

An Idea about Key Traits of Energy Efficient Building

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Abstract

Sustainability is essential for environment and this allows the businesses to stay competitive in the global market. In recent days, importance of constructing energy efficient building is increasing day to day to foster sustainable business practice and reduce environmental impacts. With the help of green technology and alternative energy source firms ensure greater success in terms of less energy consumption and greater profit. All the aspects related to the traits of energy efficient build has been discussed here. The study has been depicted the principle and practices of the energy efficient building practices. Optimization methods also have been discussed over here. Implication of renewable energy technologies in the energy efficient building practices also has been depicted in this study that focuses on the impact of energy efficient buildings in reducing environmental pollution. CSR initiatives of globalized organizations have been impacted with the effect of energy efficient building practices. Renewable energies, reuse of energies and recycling of energies also have been influenced by the energy efficient building practices that also have been focused here.

Keywords

Energy Efficient Building, Renewable Energy, Sustainability.

INTRODUCTION

In these modern days it is essential to establish an energy efficient building in order to minimise the energy cost to a great extent. The main motto of establishing energy efficient buildings is to reduce the energy consumption and at the same time improve standard of living. An energy efficient building is capable of balancing all the aspects related to energy usage in a building with the help of an advanced mix of passive solar-design action plan, energy efficient equipment and alternative source of energy [1]. An energy efficient building is capable of minimising energy, water as well as maintenance cost as a consequence this produces less greenhouse gas and therefore this does not impact the environment negatively. There are numerous materials that are utilised in the establishment of energy efficient buildings such as compressed soil vacuum insulation panels, low emissions windows and so on. Additionally, there are other materials that are utilised at the time of establishment of green building or energy efficient building.

PIR foam energy brick often called 'green energy brick' helps in the establishment of energy efficient buildings. This material is polyisocyanurate structural foam that is 16 times more efficient than traditional concrete blocks [2]. Apart from that, insulated concrete is capable of consuming less energy and thus consuming less heat. One of the major advantages of the green building or energy efficient building is that this helps to save money and also looks into the well-being of the society. Most of the energy efficient houses are designed and structured differently in order to ensure success in the process. It is believed that dome-shaped houses are most energy efficient as this poses a few corners. This in

turn allows wind to travel all the houses seamlessly without the changing of the air pressure [2]. As a consequence, this helps to maintain an optimum temperature within the room, and this ultimately allows one to consume less energy. Cubes are also considered as a great option for the establishment of energy efficient buildings.

With the assistance of the solar panel and vacuum insulation panel energy consumption of the building is managed. This helps to maintain a good balance in the utilisation of energy and at the same time this allows the companies to save money. On the other hand, there are three major ways that are able to improve the energy efficiency of building systems. It is clear that the key to manage functionality, security, safety, and efficiency of building systems is to make sure that the instruments are effectively maintained and managed by monitoring [3]. Apart from that, security managers also can monitor the energy consumption to reduce wastage of energy. By inconvenient technologies and suitable strategies, the wastage of energy and at the same time lighting control is managed and by routinely check-ups.

Occupancy-based HVAC control and as well as program thermostats are also used to effectively control lighting. All this eventually helps companies to save their operations cost to a great extent and gain more profits. It is essential for the companies to focus on the internal business structure and prioritise on the upgradation of the system to maintain the competitiveness in the global market. Every saving is crucial for the companies as this helped the firms to reduce carbon emissions and save energy for other business-related activities. In the case of industrial building, maintaining energy consumption and utilisation of alternative energy sources are integral parts in this 21st century [4]. Often solar

panels are incorporated in industrial buildings to save energy and maintain sustainability. This in turn allows the companies to improve their efficiency of the operations and at the same time this allows the companies to improve their revenue.

OBJECTIVES

The aim of the study is to understand the traits of energy efficient buildings and its impacts on the effectiveness of the organisation.

- To identify the key trait of the energy efficient building and impact on the effectiveness or the organisation.
- To investigate the ways to improve the energy efficiency in buildings for better sustainability of the environment.
- To analyse the necessity of the energy efficient building in modern architecture of the organisation.

MATERIAL AND METHOD

The overall study has been conducted with the help of the appropriate methods and techniques. In order to accomplish the study cross sectional research methodology has been incorporated as this helps is capable of assessing all the aspects at the same time. On the other hand, a qualitative research strategy has been undertaken to effectively carry out the entire research in the right direction. With the assistance of the secondary data collection methods valid and sound data has been gathered to effectively and successfully carry out the entire work [5]. This process is effective and takes less time and can be handled easily.

