DESIGN AND IMPLEMENTATION OF A POWER MONITORING SYSTEM FOR INDUSTRIAL APPLICATIONS

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Abstract This research project introduces the development of an effective user-friendly power monitoring system for a leading bottling company located in the Western Province area. The aim of this project monitor the power quality of the power system in real time and to get accurate energy consumption value to calculate KPI values of the company. The system monitors the electrical system in real-time using a powerful energy analyser which is capable of measuring many parameters related to electricity. Power monitoring systems are used widely in industrial plants and buildings to analyze power consumption. For industrial plants, it is essential to measure changes of three-phase voltages, current demand, power factor, harmonic distortion, frequency, and power consumption to monitor power quality. Manual data logging is not an effective and accurate method. To solve this issue, a low-cost suitable power monitoring system was developed for the selected company. For the data collection, seven power analysers were installed in the main panel room. These power analysers are installed on two incoming bus bars and five outgoing bus bars. The real-time data measured by the power quality analyser is transferred to the programmable logic controller's (PLC) Modbus Gateway. The Modbus Gateway transfers data to PLC, which then transfers data to a local database which is established in the office via Ethernet. The developed centralized supervisory control and data acquisition (SCADA) can log all this data second by second in its database. Finally, one of the KPI values for Power Consumption per Bottle Case for the company was obtained and energy-saving opportunities were identified through this system. Using the database, power system-related issues were analysed and identified according to industry standards and suggested solutions to mitigate them.

Keywords: Power monitoring, Power quality, PLC programming