

The role of green buildings in energy conservation

Assist. Prof. Dr. Hassan Youssef

Assistant Professor, Department of Architecture, Institute of Aeronautical Engineering and Technology

hassaneng49@yahoo.com

Abstract:

The world is now witnessing increasing interest in environment and sustainable development issues. Over the past three decades, there has been a growing realization that current development model is no longer sustainable, after its consumption lifestyle has been linked to serious environmental crises.

Studies confirm that humankind is currently facing two problems, the first of many resources which we consider to be extinct in near future. The second relates to the increasing pollution that our environment is currently experiencing, resulting from large amount of harmful waste that we produce. The common pressures of increasing awareness scarcity of future and growing problem toxicity in world have led to emergence issue of environmental conservation sustainability through rationalization of energy consumption as an important subject both in field of thought politics recently in architecture, At present preservation environment and sustainability, logical natural resources appropriate management of buildings contribute saving scarce resources and reduce energy consumption improve environment while taking into account whole life cycle building as well as environmental quality, functional aesthetic.

The aim of research to highlight the role of green buildings and sustainable architecture in reducing rationalizing consumption of energy, water and resources and improving public health by designing implementing buildings conform traditional architecture using modern technological systems.

Keywords:

green buildings, energy conservation, sustainable development

1. Introduction

There are no longer dividing lines between the environment and the economy since the emergence and spread of the concept of green buildings and sustainable development that ensuring the continuity of economic growth cannot be achieved in light of the threat to the environment with pollutants and waste and the depletion of its natural resources. It is achieved through the integration of the principles of traditional architecture with modern technology systems and means, as they work to rationalize energy consumption through (preserving building and natural energy sources, increasing the durability of buildings, providing comfort for residents, saving energy and operating costs, reducing pollution and waste through reuse, and green buildings). Saving between 15-20% (2014) of electricity and water consumption in addition to increasing the life of the building [14]. Protecting the right of today's generations, providing a healthy and decent life and ensuring the right of future generations is a major challenge in the twenty-first century, and green and sustainable building is one of the most important New methods and systems that contribute to obtaining and rationalizing energy in a renewable manner, and hence the role of research in highlighting the role of green buildings

as a One of the most important modern trends of architectural thought, which is concerned with the relationship between the building and its environment, whether natural or manufactured, and its role in rationalizing energy consumption.

1.1 Research Problem

Studies indicate that the construction sector alone consumes (40-50%) of energy consumption in the world according to a study [14] and that more than half of the natural primary resources (about three billion tons annually) are used in the field of building and construction, where traditional buildings produce a third of greenhouse gases. Therefore, the call continues to deal with the environment in a more balanced manner, especially by architects to search for design alternatives for modern buildings and to benefit from new and renewable natural energy sources in constructing green buildings that rationalize energy consumption.

2.1 Research objective

Getting to know the most important modern systems and design foundations for green buildings, accessing the most important technical and engineering standards for green buildings, benefiting from previous experiences (Dubai's experience in green buildings) and trying to apply them in Egypt and the Arab countries in order to benefit from natural and renewable energy sources and their role in rationalizing energy consumption in Egypt.

3.1 Study Methodology

The study methodology relied on addressing the general foundations for designing green buildings and an analytical study of Dubai's experience in constructing green buildings by addressing the green building regulation for Dubai Municipality and benefiting from global experiences in the construction and construction of green buildings and their role in rationalizing energy consumption and trying to apply it in Egypt. Figure 1 shows the general structure of the research .

- Results

- Rationalizing energy consumption for green buildings by 24-50%, while traditional buildings consume 40% of global energy.
- Reducing carbon dioxide emissions from green buildings by 33-39%, while traditional buildings are responsible for emitting 35% of greenhouse gases.
- Reducing the generation of solid waste for green buildings by 70%, while traditional buildings produce 28% of solid waste and work to fill 40% of landfills.
- The average electricity consumption in green buildings is less than 100 kilowatts/m²/year, while traditional buildings consume about 200 kilowatts/m²/year.
- Providing water in green buildings through simple investments and changing water consumption behavior.
- Saving energy through behavioral change and the application of available low-cost technology. toy

