

Design and Development of a Solar-Powered Electric Bicycle for Sustainable Urban Transportation

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Abstract: *The Design and Development of a Solar-Powered Electric Bicycle for Sustainable Urban Transportation aims to create an eco-friendly, cost-effective, and energy-efficient personal transportation system for daily urban use. With increasing traffic congestion, fuel consumption, and environmental pollution in cities, there is a strong need for clean and sustainable transportation alternatives. The solar-powered electric bicycle (Solar E-Bicycle) provides a practical solution by combining renewable solar energy with electric power. In this project, a single-person solar-powered electric bicycle is designed and developed using both a solar panel and a rechargeable battery. The solar panel is used to generate electrical energy from sunlight, which is stored in the battery and later used to power the electric motor. Mechanical concepts such as frame fabrication, gears, rotating wheels, and proper alignment are applied to ensure smooth riding, stability, and rider comfort. The electrical system includes components such as a battery, electric motor, solar panel, wiring, and control switches for efficient power management. The Solar E-Bicycle reduces dependency on fossil fuels, minimizes carbon emissions, and lowers transportation costs. It is easy to operate, requires less maintenance, and is suitable for short-distance travel in urban areas. This project demonstrates how renewable energy can be effectively used in personal transportation and contributes toward sustainable and green mobility solutions for modern cities.*

Keywords: *Solar-Powered Electric Bicycle, Sustainable Transportation, Renewable Energy, Electric Motor, Rechargeable Battery, Solar Panel, Green Mobility, Urban Transportation, etc*