Qualitative researchers are capable of providing in depth knowledge about the subject matter of the study. This in turn helps to maintain reliability and validity of the findings. All the necessary and important data related to the key traits of the energy efficient building have been gathered from the authentic sources to maintain the reliability of the present study. It has been taken care of at the time of data collection that all the information is valid and the journals or articles have been published after 2019. All the crucial information has been gathered from the reliable secondary sources such as peer-reviewed journals, articles and other reliable sources to maintain the authenticity of the study [6]. Apart from that, entire study has also been conducted by following the ethical considerations to ensure successful accomplishment of the study.

RESULTS

Traits of energy efficient building

There are several traits of an energy efficient building and this has a great significance in minimising energy consumption. In order to construct an energy efficient building, it is essential for the controls to focus on a few aspects such as reducing heating, lighting loads, ventilation, cooling, and so on [7]. The main trait is hidden at the designing part of the buildings and effective planning and

design helps the entire process. On the other hand, insulation has a great impact on the establishment of energy efficient buildings. With the assistance of suitable engineering tools, the constructors design and plan the entire work and secure the success in the process of establishment of green building.

In other words, an energy efficient building can be identified with the help of numerous features such as utilisation tools and technology to monitor energy utilisation and wastage. Apart from that, by looking into the shape of the building, energy efficient buildings are also identified as their buildings are designed in a unique pattern. With the assistance of the suitable plan, organisations establish green building that eventually allows the firm to look to the betterment of the environment in terms of reducing carbon emission [8]. A well-maintained ventilation and a greater infrastructure are one of the most common aspects that is observed in the business. That in turn allows the firms to ensure utilisation of green technology is successful. In the present day the tendency of the establishment of the green business has increased and the activities related to green building have dramatically expanded around the world [9]. The benefits of the buildings are the major reason behind the establishment of energy efficient buildings.

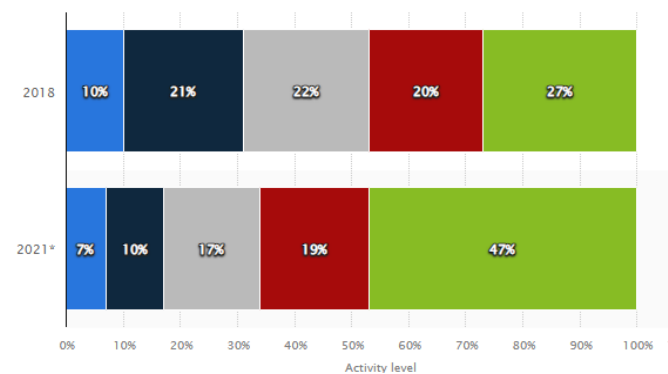


Figure 1: Levels of green building activity worldwide in 2018 and 2021, based on percentage of green building project

Challenges faced to establish energy efficient buildings

Despite the advantages there are several disadvantages or there are several barriers that impact the success establishment of energy efficient building. Most of the time the first faces issues related to the overall heating due to the excessive insulation. Apart from that most of the times the company faces issues due to lack of proper planning and expertise. As a consequence, firms fail to build energy efficient buildings for conducting day to day work. In some extreme cases firms face issues due to the insufficient financial backbone and lack of skilled workers [10]. This leads to program failure and this eventually impacts the effectiveness of the overall system. In the majority of times energy efficient buildings fail to maintain their effectiveness as often this fails to monitor carbon emissions. Additionally, technological faults also impact the overall activities as the majority of the work is handled with the help of green technologies.

Financial backbone is one of the primary factors that acts as obstacles as mentioned above. The sole reasons behind the barriers are that renewable technologies and the utilisation of few instruments are costlier than the normal and traditional system; this increases the budget at the initial time. Not only has that, monitoring the thermostat and ventilation also expanded the financial plan to a great extent. On the other hand, the secondary issues that act as barriers in case of utilisation of green technology for the sake of the establishment of the energy efficient building. In most of the cases the installation of the air source heat pumps requires space in order to operate effectively and precisely. In case of lack of space this results in a faulty aesthetic of the building and this can damage the surrounding area [11]. From another perspective, most of the time the overall process faces issues due to the unwillingness of the workers and lack of prior knowledge about the effectiveness and the operation of the technology. All these issues eventually impact the overall work and act as the barriers in the path of the establishment of the energy efficient building.

Methods of improving energy efficiency in buildings

There are several ways through which a building can be more efficient; ventilating, cooling, and reduction of heating can significantly bring energy efficiency in buildings. It is crucial for the business to focus on the insulation as this is considered as one of the essential activities of the establishment of green buildings or energy efficient buildings. Apart from that this becomes essential for the companies to select the previous ventilation system by considering the space availability and the requirement of the overall process. Choosing the right ventilation system can improve energy efficiency. Building construction should focus on insulation, in which an outside envelope should be formed with the lower temperature and cooling facilities should also be developed within this process [12]. This needs proper knowledge and skill of engineers which make betterment in overall construction without creating any harm from outside temperature.

