Building System Management BMS

Cost Efficiency

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Abstract

The current study attempted to investigate the economics evaluation of application of building management system (BMS) and the problems against applying it. For this purpose, some building according to area and type of application selected as sample. And again, to find the major problems against its application in view of experts and contractors a questionnaire to collect concern data provided. The results showed, the application of BMS in case of existence of subside for the energy resources such as electricity, water and gas, in economic issue is not suggested but in case of non-subsidy it is. In addition, the results showed the major problems against BMS application in Iran are economic, cultural issues, lack of information and accessibility.

Introduction

One of the important issues that, in recent decades, interest has developed in most industrialized nations, the prevention of waste of energy. Energy as an important source of a country's economy, due to limited resources and high cost of production, it is always optimal use and energy savings in all aspects of transportation, manufacturing, construction and industrial applications in mind. Today, the population of major cities, and thus the creation of office and residential towers, building management systems, and building automation systems, to enhance the level of service commensurate with the progress of construction, and technology and to achieve optimum energy consumption, has become more and more common. Proper use of these systems, increase productivity, reduce costs and save energy. Industry and construction sector, more than a third of our country's energy consumption, is dedicated to [1]. Industry and construction 38% of energy consumption in Iran, devoted to the value in 2001, and is forecast to be approximately 5.5 billion dollars, the number of billions of dollars in 2020 to 6/157 [10]. The topic of energy saving, more people are looking to the building management system, is directed. Because the building management system, all energy consumption, such as electricity and thermal energy, is under control. According to studies conducted by researchers at the average potential savings, 43% of the buildings there [2]. Energy problem in our country for many years, not worthy of attention in implicit and explicit government subsidies, has given us the true value of energy in its various forms, has been opened. In recent years, for various reasons need to calculate consumption and energy savings as a crucial and inevitable necessity, appears. But in smart buildings, but the slow and limited building that has been done. The economic evaluation of the project, due to energy prices, and the resulting implementation costs and benefits, and barriers could be a subject for research. The slow process of building management systems, and given the benefit of this system, we have decided to investigate the implementation of the plan paid, and factors affecting the building management system implementation process, we identified. Also, the executors of mass production and availability of technology and cost, the implementation of the system studied, and the strategies to accelerate the implementation of the project should be provide

Overview

BMS manages and monitors the mechanical, electrical, and plumbing systems in a building. The primary purpose of a BMS is to improve the energy efficiency of a building and reduce its operating costs.

A BMS typically includes sensors, controllers, and software that work together to collect data on building systems, analyze that data, and make adjustments to optimize performance. For example, a BMS might adjust heating and cooling systems based on occupancy levels to reduce energy consumption during off-hours.

Some of the key components of a BMS include:

١. Sensors: These detect changes in the environment and collect data on things like temperature, humidity, and light levels.
٢. Controllers: These receive data from the sensors and make decisions based on that data. They can also send commands to building systems to adjust performance.
٣. Software: This is the user interface that allows building managers to monitor and control the system. It provides real-time data and allows for remote access.
٤. Overall, a BMS can help building owners and managers save money on energy costs, improve building performance, and reduce their environmental impact.

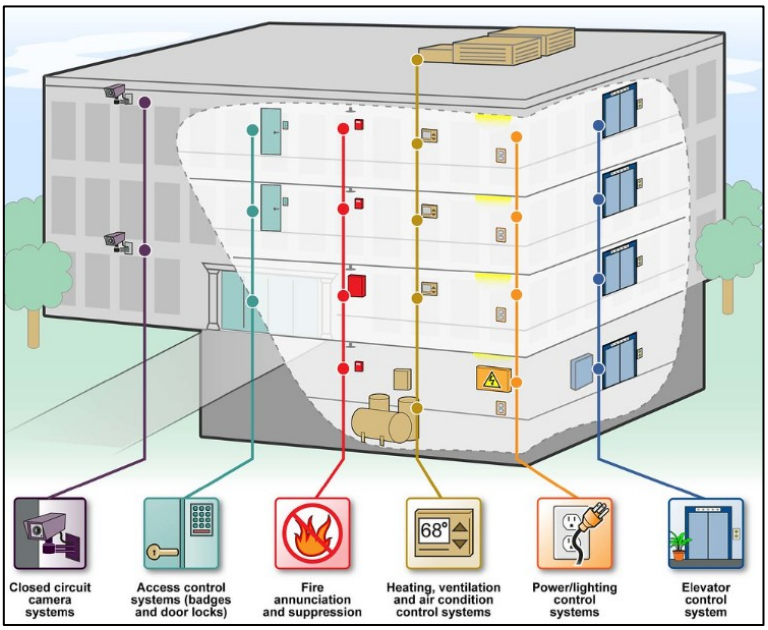


Figure – 1

Building Management Systems (BMS) Applications

Building Management Systems (BMS) can be used in a wide range of buildings and facilities, including:

Commercial buildings: BMS systems are commonly used in commercial buildings such as office buildings, shopping malls, and hotels to manage and control building systems, such as HVAC, lighting, and security.

