

# Photovoltaic Actuated EVs: Induction Motor Triumphs, Paving Sustainable Path in Transportation Revolution

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**Abstract:** *This comprehensive review explores the incorporation of renewable energy sources, particularly solar energy, in electric vehicles (EVs) through induction motors. It emphasizes the importance of sustainable transportation and the potential of solar power in meeting EV energy demands. The study employs a rigorous methodology involving theoretical analysis, simulation studies, and practical experiments to compare induction motors with brushless direct current (BLDC) motors in photovoltaic-actuated applications. Theoretical assessments delve into motor characteristics, while simulations analyze performance under various conditions. Practical experiments with a photovoltaic-actuated prototype validate theoretical and simulation results. The research concludes that induction motors outperform BLDC motors in photovoltaic-actuated EVs, offering higher efficiency, reliability, and adaptability to solar variations. They also feature reduced complexity and superior torque capabilities. These findings have significant implications for advancing solar-energized EVs, promoting sustainability and reliability in propulsion technology. The study's insights benefit researchers, practitioners, and policymakers seeking to enhance photovoltaic-actuated EV efficiency. It advocates for the widespread adoption of induction motors, contributing to a more sustainable and resilient future for photovoltaic-actuated transportation.*

**Keywords:** Brushless DC Motor; Electric Vehicle; Induction Motor; Photovoltaic; Transportation