Moreover, high skilled activities and technological implementation can make a better impact on energy improvements. Upgradation of LED lighting inside the organisation which helps to reduce usage of energy and also adjusts room temperature [13]. All the aspects are extremely crucial for upgrading the green building or to improve the energy efficiency in buildings in order to make the business more sustainable. Apart from that 'leadership energy and environment (LEED)', upgradation is a vital aspect that can improve sustainability of the building. This adaptation can bear low cost rather than any other construction element. Moreover, this mainly helps in site of planning, energy usages and indoor air quality.

Principles and practices of energy efficient buildings

Energy efficient building has followed in particular some principles that ensure the sustainability of the environment. Optimization of the energy use considering energy

restoration and conservation of the energies has been highlighted in the principle of the energy efficient building. Climatic Design of energy efficient building has been focused on the optimization of the site potential that determines the capability of the building [14]. Reduction of water conservation also has been considered in the structure of energy efficient buildings. Passively Water conservation has been concerned by the energy buildings that help to sustain the environment with positive impact. Reuse and recycle of the energies also have been prioritized by the energy efficient buildings considering the optimization of the operational and maintenance practices.

Essential features that can ensure the energy efficiency of a building are the window orientation in the building design, thermal mass, distribution technique of mechanisms, radiative loss, conductive system and the convention heat considering strict control panel. Most of the industrial belts are using the energy efficient building practices to reduce the industrial pollution along with developing the environmental sustainability that determines the climate sensitive passive impacts on the industrial operations [15]. Reducing and controlling heating, cooling ventilation and lighting loads are significant practices of the energy efficient buildings that have been also considered as the green practices in building construction.

Reuses of renewable energies including recycling of the energies are considering the energy efficient building practices to sustain the environment. Implication of energy savings segments in the construction of energy efficient buildings has been highlighted by the replacement of old instruments with new tools that can save electric energy [16]. Implication of advanced technologies increases the probability of energy savings considering the insulations, ventilations, sunlight utilizations. Considering the optimization of the methods of construction of the energy efficient buildings, rammed earth, wood, and straw are gradually used in the energy efficient building practices. The overall impact of energy efficient building is remarkably effective in the development of environmental sustainability.

Implication of optimization methods in energy efficient buildings

Building envelopes and geometric configuration implication in the energy efficient building practices enhances the energy performance of the building. Derivative and derivative free both are considered in the optimization of the building construction focusing on the energy efficiency. Appropriate optimization can mitigate the problem raised in the operational execution process of the energy efficient building practices including the optimization methods. Automation and interoperability are also prioritized by the optimization of the energy efficient building practices. Energy efficient architecture buildings have been identified as the optimization method which has been more applicable to the construction of the energy efficient buildings [17]. Envelopes parameters are determining the optimization of geometric configuration as the independent

variables enactment that helps to enhance the efficiency of energy consumption of the energy efficient buildings.

Monitoring the power quality consumption increases the strategic optimization methods implication in the green building architecture. Centralized meter reading helps to identify the electric energy consumption to control the use of electric consumption in the green building practices. Conservation of the electric energy through energy efficient building practices [18]. Energy conservation by energy efficient building practices has benefited the environment along with the human beings of the earth that helps to prevent future scarcity of energy. Building external and internal environments have been impacted with the building envelopes design that helps to save energies for the future along with current sustainability of the environment. Differentiation between the building interior from the exterior has impacted the energy consumption impact of the energy efficient building structure.

Sustainable development of energy efficient buildings considering renewable energy technologies

Renewable energy technologies determine the sustainability of the environment by reducing the energy consumption and reuse along with recycling the renewable energies. Implications of the advanced technologies considering the renewable energy generators in the energy efficient building structure enhance the probability of increasing sustainability of the environment. Water consumption reduction is one of the best characteristics of the energy efficient building practices that influence most of the industries in the global aspect to adopt the building structure considering the reduction of the environmental pollution [19]. Renewable energy technologies focused on the generating energies that reduces the air pollutants and helps to maintain the eco environment balance. Infrastructure of the energy efficient buildings has prioritized the ventilation system and sunlight accessing procedures that enhance the capability of renewable energy technologies.