Healthcare facilities: Hospitals and other healthcare facilities use BMS systems to manage critical systems such as HVAC, electrical, and medical gases to ensure the safety and comfort of patients.

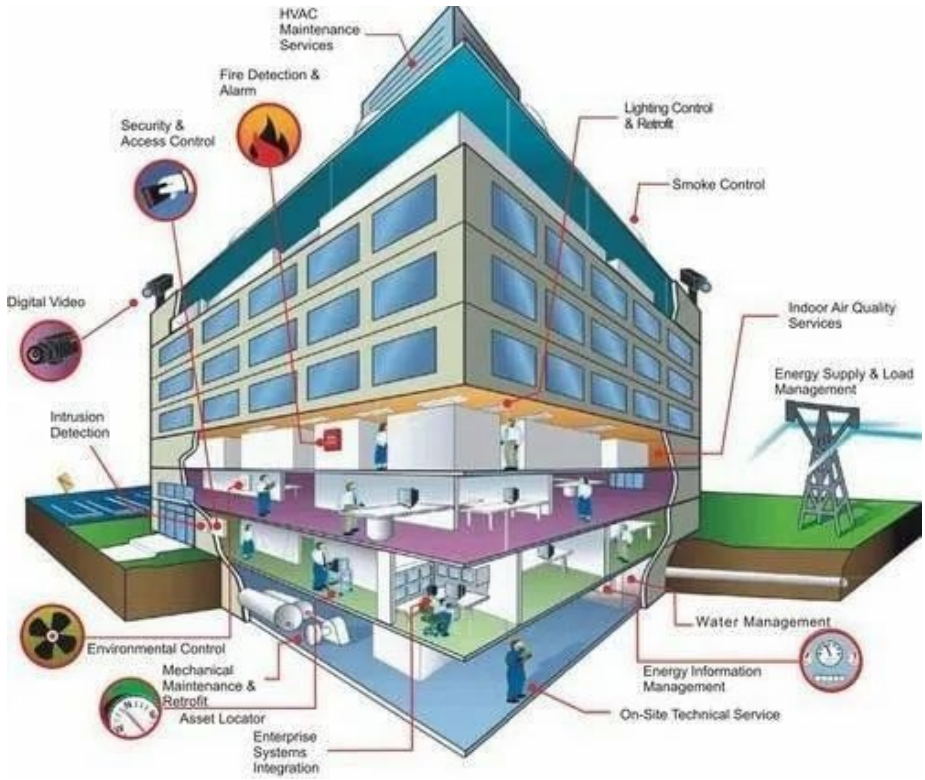
Industrial facilities: BMS systems are used in industrial facilities such as factories, warehouses, and production plants to monitor and control environmental conditions, equipment performance, and energy usage.

Educational institutions: BMS systems are used in schools, colleges, and universities to manage and control building systems, such as HVAC, lighting, and security, to ensure the comfort and safety of students and staff.

Government facilities: Government buildings such as courthouses, police stations, and public works facilities use BMS systems to manage and control building systems, such as HVAC, lighting, and security.

Residential buildings: BMS systems can also be used in residential buildings, such as apartment buildings and condominiums, to manage and control building systems, such as HVAC, lighting, and security.

In general, any building or facility that has mechanical, electrical, or plumbing systems can benefit from a BMS system. BMS systems can improve energy efficiency, reduce costs, and enhance the comfort and safety of building occupants.



BMS Cost Efficiency

Building Management Systems (BMS) are designed to monitor and control various building systems, such as heating, ventilation, air conditioning, lighting, and security. Implementing a BMS can result in significant cost savings by optimizing energy usage and reducing operational expenses.

To maximize cost efficiency when implementing a BMS, it's important to consider the following:

١. Determine the scope: Identify the systems to be integrated into the BMS, and prioritize based on their impact on energy consumption and operational costs.
٢. Select the right components: Choose components that are compatible with existing systems and offer the necessary features and capabilities to achieve the desired results. Look for cost-effective options that meet the required standards and certifications.
٣. Optimize system design: Work with experienced professionals to design the BMS in a way that maximizes efficiency and minimizes costs. This includes selecting the appropriate sensors, controllers, and software, and ensuring that they are installed and configured properly.
٤. Ensure proper installation and commissioning: Proper installation and commissioning are critical to achieving optimal performance and energy savings. Work with qualified contractors and technicians to ensure that the system is installed correctly and functioning as intended.
٥. Implement ongoing maintenance and monitoring: Regular maintenance and monitoring are necessary to ensure that the BMS continues to operate efficiently and effectively over time. Implement a maintenance plan that includes regular inspections, testing, and software updates.

By following these steps, building owners and operators can implement a BMS that is cost-effective and delivers long-term benefits in terms of energy savings and operational efficiency.

