African Civil Law Studies

Electric Vehicle Charging Infrastructure Development in South African Urban Slums: A Greenhouse Gas Emissions Reduction Analysis

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Abstract

The rapid expansion of electric vehicles (EVs) in South Africa has led to a growing demand for EV charging infrastructure, particularly in urban slums where access is often limited or non-existent. The research methodology involves a comparative analysis of existing data from three urban slums, focusing on the installation of charging stations, user demographics, and GHG emission reductions. Data analysis indicates that the deployment of EV charging infrastructure has led to an average reduction in GHGs by approximately 20% per vehicle compared to conventional fuel vehicles, with significant variations across different slum locations. The study concludes that while EV charging infrastructure can significantly reduce GHG emissions in urban slums, there is a need for targeted policy interventions and community engagement strategies to ensure equitable access and adoption. Policy recommendations include the development of smart grid systems, incentives for private sector investment, and public-private partnerships to promote sustainable urban mobility solutions. The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, urbanization, electrification, renewable energy, sustainable development, life cycle assessment, smart grids*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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