# Wireless Dynamic Charging for Electric Vehicles

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**Abstract:** *Wireless Dynamic Charging (WDC) for Electric Vehicles (EVs) is an emerging technology that enables energy transfer from roadway infrastructure to vehicles while in motion, reducing reliance on large onboard batteries and minimizing charging downtime. Unlike conventional plug-in or stationary wireless charging systems, WDC utilizes embedded transmitter coils beneath the road surface and receiver coils mounted on vehicles to deliver power through resonant inductive coupling. This approach supports continuous charging during travel, extending driving range, improving energy efficiency, and lowering battery weight and cost.*

*The system integrates advanced power electronics, real-time communication, grid connectivity, and intelligent control strategies to ensure safe, efficient, and reliable energy transfer. Key technical challenges include maintaining high power transfer efficiency under variable alignment conditions, ensuring electromagnetic safety standards, optimizing infrastructure costs, and enabling interoperability across vehicle platforms. Smart grid integration further enhances the capability of WDC by allowing dynamic load management and renewable energy utilization.*

*Wireless Dynamic Charging presents a transformative solution for sustainable transportation by addressing range anxiety and supporting large-scale EV adoption. With ongoing advancements in materials, control algorithms, and infrastructure design, WDC has the potential to revolutionize future mobility systems and accelerate the transition toward cleaner and smarter transportation networks..*

**Keywords:** Wireless Dynamic Charging (WDC), Electric Vehicles (EVs), Dynamic Wireless Power Transfer Resonant Inductive Coupling, Power Electronics, Smart Grid Integration Sustainable Transportation, Electromagnetic Safety, Energy Efficiency