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Review Paper on Wireless charging for EVs

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Abstract – *The WPT technology has advanced quickly in recent years. With a grid to load efficiency of above 90%, the transfer distance increases from a few millimetres to several hundred millimetres at kilowatt power levels. Thanks to the developments, both stationary and dynamic EV charging applications find the WPT to be particularly appealing. This paper examined the WPT-related technologies that are relevant to EV wireless charging. The difficulties of charging time, range, and cost can be readily solved by adding WPT to EVs. With the widespread adoption of EVs, battery technology is no longer important. We intend to advance both the expansion of EV and the continued development of WPT.*

Keywords –*Electric vehicle (EV), inductive power transfer (IPT), wireless power transfer, safety standards, and dynamic charging (WPT).*

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I. Introduction

Electrification of transportation has been practiced for many years for a variety of reasons, including energy, environment, and many others. Electric locomotives have been well developed for many years in railway networks. On a set track, a train travels. Pantograph sliders make it simple to obtain electrical power from a conductor rail. For electric vehicles (EVs), however, the great degree of flexibility makes it difficult to obtain electricity in a comparable manner. An EV is often equipped with a high power and large capacity battery pack as an energy storage unit to enable it to go a sufficient distance.

- However, one advantage of automobiles with internal combustion engines is that they are simple and quick to refuel, thus traveling a long distance in one is rarely an issue. They may be facing extinction in the electric transportation revolution.
- For their successors, not so. Electric cars come with a range of charging systems, as well as various cables and outlets, because there are no global standards in place.
- In order to ensure that the battery is completely charged at the beginning of a long trip and that suitable fast-charging stations are accessible along the way, meticulous planning is required.
- If electric automobiles could be remotely recharged, it would be considerably more practical. Some small items, like mobile phones and electric toothbrushes, can already be recharged in this manner.

Even with numerous government incentive programmes, consumers do not now find EVs to be particularly appealing. Government grants and tax breaks are one way to boost EV market share right now. The only issue with an electric car is the electricity storage technology, which necessitates a battery that is currently the bottleneck due to its subpar energy density, short lifespan, and high cost. The battery in an EV is difficult to build since it must concurrently meet the following criteria: high energy density, high power density, inexpensive cost, extended cycle life, good safety, and reliability. The most cost-effective option for usage in electric vehicles is widely acknowledged to be lithium-ion batteries.

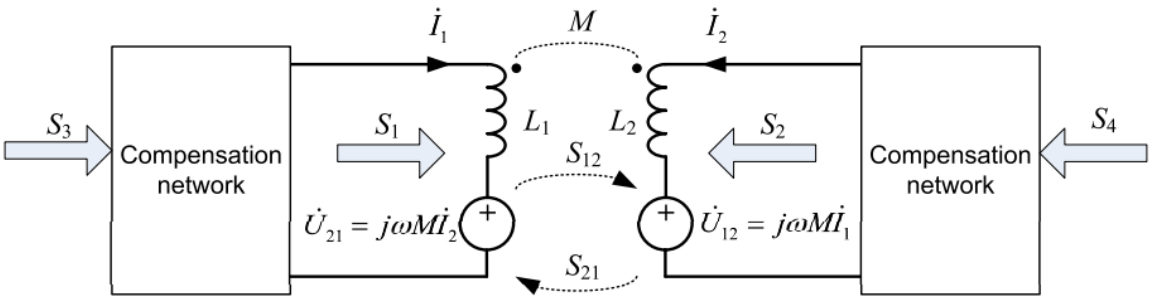
With a dynamic WPT system, the EV could be powered while being driven and could continue running indefinitely without stopping. Additionally, compared to EVs with conductive charging, the battery capacity of EVs with wireless charging may be reduced by 20% or less.

