad is equipped with a high-power electric vehicle charging system, which enables electric cars to charge their batteries while on the move.





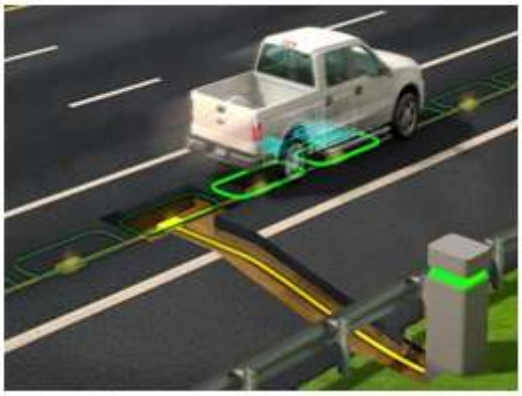
These latest trends are expected to drive the growth of the wireless electric vehicle charging market in the near futureGroundPad is equipped with a high-power electric vehicle charging system, which enables electric cars to charge their batteries while on the move.

Feeding via the ground

Ground-level power supply, also known as surface current collection or, in French, alimentation par le sol ("feeding via the ground"), is a concept and group of technologies whereby electric vehicles collect electric power at ground level from individually-powered segments instead of the more common overhead lines. Ground-level power supply has been used primarily for aesthetic reasons. During the late 2010s it has become more economical than overhead lines. Ground-level power supply systems date back to the beginning of electric tramways, with some of the earliest such systems using conduit current collection. Since the turn of the 21st,new systems such as the Alstom APS, Ansaldo Tramwave, CAF ACR, Elways, and others have been

International Journal of Engineering Applied Sciences and Technology, 2022
Vol. 6, Issue 11, ISSN No. 2455-2143, Pages 102-105
Published Online March 2022 in IJEAST (http://www.ijeast.com)

introduced which use modern technology to address some of the limitations and dangers of the older systems. With the increased efficiency and energy density of capacitor and battery powered systems, ground-level power supply systems are used in smaller portions of the line to charge the batteries, for example only during station stops.



A number of ground-level power supply systems were developed from the 1970s through the 1990s, but failed to reach commercialization due to reliability and safety issues. The first ground-level power supply system developed to modern safety standards was the Ansaldo Stream. After a competing system, Alstom APS, became the first commercially implemented system in 2003, there has been a proliferation of commercial implementations of ground-level power supply systems.[8] During the late 2010s, ground-level power supply systems have become more cost-effective than overhead line systems.

IElectric roads power and charge electric vehicles while driving. Sweden has tested electric road systems that charge the batteries of private electric vehicles, and among the tested systems are two ground-level power supply systems tested since 2017, in-road rail by Elways-Evias and on-road rail by Elonroad. Both systems were found to be more economical than the tested overhead line system and dynamic inductive charging system. The in-road rail system is planned to deliver up to 800 kW per vehicle traveling over a powered segment of the rail, and the system is estimated to be the most cost-effective among the four tested systems. The new systems are expected to be safe, with segments of the rail being powered only when a vehicle is traveling over them.The rails have been tested while submerged in salt water and were found to be safe for pedestrians.



Wireless Charging

As autonomous cars come onto the market, wireless charging technology will be the ideal solution to keeping them charged. It won't take a supercomputer to drive a car away from a wireless charger at low speed and park it nearby so another car can use the charging equipment. Making chargers with cords .When I get my first EV, I want it to be able to charge wirelessly for the same reason I prefer a self starter over using a hand crank — convenience. Technical prowess and zoomy styling are all well and good, but convenience is what sells cars. It Detracts From The EV Revolution False: Wireless charging will be an essential part of the electric car revolution and play a vital role in the development of autonomous cars. While most of the attention today is on sensors, mapping, and machine learning, wireless charging is an equally important technology .Let's face it, fleets of robotaxis will not have drivers to plug them in. In the autonomous future, cars will simply park themselves in spots outfitted with wireless charging stations. After charging, they will head off on their next ride-hailing journey or find a place to park in peace and quiet reflection until needed, freeing up the wireless charging equipment for the next car.

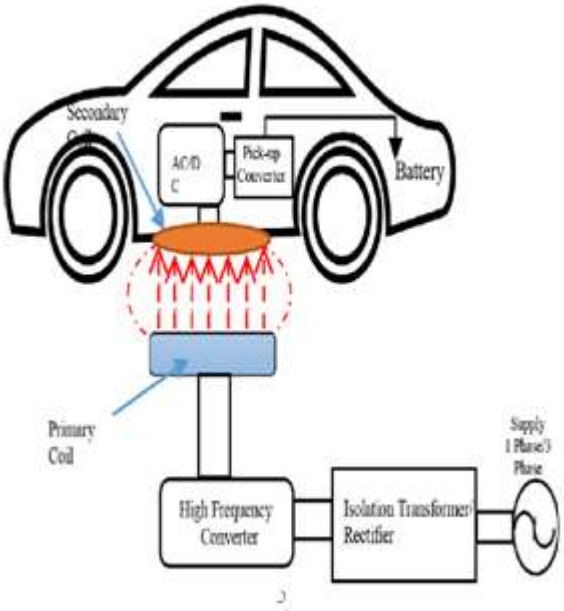
International Journal of Engineering Applied Sciences and Technology, 2022
Vol. 6, Issue 11, ISSN No. 2455-2143, Pages 102-105
Published Online March 2022 in IJEAST (http://www.ijeast.com)



