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Creating a Sustainable Legacy: Health Communities MHA/560

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Pantzartzis, E., Edum-Fotwe, F. T., & Price, A. D. (2017). Sustainable healthcare facilities: Reconciling bed capacity and local needs. *International Journal of Sustainable Built Environment*, 6(1), 54-68.

Energy efficiency and sustainable innovation

This article explains that the efforts put towards energy efficiency promote sustainable innovations in hospital buildings. The efforts have contributed to the new design on how the healthcare facilities are built and operated. The innovative approaches adopted in designing the buildings are based on the characteristics which are unique to the healthcare business. Energy efficiency is the major characteristic in building a design that promotes sustainability in the healthcare sector. There have been various minimizations in energy consumption in the hospitals. Patient participation and empowerment are considered as a key factor in promoting energy efficiency in hospital buildings. Patients are being encouraged to participate more in contributing to sustainability.

Patients have been put in control of both lighting and temperature in the hospital buildings. The television controls which have been used for a long time in the patient rooms have been improvised to help them control other factors in the hospitals. These are such as using the same controls to raise and lower their beds and blinds, changing the room temperatures as well as switching the lights on and off. This way, they can regulate the lighting and temperature in their rooms and use it whenever needed. This is a major factor in controlling energy consumption as well as controlling the environment and preventing it from adverse temperatures.

There are other additional factors that have also helped the hospitals promote energy efficiency according to the principal engineer at Stantec. There has been a design of chillers that help in heat recovery which have been a major application for major hospitals.

Although the various mechanisms adopted in the hospitals help in saving energy, they can also release a high amount of heat waste which is released to the environment. The energy recovery chillers are used to capture the heat which is released as waste from energy-efficient devices such as the HVAC systems which have been considered as a more efficient technology than the use of the traditional plants used in boiling which have high resilience but low energy efficiency.

There are other alternatives used in areas with milder climates. Hospitals built in these areas can adopt a design that allows them to only use outside air systems instead of using energy to power the circulating air systems which increases the amount of energy consumption in these buildings. The high energy consumption required to continue with normal operations in hospitals makes it possible to adopt some designs which can reduce the amount of energy consumed in these building significantly. Energy management is also a major factor in promoting energy efficiency in the various hospital building. It can help in reducing the amount of energy consumed in these building by a large margin through identifying the devices which are always running even when they are not in use. Some operating suites are considered as a major factor that leads to energy waste. Turning them on-off only when needed can effectively reduce the use of energy in the hospitals. This article helps in explains some factors which can serve as alternatives when designing hospital buildings to help in reducing energy consumption as well as energy costs.

Guidelines of energy-efficient measures

This article explains some of the guidelines that healthcare facilities including hospital building can adopt to lower the amount of energy consumed in the hospitals, lowering the cost of energy as well as promoting environmental protection. High energy consumption is explained as a major contributor to high emissions of CO₂ which can contribute to major cases of greenhouse effects. One of the major parameters which can influence the efficient use of energy in the hospital buildings includes the energy infrastructures which are highly determined by the type of equipment installed as well as the compliance of these infrastructures to the laws of efficiency. Maximizing energy efficiency requires the use of infrastructure capable of saving energy as well as infrastructure which does not necessitate reconstruction of new structures. There has been a major energy management Programme adopted to help in saving more energy within the hospital organizations.

The Energy Management Programme includes various factors that promote its efficiency in saving energy. One of these factors includes energy inspections and energy book keeping. The energy inspections help in keeping constant records on how energy consumption has evolved within the hospital over time identifying the areas which can give room for potential energy saving within the building. The Programme also includes the identification of targets that require enough energy to run. The implementation of the program can be efficient in promoting rational use of energy within the hospitals buildings as well as the infrastructure of the organization.

There various energy-saving potentials within hospitals. Each hospital requires constant use of energy in lighting, air conditioning, heating as well as cooling. As the article explains, there are various energy-saving opportunities associated with lighting within the hospital

buildings. High-performance lamps can be one of the major alternatives for saving energy consumption within the hospital buildings. A 50% reduction in the total energy consumption can be used promoted by the use of high-performance lamps as well as the use of capacitors for outdoor lamps to reduce the energy consumption within the hospital buildings.

Heating also provides a chance for major energy-saving and reducing costs within the hospital buildings. Many hospital buildings have opted to use gas in heating. Others use boilers within the hospitals for steam and water heating. Annual monitoring of the boilers and insulation can help in reducing the amount of energy consumed by a great margin. Cooling is also a major factor that consumes energy within the hospitals. For proper cooling, there is a need for constant use of cooling mechanisms within the hospitals to promote better conditions. Thermal insulation has been considered as a major factor that can improve the temperature conditions within the hospital buildings reducing the need for cooling.

This article will help greatly in the identification of the energy requirements as well as providing guidelines on ways through which energy can be greatly preserved within the hospitals. It identifies some of the potential areas where energy consumption can be minimized to minimize the cost of energy used in the hospital.

García-Sanz-Calcedo, J., Al-Kassir, A., & Yusaf, T. (2018). Economic and environmental impact of energy-saving in healthcare buildings. *Applied Sciences*, 8(3), 440.

Economic and Environmental Impact of Energy Saving in Healthcare Buildings

The article examines the environmental and economic impacts of using energy-saving methods in healthcare buildings. The article examines the various energy-saving methods adopted in healthcare buildings by examining various hospital buildings in Spain. The article examines the use of electrical energy, air conditioning systems(HVAC) Domestic water heating systems(DWH), lighting systems as well as renewable energy systems adopted in these buildings. Hospital buildings have a major influence on the economies in developed countries due to the high amount of energy they consume. The energy expenditure in Spain in 2017 amounted to 6.7 % of their gross domestic product. The energy intensity in the last few years has been increasing greatly due to the various requirements of energy in hospital buildings. The dependency on electrical energy in these buildings has had a major influence on the increased consumption and expenditure making it necessary to look for alternative sources. The energy-saving methods are considered more efficient in saving energy in large buildings that constantly use energy for different activities. Small hospitals require an average consumption of 40,000kWh. According to Kolokosta, et al, (2012) the adoption of energy-saving techniques regardless of how simple they might be can help hospital buildings to reduce the energy consumption by at least 10%. This can only be possible if the categories leading to the high energy consumption are constantly monitored for ease of control.

Optimizing the installation of electrical energy has a significant role. Hospital buildings with up to 300 beds require energy consumption not less than 8.88kWh while hospitals with more than 300 beds require more than 10.04 kWh to operate efficiently. Optimization of the electrical energy installation includes the use of some energy-saving measures which can reduce the use of electricity in these buildings including installation of power

capacitors that provide reactive power compensation, choosing an appropriate power supply as well as improving the contract constrictions for the electrical energy supply. This helps in reducing the direct costs associated with using the electrical energy from the inevitable supply of energy into the buildings.

The improvement of air conditioning and heating systems (HVAC) also has major economic impacts on the organizations. The use of air conditioning and heating systems in hospital buildings is responsible for 50% of the total energy consumed within the hospitals. Canadian studies on natural resources consumptions indicated that the various the highest amount of energy used in these buildings goes to heating, lighting as well as ventilation. Natural ventilation is considered as one of the energy-saving factors for organizations. Other factors include the air conditioning technologies which are efficient in reducing the amount of energy consumed as well as replacing the old machines which are inefficient in performance with new ones.

This article will be useful in the development of the initiative in identifying the different ways the adoption of energy-efficient measures can help in reducing energy costs. The article also identifies some of the factors such as monitoring and control and how they can be useful in developing better efficiency in the use of energy.