

Solar Smart Bench with Charging and WiFi in College Garden

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Abstract: *The increasing demand for sustainable energy solutions and smart infrastructure in educational institutions has motivated the development of innovative public utilities such as solar-powered smart benches. This paper presents the design and implementation of a Solar Smart Bench with charging and Wi-Fi facilities installed in the college garden. The system is designed to harness solar energy through photovoltaic (PV) panels, which supply power to a battery-based storage unit, ensuring continuous operation even during non-sunny hours. The bench integrates multiple features including USB charging ports, wireless charging pads, and a Wi-Fi router to provide students and visitors with uninterrupted digital connectivity and device charging in outdoor environments. Energy management is achieved using a solar charge controller to optimize battery charging and load distribution. In addition to functionality, the bench emphasizes environmental sustainability by reducing dependency on conventional electricity, promoting the integration of solar-powered public facilities has become highly relevant. This paper introduces the design and implementation of a Solar Smart Bench installed in the college garden, providing both device charging and Wi-Fi connectivity. The system is powered by a photovoltaic (PV) solar panel, which stores energy in a battery bank through a solar charge controller for round-the-clock operation. The bench is equipped with USB charging ports, wireless charging pads, and a Wi-Fi router, allowing students and visitors to stay digitally connected in outdoor spaces.*

Keywords: Solar Smart Bench, Renewable Energy, Battery Storage, USB Charging, Wireless Charging, Wi-Fi Connectivity, Smart Campus, Green Infrastructure, Sustainable Energy, Solar Charge Controller, IoT Integration, Smart Cities