Myths about eroad

Myth #1: Wireless charging is slow and inefficient False. Wireless EV charging is just as efficient — or more efficient — than plugging in. Most people think they have to plug in an electric car to get the most efficient charging possible, but that's not true. No charging method is 100% efficient. Conventional chargers are typically 88% to 95% efficient. Wireless charging is right in the middle of that range at 90% to 93% efficiency. That means it does as good a job of transferring electricity from the charger to a car's battery as most conventional charging equipment that uses a cord.Most wireless charging equipment is Level 2, meaning it operates on 220–240 volts. Whether a Level 2 charging station is wireless or wired has no bearing on the speed of the charging process

Myth #2: Wireless Charging Is Not User Friendly False: Wireless charging delivers a seamless and transparent user experience. There are multiple EV power cord connectors and adapters in use. Figuring out which is the right one to use can be daunting. Wireless charging takes all the stress out of the equation. With wireless charging, there is no need to plug in at home or worry about whether you remembered to connect the car when you arrived home from work. All a driver needs to do is park above a charging pad, which can be easily installed in a garage or parking lot. The car begins charging immediately. There's no mess, no hassle, and you can return to a fully charged vehicle without even thinking about it.



Myth#3: Wireless Charging Detracts From The EV Revolution False: Wireless charging will be an essential part of the electric car revolution and play a vital role in the development of autonomous cars. While most of the attention today is on sensors, mapping, and machine learning, wireless charging is an equally important technology.Let's face it, fleets of robotaxis will not have drivers to plug them in. In the autonomous future, cars will simply park themselves in spots outfitted with wireless charging stations. After charging, they will head off on their next ride-hailing journey or find a place to park in peace and quiet reflection until needed, freeing up the wireless charging equipment for the next car.



II. CONCLUSIONS

ProperFor all the electric road scenarios that we analyse, the social benefits of the electric road are larger than the social

cost. The largest benefit stems from operation cost savings for carriers, simply because it is cheaper to fuel the trucks with electricity than with diesel.. The second largest benefit is the reduction of carbon emissions. The NBCR and the reduction in carbon emissions per invested euro is highest for the medium-sized network, indicating economics of scope up to a network size threshold.The reduction of carbon emissions and NBCR is relatively robust in sensitivity analysis based on fairly large variations in diesel and electricity prices. Intermittent electric transmission increases the NBCR due to lower investment cost, though this alternative requires larger batteries and thereby increases the costs of hybrid trucks.If the user charge is set to optimize welfare, the revenues cover the marginal cost of the wear and tear on the electric road. Assuming a profit maximizing operator of the electric road, the revenue from the user charges almost covers the investment and maintenance costs for the medium-sized network. If we assumintermittent electric transmission, the investment and maintenance costs are fully covered in all electric road scenarios. However, if user charges are set by a profit maximizing monopolist, the reduction in carbon emissions decreases by 20–25 percent, as it becomes more costly for carriers to use the electric road.Several arguments can be made for public operation and ownership of electric roads. First, it is unlikely that private investors would be willing to take the risks of such an investment. There are at least two major investment risks. The first is that investment and maintenance costs become larger than estimated. Costs are uncertain as there is no full-scale electric road network in operation.

Acknowledgement: This paper was submitted as part of assignment for the subject " Biology for Mechatronics Engineering "

III. REFERENCE

[1]. Ahmad, A., Alam, M.S., and Chabaan, R., "A Comprehensive Review of Wireless Charging Technologies for Electric Vehicle s," IEEE Trans. Transp. Electrif. 2018.

[2]. G., Bertoluzzo, M., Pinto, R. et al., "Analysis and Design of DD Coupler for Dynamic Wireless Charging of Electric Vehicles," J. Electromagn. Waves Appl. 5071:1-20, 2017.

[3]. Zhao, L., , D.J., and Madawala, U.K., "Hybrid Bidirectional Wireless EV Charging System Tolerant to Pad Misalignment," IEEE Trans. Ind. Electron. , 2017.

[4]. Jiwariyavej, V., Imura, T., and Hori, Y., "Coupling Coe 俸 cients Estimation of Wireless Power Transfer System Via Magnetic Resonance Coupling Using Information from either Side of the System,"

IJEAST

INTERNATIONAL JOURNAL
OF ENGINEERING APPLIED SCIENCE AND TECHNOLOGY

AUTHORS

Sanjay Kumar N

Venkatashwarra S

ABOUT IJEAST

International journal of Engineering Applied Science and Technology (IJEAST) is a peer-reviewed, open access journal that publishes high - quality research paper in the field of Engineering, Applied Science and Technology.

IJEAST aims to provide a platform for researchers, academicians, and professionals to share their innovative ideas, research findings, and practical experiences with the global scientific community.

JOURNAL METRICS

H-INDEX	i10-INDEX	IJEAST CITATIONS	PEER-REVIEWED & OPEN ACCESS
33	154	9,647 (IJEAST CITATIONS)	PUBLISHED MONTHLY

PEER REVIEWED

All submission are rigorously peer reviewed to ensure quality.

AUTHORS ARE OUR PRIORITY

We value our authors and recognize their contribution to the advancement of research and knowledge.

OPEN ACCESS

Free and unrestricted access to research for all.

GLOBAL REACH

Connecting researchers and professionals worldwide.

TIMELY PUBLICATION

We ensure a swift and efficient publication process.

For more information, visit our website
www.ijeast.com

editor@ijeast.com

www.ijeast.com

India

2455-2143