Recommendations

- The building design must take into account climatic factors such as heat, wind and rain, with attention to lighting and natural ventilation, and encourage the use of renewable energy for heating and cooling systems and rationalizing water use.
 - Attention to the application of codes for energy saving and rationalization in buildings.
 - The designer should encourage the reuse of waste and re-treatment of water for garden irrigation and hygiene uses.
- Taking into account the use of less land more efficiently, in order to reduce the required land areas, including fewer walking distances.
- Using modern technology in the infrastructure of housing and linking it electronically to the networks of cities and neighborhoods.
 - Building legislation, infrastructure and local management systems must be developed in order to comply with the requirements of cities
 - Sustainable.
 - Attention to the planning systems and building legislation of flexibility and adaptability to accommodate those proposals.
 - Expansion of building codes to include all aspects of architecture to accommodate modern technology, ways to save energy, and requirements of green architecture.
 - Focusing on the use of renewable energy sources in advanced economic ways such as solar energy, wind energy, bioenergy, hydroelectricity and underground energy, and benefiting from Dubai's experience in green construction.
 - Benefiting from Dubai's experience in developing strategic visions to activate the idea of green construction.
 - Use of recyclable building materials.
 - Reuse of water used in buildings.
 - Benefiting from directing buildings by placing solar cells on top of the roofs of buildings.
 - Take advantage of rain water and reuse it, as in the examples shown in the research.
 - Rely on natural lighting and take advantage of it.
 - Use of VOC-free paints, sealing adhesives, and formaldehyde-free materials.
 - Use of low flow sanitary equipment in bathrooms and kitchens.
 - Drip irrigation in green areas.
 - Using types of glass that reduce the heat load inside the interior spaces.

References:

- [1] eabd aljawad , 'asma' (2010) , "astighlal aleimarat almustadimat waleimarat fi tarshid aistihlak altaaqat , bahth manshur" , almajalat alhandasiat , kuliyyat alhandasat , jamieat al'azhar , s 50.
- [2] layihat almubanaa alkhadra' (2011) - manshur ealaa mawqie alkuurunaa lihukumat wabaladiat dubay www.dm.gov.ae
- [3] mubadarat dubay liliastidamat aleaqaria (2014) , altabeat al'uwlaa -.
- [4] muhamad , khalid (2016) , "tutibyq mafahiym almabani alkhadra'") dirasat halat alkhartum alkubraa (, majistir wadirasat alealya jamieat alsuwadan lileulum waltakhtitya s 71.

- [5] hatal , hamid (2007) , altanmiat almustadamat , altanmiat almustadamat fi 'amerika , manshur fi kitab almutamar walmaerid althaanaa , alfuras , taht eunwan alhifaz aleumrania - alfuras waltahadiyat fi alqarn alhadaa alwarid , matbueat baladiat dabaa , s 39.
- [6] waziri , yahyaa (2003) , altasmim almiemariu alsidiq alhadariu. nahw eimarat khadra' , maktabat madbulaa , alqahirat s 50.
- 7- nafie , mahmud 'ahmadu. "astiratijiaat tarshid almiyah aleadhuh walaistifadat minha fi tawlid altaaqat faa albiyat alsahra alearabiat faa daw' aibtikarat altasmim alsanaeaa" majalat aleimarat w alfunun waleulum aleadaad 5 aleadaad 21
- [7] G.K wok Aia, Alison and Grondzik, PE Walter (2011), The Green Studio Hand Book Environmental Strategies for Schematic Design New York, USA.PP:71.
- [8] Guzowski, Mary (2010), Towards Zero Enyrgy Architecture-New Solar Design, Laurenceking-London -pp: 132-165.
- [9] Home World Green Building Council. <http://www.worldgbc.org/>. Last accessed December 2018.
- [10] Ikola Cekić, et al., Application of solar cells in contemporary architecture Contemporary Materials (Renewable energy sources), VI-2 (2015).
- [11] Nina Lazar and K. Chithra (2019)Green Building Rating Systems from the Perspective of the Three Pillars of Sustainability Using Point Allocation Method: Springer Nature Singapore Pte Ltd. 2019 H. Drück et al. (eds.), Green Buildings and Sustainable Engineering,pp.151-165.
- [12] Nyoman Suwartha(2018)Creating a Sustainable Future Through the Integration of Management, Design, and TechnologyInternational Journal of Technology (2018) 8: 1518-1522
- [13] Richard M, Hodgetts & Luthans, Fred (2003): international Management, (3rd ed.), the McG raw – Hill companies, Inc; Singapore, P: 108.
- [14] Sayigh, Ali (2014), Sustainability Energy and Architecture Case Studies in Realizing Green Buildinges.Elsevier-Oxford-UK: pp.132.
- [15] Shahad a.m. al-Abbasi et al., Effect ofgreen roof design on energy saving in existing residential building under semi-arid Mediterranean climate (AMMAN as acase study), JES, Assiut University, Faculty of Engineering, Vol. 46, No. 6, November 2018, pp.738–75.
- [16] United Nations (UN), 2018. Sustainable Development Goals, Knowledge Platform – Industry. Available online at [http://sustainable.development.un.org /topics /industry](http://sustainable.development.un.org/topics/industry) Accessed on December 28, 2018.
- [17] USGBC (2013), LEED Reference Guide for Building Design and Construction V4: U.S. Green Building Council.PP:45-65.
- [18] Van der Meulen, S. H., Costs and Benefits of Green Roof Types for Cities and Building Owners, J. sustain. dev. energy water environ. syst., 7(1), pp 57-71, 2019.
- [19] <https://www.aia.org/> The American Institute of Architects, last accessed March 2019.
- [20] <https://www.archdaily.com> Surry Hills Library and Community Centre / FJMT" 25 Apr 2010. ArchDaily. Accessed 19 Mar 2019.