Advantages

There are several advantages to implementing a Building Management System (BMS) in a building, including:

١. Energy Efficiency: One of the primary advantages of a BMS is that it helps to improve the energy efficiency of a building by optimizing the performance of various systems such as HVAC, lighting, and water heating. This can lead to significant cost savings on energy bills and reduce the building's carbon footprint.
٢. Improved Comfort: A BMS can also help to improve the comfort of building occupants by maintaining optimal temperature, humidity, and lighting levels. This can lead to increased productivity and overall satisfaction.

٣. Increased Safety and Security: A BMS can also help to improve safety and security in a building by monitoring and controlling systems such as fire alarms, access control, and CCTV.
٤. Remote Monitoring and Control: With a BMS, building managers can remotely monitor and control building systems from anywhere with an internet connection. This can lead to faster response times to issues and more efficient operations.
٥. Predictive Maintenance: A BMS can also use data analytics to identify potential issues with building systems before they become major problems. This can help to reduce maintenance costs and minimize downtime.
٦. Overall, a BMS can help building owners and managers to operate their buildings more efficiently, save money on energy costs, and provide a more comfortable and safer environment for occupants.

Research Methods

In this study, we identified a building management system, library studies, and then investigate using Simple Payback Model, or Net Present Value was performed. Software packages TAC, was used for the economic evaluation. The analysis of the two different scenarios, done. The first scenario of economic analysis, with current prices of energy and other scenarios, the real price of energy by eliminating the subsidies. Also, to identify barriers to the implementation of this system, a questionnaire and a group of engineers, engineering, and the mass is distributed, results using descriptive statistics using SPSS software is examined.

Economic evaluation of the implementation of BMS in buildings

For this purpose, according to the area, and was elected a member of five buildings, including a hospital, training center, an office building, a commercial building, is a hotel. Economic evaluation of the implementation of BMS in the building, in which case the first annual energy costs, and maintenance costs of buildings, facilities, personnel and annual wages, and maintenance was collected. Due to the size of the building, and consulting with the building management system implementation, operation and maintenance costs of the building is estimated, inflation in the housing sector, electricity, gas, water and other Fuels, based on the price index of consumer goods and services, 1.22 percent annual interest rate of 16% is considered. The information, software, and economic evaluation is done. If NPV≥0, the economic plan, and if the NPV NPV <0 is not an economic plan. It can be said, if the IRR is greater than the sum of inflation and interest rates, the project is economically feasible [9]. Economic in evaluation following assumptions considered, the design life of 10 years and a residual value of zero, and intended, as well as energy consumption, using the design of control systems, lighting and cooling system parts and heating by 40%, and the percentage of water is considered. The reduction in maintenance costs and annual maintenance of 10% is considered. First scenario: economic analysis of the implementation of the BMS, the current price of energy in buildings.

For this purpose, according to the size and type of users, five were selected for the building type, such as a hospital, training center, an office building, is a commercial building and a hotel. So, from Estimate costs and benefits of energy savings and reduced maintenance costs of the building, the economic analysis was conducted, and the results are summarized in the table below. The results show that in all cases (NPV <0), so the implementation of BMS, the current price of energy, it is not economically feasible.

Table 1. The results of the economic evaluation of projects with current energy prices

IRR	The net present value	Area (M2)	Building Name
% 11/1	-666،629،636	16000	Hospital
% -3/1	- 702,968,758	11000	hotels
% -3/9	-3,434,744,223	33000	Education Center
-	-565,175,767	2500	commercial company
% 2/8	-1,273,828,781	13000	Administrative Building

Scenario Two: The economic analysis of the implementation of BMS, the real price of energy in buildings by eliminating subsidies the building selected, the economic analysis with real price of energy, eliminating subsidies was repeated, the results show that in all cases (NPV> 0), and so the project is economically feasible. The results are summarized in the table below.

SUMMARY AND CONCLUSIONS

The economic evaluation of the implementation of BMS, shows the current energy prices, in all structures studied, the net present value (NPV 0) is positive, so the implementation BMS, if the building removal of energy subsidies, it is economically feasible. In most cases, the return on investment in less than 5 years is possible. The results show that, the return on investment in large buildings, faster and BMS were used in large buildings, is more appropriate. For buildings with low size, no economic justification is not welcomed. In other countries, certain financial policies, including higher taxes on consumption Add or provide low-interest loans, the use of new technologies, in order to accelerate the development of intelligent buildings, is adopted. We should also, by adopting appropriate policies, and targeted energy subsidies, and with appropriate support and incentives, the intelligent building speed. The results show, cultural, economic, unfamiliarity with the system, lack of equipment, lack of government support, the main obstacles to the implementation of this system is, therefore, culture and propaganda in the media, the state facilities Banking, during the construction of intelligent building, training of specialists for the installation and maintenance, targeted subsidies, and providing real energy prices, and also forced a smart building, especially in the energy sector by engineering system, upon the recommendation of the most intelligent to accelerate the process of buildings, respectively.

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