This particular technology also helps to reduce the electric consumption by using the renewable resources such as fresh air and sunlight along with limited use of water, in the operational function of the industries energy efficient building practices limited the material use, considering renewable energy technologies to reduce the quantity of waste product. Energy efficient building practices have a passive effect on the waste management that also fulfil the sustainability criterion of the environment [20]. Cheap electricity resources can be generated from renewable energy with the implication of advanced technologies that helps to mitigate the demand of electric supply in a cost-effective manner. Wind, solar and hydropower can be used as renewable energy technologies that can accelerate the process of development of environment sustainability. Using the renewable energy technologies in the energy efficient building practices ensure the resources availability, by product emissions and increasing energy efficiency to execute further more operational processes. Renewable

energy technologies have considered the innovation practices that better the process of energy efficient building construction.

DISCUSSION

The discussion chapter has been interpreted as the result of evaluation of key features of energy efficient buildings that helps to develop sustainability. The characteristics of the energy efficient buildings are considered in the study to understand the importance of green building practices implication in the organizational structure. Main feature of energy efficient building is to lower the pollution of the environment and establish an environment friendly organizational structure considering sustainability development. Heat and cool control including the improvement of ventilation service along with sunlight accumulation in the energy efficient building has accelerated the process of environmental sustainability in the organization. Using renewable energies including saving energy is the purpose of energy efficient buildings.

Considering the global warming and increasing demand of energies according to the enhanced population, energy restoration is a major concern in the global aspect to avoid the scarcity of energy. Beside this, resume of energies and recycling of energies also has been prioritized in the energy efficient building practices. The study has also discussed the ways to develop the sustainability of the environment considering the energy efficient building practices. Importance of the implication of energy efficient building architecture in the organizations also has been discussed here to reduce the industrial pollution of the environment along with maintaining the sustainability. Challenges faced by the energy efficient building practices implication in the organizations also has been discussed based on the findings that helps to strategic planning for the implication of the energy efficient building practices in the industrial belt.

The study also highlighted the principles and practices of energy efficient buildings that help to develop the environment sustainability. Optimization of energy consumption and the material used have been focused here that determines the energy saving capability of green building practices. Waste management also has been prioritized by energy efficient building practices. Most effective approach of green building practices is to reduce the electric consumption by using renewable resources. Water consumption also has been concerned by the practices that assure the availability of the resources and energies. Enveloped design of energy efficient buildings helps to differentiate the exterior and interior that ensures the renewable energy consumption reduction considering the water and electric consumption. Geometric design also helps to identify the lacking implication of the energy efficient buildings that can more effectively increase the efficiency of green practices in the maintenance of environmental sustainability.

Implication of renewable energy technologies in the green

building practices helps to explore the efficiency of renewable energies to reduce the air pollution. More advanced technologies have more capability to increase environmental sustainability and lower the effect of global warming. Social and environmental responsibilities of organizations also have been enhanced that impacted the brand reputation of the company. CSR activities of globalized companies have been increased by reducing the industrial pollution and determining the environmental and business sustainability considering the energy efficient building practices. The overall discussion based on the result reflects the impact of energy efficient building practices on organizational performance including CSR activities.

CONCLUSION

The entire study has focused on the impact of energy efficient building practices on organizations that generate the objectives of the study. Key traits of energy efficient building practices and its impact on the effectiveness of the organizations has been prioritized in the objective of the study. On the other hand, challenges and strategies also have been discussed in the study to evaluate the importance of the energy efficient building practices. Secondary data analysis has been used in the study retrieved from peer reviewed journals that makes the study more reliable and validated. Thematic data analysis also has been used to interpret the secondary collected data. Themes are developed on the basis of realistic observation considering peer reviewed journals that enhance the quality of the study. The themes are helping the study to meet the objectives of the study.

Methods of improving energy efficient buildings have been discussed over here considering the principle and practices of energy efficient buildings. Optimization of the energy resources has been highlighted here to understand the depth concept of the energy efficient buildings. Envelopes design in the energy efficient building also has been highlighted here to improve the energy efficient practices. Geometric design of the buildings also has been discussed here featuring the heating and cooling control ability of energy efficient buildings and identification of the requirements of energy efficient buildings. Uses of renewable energies, reducing the consumption of energies, recycling of renewable energies has been prioritized by the energy efficient buildings. Most effective impact of green building practices in organizations is to reduce industrial pollution in a global aspect that helps to minimize the impact of global warming and develop the sustainability of the environment.

Organizations also have been benefited with the implication of green building practices in the operations of business as CSR initiatives that enhance the brand reputation of the company. Implication of renewable energy technologies in the energy efficient building practices helps to reduce the air pollution that also increases the sustainability of the environment. Characteristics of energy efficient buildings and benefits of it have impacted the

organizational performance regarding the environmental sustainability along with business. Cost-effective long-term effect of energy efficient building practices also helps to increase the profitability of the business considering extra competitive advantage. CSR initiative of globalized organizations including the implication of energy efficient buildings enhances the development of environmental sustainability.

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