Driving Sustainability in Residential Construction: Solar Panels and V2G Integration for CO2 Reduction

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In the building and transportation sectors, CO2 emissions account for approximately 75% of total emissions. Planning and designing residential construction with sustainable transportation options reduces environmental impact and improves community connectivity. Integrating electric vehicles (EVs) into efficient residential construction can be a viable solution. EVs have changed the way people and goods are transported by reducing CO2 emissions, improving energy efficiency, and promoting cleaner and more sustainable transportation. With Vehicle-to-Grid (V2G), EVs can draw power from solar energy and supply it back when needed, resulting in bidirectional energy flow. Through V2G, solar energy can be integrated more effectively into the grid. The system allows excess solar energy to be stored and used at homes during high electricity demand periods or at night. In this study, energy models are investigated to optimize energy flow in smart residential construction equipped with solar energy and EVs.

Keywords: Residential Construction, Vehicle-to-Grid, Electric Vehicles, Solar Energy