

Energy Monitoring and Control System

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Abstract: *An Energy Monitoring and Control System (EMCS) is a system designed to monitor and control energy consumption in various applications. It is often used as a retrofit to existing systems to improve energy efficiency and reduce costs. In the face of growing energy demands and the urgent need for sustainable energy consumption, the development of intelligent energy monitoring and control systems has become critical. This project presents a comprehensive Energy Monitoring and Control System designed to track, analyze, and optimize energy usage in real-time. By integrating sensors, microcontrollers (such as Arduino or Raspberry Pi), and communication modules (like Wi-Fi or Zigbee), the system collects data on electrical parameters such as voltage, current, power, and energy consumption. The collected data is then transmitted to a central monitoring unit or cloud platform where it can be visualized through a user-friendly dashboard. Advanced analytics and threshold-based controls are employed to detect anomalies, enable predictive maintenance, and automate the control of connected appliances to reduce unnecessary energy consumption. This system is scalable, cost-effective, and applicable in residential, commercial, and industrial settings. Ultimately, it promotes energy efficiency, cost savings, and contributes to environmental sustainability by encouraging more responsible energy use.*

Keywords: Energy Monitoring and Control System

