# ELECTRIC VEHICLES CHARGING BASED WIRELESS POWER TRANSFER

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| **ABSTRACT**With the surge in adoption of electric vehicles, finding sustainable and efficient charging solutions has become paramount. This paper delves into approach, utilizing microgrids for the wireless self-charging of electric vehicles. Microgrids, typically characterized by decentralized and renewable energy sources, offer a unique advantage in harnessing localized energy, ensuring a lower carbon footprint. This study outlines the design of a wireless charging with challenges faced, such as energy transfer efficiency, grid stability, and the optimization of energy distribution. The proposed charging station uses microgrids for system stability, working autonomously with the main grid, the station's performance was exemplary. Wireless Power Transfer technology simplifies user experience. The system achieved a 90.06% efficiency, demonstrating minimal energy dissipation during transfer. Experimental results demonstrate the feasibility of this approach, with electric vehicles s successfully achieving charging rates comparable to conventional methods but in a greener and more sustainable manner.Keywords: Electric vehicle, Wireless power transfer, Photovoltaic**References:** 1. Detka, K., & Górecki, K. (2022). Wireless power transfer—a review. Energies, 15(19), 7236. https://doi.org/10.3390/en15197236
2. Bi, Z., Kan, T., Mi, C. C., Zhang, Y., Zhao, Z., & Keoleian, G. A. (2016). A review of wireless power transfer for electric vehicles: Prospects to enhance sustainable mobility. Applied Energy, 179, 413–425. https://doi.org/10.1016/j.apenergy.2016.07.003
3. Singh, S., Jagota, S., & Singh, M. (2018). Energy management and voltage stabilization in an islanded microgrid through an electric vehicle charging station. Sustainable Cities and Society, 41, 679–694. https://doi.org/10.1016/j.scs.2018.05.055
4. Shahzad, S., Abbasi, M. A., Ali, H., Iqbal, M., Munir, R., & Kilic, H. (2023). Possibilities, challenges, and future opportunities of microgrids: A review. Sustainability, 15(8), 6366. https://doi.org/10.3390/su15086366
5. Battula, A. R., Vuddanti, S., & Salkuti, S. R. (2021). Review of Energy Management System Approaches in Microgrids. Energies, 14(17), 5459–5459. https://doi.org/10.3390/en14175459
6. Trung, N. K., & Diep, N. T. (2021). A maximum transfer efficiency tracking method for dynamic wireless charging systems of electric vehicles. Journal of Electrical and Computer Engineering, 2021, 1–10. https://doi.org/10.1155/2021/5562125
7. Du, J., Pei, M., Jia, B., & Wu, P. (2022). Optimal deployment of dynamic wireless charging lanes for electric vehicles considering the battery charging rate. Journal of Advanced Transportation, 2022. https://doi.org/10.1155/2022/6428887
8. Kashani, S. A., Soleimani, A., Khosravi, A., & Mirsalim, M. (2023). State-of-the-Art research on wireless charging of electric vehicles using solar energy. Energies, 16(1), 282. https://doi.org/10.3390/en16010282
9. Vishnuram, P., P., S., R., N., K., V., & Nastasi, B. (2023). Wireless chargers for electric vehicle: A systematic review on converter topologies, environmental assessment, and review policy. Energies, 16(4), 1731. https://doi.org/10.3390/en16041731
10. Palani, G., Sengamalai, U., Vishnuram, P., & Nastasi, B. (2023). Challenges and barriers of wireless charging technologies for electric vehicles. Energies, 16(5), 2138. https://doi.org/10.3390/en16052138
11. Dimitriadou, K., Rigogiannis, N., Fountoukidis, S., Kotarela, F., Kyritsis, A., & Papanikolaou, N. (2023). Current trends in electric vehicle charging infrastructure; opportunities and challenges in wireless charging integration. Energies, 16(4), 2057. https://doi.org/10.3390/en16042057
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