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# Optimization of Dynamic Wireless Charging in Binghamton University Bus Network: Optimal Locations and Battery Size

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**Abstract:** The sales of electric vehicles (EVs) start to boom in recent years. This is mainly due to people's increased concern about the environmental impact caused by traditional fossil-fuel vehicles. One great limitation of current EV technology is that the driving range is short and an EV must stop for an extended period of time to get charged. The dynamic wireless charging (DWC) technology partially addresses these drawbacks by providing EV owners the ability to charge while in motion. This technology is similar to the one used for wireless charging of mobile phones but on a much larger scale. The charging principle for this technology is inductive magnetic charging. This type of technology is especially suitable for electric buses with fixed routes that serve a local area. The aim of the paper is to find the optimal locations of wireless chargers and the optimal battery size. A case study of DWC system design based on Binghamton University's bus system data is carried out in this paper. A Mixed Integer Linear Programming (MILP) model is developed to minimizing the total implementation cost. The results show that the developed optimization model can substantially reduce the buses' battery size and improve the cost-effectiveness of installing dynamic power transfer facilities when compared with regular static outlet charging.

*Keywords:* Dynamic wireless charging, Battery, Electric bus, Transportation network