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Wireless Charging Station with IoT Monitoring Powered by Battery and Solar

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Abstract: *This project presents the design and implementation of a solar-powered wireless charging station integrated with an IoT-based monitoring system. The system utilizes a photovoltaic (PV) solar panel to harvest solar energy, which is stored in a 12V rechargeable battery to ensure continuous operation during low-light conditions or at night. A Qi-standard wireless charging module, powered by the battery, enables cable-free charging for mobile devices. An Arduino microcontroller serves as the core of the system, managing data acquisition from voltage and current sensors and facilitating communication with a cloud-based IoT platform via a Wi-Fi module. Real-time data such as battery voltage, current flow, and charging status are monitored and visualized remotely through a mobile or web dashboard. The design incorporates safety features like charge controllers, fuses, and reverse polarity protection to ensure reliable operation. The system was tested for efficiency, component compatibility, and remote monitoring accuracy. The final setup is enclosed in a weatherproof housing, making it suitable for outdoor deployment in remote or off-grid environments, supporting sustainable and convenient mobile charging solutions..*

Keywords: Wireless Charging, Solar Energy, IoT Monitoring, Battery Storage, Arduino Controller

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