

Efficient Energy Management System Using Pir Sensor

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In most developing countries like Nigeria, the demand for electrical energy outweighs the supply. Negative economic and environmental impacts are also associated with its generation, transmission and consumption. As a result there is need for the available energy to be efficiently managed. This project designed and implemented a microcontroller based energy saver and management system. The design of the energy saver and management system was aimed at coordinating the manner of use of electrical appliances, thereby reducing energy consumption in electrical appliances (such as fan and light) and devising a means of reducing the need for human intervention in the control of electrical appliances in a residential building. The project consists of a PIC microcontroller that utilizes a PIR sensor to detect occupants' presence in the building; it also has a light intensity detection unit used to determine the level of ambient lighting as well as a temperature sensor to determine ambient temperature. The control signal from the microcontroller was used to operate the load driver circuit to switch the appliances on or off. The results show that the designed system can reduce the level of energy consumption effectively and efficiently.

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I. Introduction

There is growing need for electrical energy as a result of modern civilization. The energy finds application at homes, offices and industries. As a matter of fact the level of industrial and technological development of any nation is dependent on the sustainability of its electrical power supply [1]. As at present, in most developing countries, the demand for electrical power is more than the supply [2]. [2], , [5]. In addition, in the past when

electricity consumption was not metered, consumers were not paying attention to efficient energy management. The campaigns by utility power providers, for example in Nigeria, on efficient energy management mean nothing to the consumers thereby over stressing the power system components and appliances. Nowadays because energy consumption has been metered, consumers, both domestic and industrial have come to realize the economic implication of efficient energy management [6]. Traditionally, mechanical switches were used for energy management but the desired objectives were not effectively achieved due to the nonchalant attitude and negligence of humans as efficient energy management was dependent on human consciousness [7]. In order to address the pitfalls of using mechanical switches, sensor based automatic switches are now being used [8]. Sensor based switches are used for automatic control of electrical loads in order to conserve energy consumption. There are two major classes of such sensors which are occupancy and daylight sensors [9]. Occupancy sensors are designed to turn on/off loads depending on whether the room is occupied or not [10].

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