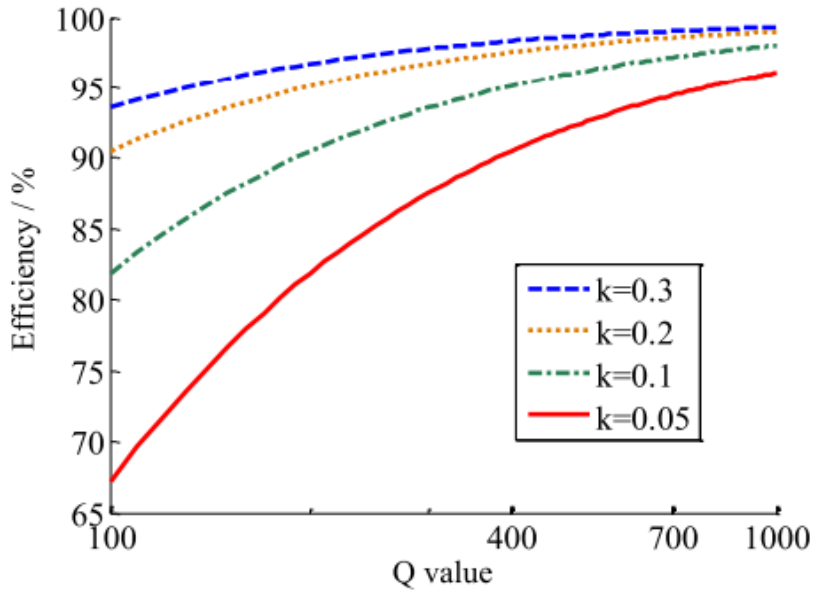
II. Problem Statement

1. Magnetic resonance-based wireless power transfer (WPT) technology has the potential to relieve people from cumbersome wires. In truth, the WPT uses the same fundamental principle that has been established over the course of at least 30 years under the name inductive power transfer.
2. With a grid load efficiency of above 90%, the transfer distance increases from a few millimeters to several hundred millimeters at kilowatt power levels. Thanks to the developments, both stationary and dynamic EV charging applications find the WPT to be particularly appealing.
3. The difficulties of charging time, range, and cost can be readily solved by adding WPT to EVs. With the widespread adoption of EVs, battery technology is no longer important. It is believed that research will advance the advancement of WPT and the growth of EV.

- Identification of components and designing of wireless EV charging system
- Fault finding, correction of implemented circuit and demonstrating system
- Used adapter for power supply
- Battery protection circuit to protect the battery from overheating and disconnect it automatically once it's fully charged

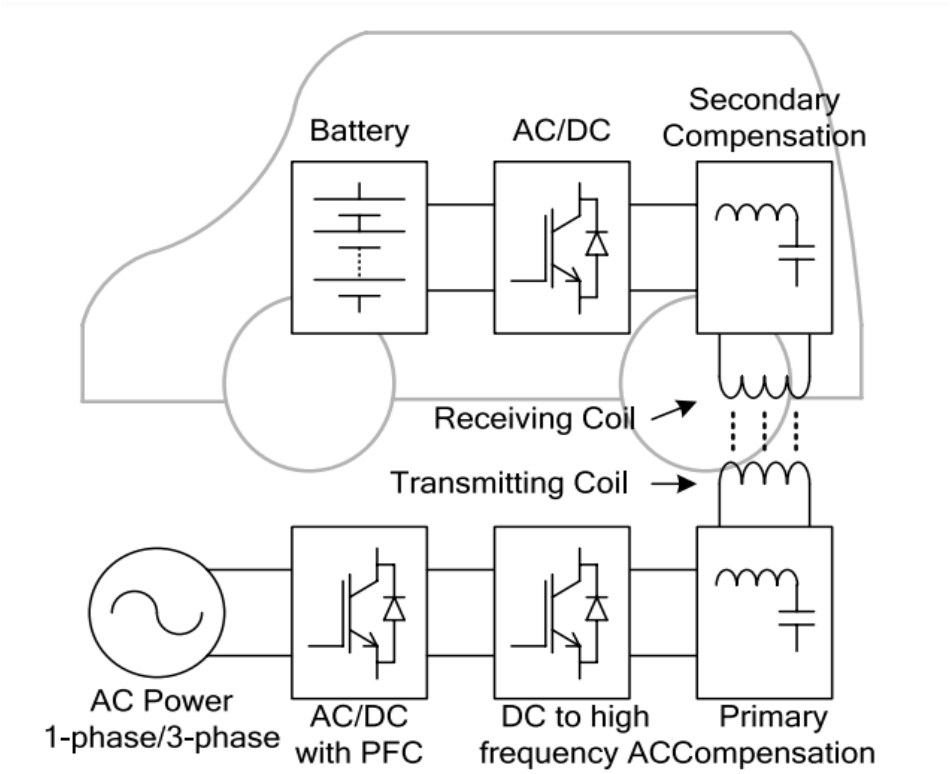
III. Proposed Work





1. Using an adapter, we will supply power to the circuit.
2. There will be a coil in the output of the circuit
3. This coil will wirelessly emit emf waves using the power we supply to the circuit
4. There will be a coil on the receiver end to which the emf waves of the first coil will latch on to

5. The voltage will be flexible so we need to stabilize it
6. We will use the battery protection circuit so that the battery is prevented from overheating, blasting, to break the circuit once the battery is charged.



It is obvious that environmental and energy-related challenges make vehicle electrification necessary. Compared to wired charging, wireless charging offers a number of advantages.
The basis for EV mass market acceptance, regardless of battery technology, will be laid when highways are electrified with wireless charging capability.
The wireless charging of EVs is a possibility as technology advances.

IV. Results

❖ India has the greatest untapped EV market in the world, particularly for two-wheelers.

❖ According to a recent study, the market for electric cars (EVs) is predicted to be worth at least $475 billion by the year.

❖ By 2025, the expected penetration of electric two-wheelers would increase from 1% to up to 15%.

❖ While the Indian government is actively encouraging the use of electric vehicles, insufficient infrastructure, a dearth of high-performing EVs, and high upfront costs are seriously impeding widespread adoption.

V. Conclusion

❖ The penetration of EVs has greatly expanded as a result of various automakers releasing these vehicles at a quick clip.

❖ The ability of the EV sector to meet expanding demand is constrained by a variety of potential market barriers. The two-wheeler consumer category continues to be constrained by an inadequate charging network.

❖ In the upcoming years, these challenges are projected to become more prominent due to the lack of a strong manufacturing environment for the materials related to the EV revolution and the concentration of the supply chain in several areas.

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