

Influence of Industry 4.0 Applications and Development of Internet of Things (IoT)-Based Logic Framework in Energy Management Systems in Buildings

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Abstract

Energy management refers to the reduction of energy usage and costs with little steps like choosing LED light bulbs and energy-efficient appliances or larger efforts such as the improvement of insulation and weatherization. Energy management is simplified as foresighted, organized, and systemic production, distribution, and use of energy under ecological and economic target setting and judicious and effective use of energy to maximize profits and minimize energy demands. This work aims to develop a strategy for energy management in commercial buildings to create best-practice in commercial building energy consumption. Also, study the current energy practice in Nigeria and identify factors affecting energy management. A total population size of 150 comprises commercial buildings of malls and supermarkets where the internet of things (IoT) application was obtainable. Sample size of 100 comprised of respondents from the population was administered with 100 questionnaires out of which 80 valid questionnaires were used for the analysis. The questionnaire was administered among 13 branches of malls and mega supermarkets. That is an average of 6 questionnaires in each branch to respondents like managers, facility managers and other staff connected with the application of the installed IoT features. This study highlighted the factors that influence adequate and proper energy management in buildings. To this end, this research achieved the following objectives: To study the current practice of electrical energy management in commercial buildings, identify factors influencing electrical energy management in buildings (commercial buildings), and influence of Industry 4.0 applications in electrical energy management systems in buildings. The government should provide sufficient funding for power stations and maintenance activities. The use of Tariffing Meter System should be adopted in energy management, therefore eradicating the estimation billing system. There should be more aware of advanced networking and monitoring technologies for management.