

# Green Architecture

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## ABSTRACT

green buildings are the ways and new methods of design and construction stand in environmental and economic challenges that have cast a shadow on the various sectors in this day and age, the new buildings are designed, implementation and operation methods and advanced technologies contribute to reducing the environmental impact, and at the same time lead to lower costs and, in particular, operating and maintenance costs (Running Costs) . The aim of this paper is to show the effect of Positive architectural strategies that have been developed over time. Examples of such strategies include the arrangement of rooms or the sizing and orientation of windows in a building, and the orientation of facades and streets or the ratio between building heights and street widths in urban planning, Principles of green architecture include : Saving alternative energy sources. Whenever feasible, build homes and communities that supply their own power. Provide energy and conservation it in buildings for maximum protection against the loss of warm or cool air & Laminated glass some windows provide the same insulation value as traditional stone, masonry, and wood construction. In regions that experience extreme heat, straw-bale or mud-brick construction—used since ancient times ,is a good way to save money and energy indications designed to reduce the negative impacts in the design and applied to a sample of buildings and extract the results.

**Keywords** – Architecture, green architecture, energy sources, architectural strategies, design.

## I. INTRODUCTION

During the 1970s the Norwegian environmental philosopher Arne Naess proposed a theory of “deep ecology” (or “ecosophy”) asserting that every living creature in nature is equally important to Earth’s precisely balanced system. Working in exact opposition to this philosophy, the politics and economics of that decade accelerated the development of green awareness. The lack of business regulation in the United States meant unlimited consumption of fossil fuels. Meanwhile,

the 1973 OPEC oil crisis brought the cost of energy into sharp focus and was a painful reminder of worldwide dependence on a very small number of petroleum-producing countries. This crisis, in turn, brought into relief the need for diversified sources of energy and spurred corporate and government investment in solar, wind, water, and geothermal sources of power.

## II. GEEN ARCHITECTURE CONCEPT:

Green architecture seeks to minimize the negative environmental impact of buildings by efficiency and moderation in the use of materials, energy, and development space and the ecosystem at large. And uses an energy and ecological conservation in the design of the built environment. A lot of architects have called for using the green architecture, especially in the seventies after the energy crisis solutions in the world and architects who call for the concepts of green architecture such as: William Reed , Bruce Bean and Robert Fox from the United States .Thomas Herzog from Germany Norman Foster and Richard Rogers from Britain, Architect "Hassan Fathy" from Egypt ,architect Ken Yeang from Japan and many others.

William Reed said that” green building is only the buildings are designed, implemented and managed in a manner which puts the environment in mind it is also felt that one of the concerns of green building appears in reduced based on the influence of the environment besides reducing its inception costs and run Green architects generally work with the key concepts of creating an energy efficient, environmentally friendly house, The natural ecology of the planet should be the macro model for architects to use as a model for a green building. Architecture can model itself on the planetary system to copy the natural ‘green’ environment, making a new building, or adapting an existing building, both environmentally friendly, in terms of materials used and the space it occupies, and energy efficient, including solar technology.

Green architecture briefly, the design of the buildings in a manner that respects the environment and its characteristics in line with it without repulsion or cost, taking into account the importance of reducing the energy, materials and resource consumption while

reducing construction and use effects on the surrounding to construction elements of the environment in addition to organizing harmony with nature to achieve a functional system and beauty at the lowest cost processed.

### III. HISTORECAL BEGINNINGS OF GREEN ARCHITECTURE

By the mid of 1980s, Number of environmental societies radically expanded; groups such as (Greenpeace, Environmental Action, the Sierra Club, Friends of the Earth, and the Nature Conservancy all experienced burgeoning memberships). For architects and builders a significant milestone was the formulation in 1994 of Leadership in Energy and Environmental Design (LEED) standards, established and administered by the U.S. Green Building Council. These standards provided measurable criteria for the design and construction of environmentally responsible buildings. The basic qualifications are as follows:

1-Sustainable site development involves, whenever possible, the reuse of existing buildings and the preservation of the surrounding environment. The incorporation of earth shelters, roof gardens, and extensive planting throughout and around buildings is encouraged.

2-Water is conserved by a variety of means including the cleaning and recycling of gray (previously used) water and the installation of building-by-building catchments for rainwater. Water usage and supplies are monitored.

3-Energy efficiency can be increased in a variety of ways, for example, by orienting buildings to take full advantage of seasonal changes in the sun's position and by the use of diversified and regionally appropriate energy sources, which may, depending on geographic location, include solar, wind, geothermal, biomass, water, or natural gas.

4-The most desirable materials are those that are recycled or renewable and those that require the least energy to manufacture. They ideally are locally sourced and free from harmful chemicals. They are made of nonpolluting raw ingredients and are durable and recyclable.

5-Indoor environmental quality addresses the issues that influence how the individual feels in a space and involves such features as the sense of control over personal space, ventilation, temperature control, and the use of materials that do not emit toxic gases. The 1980s and early '90s brought a new surge of interest in the environmental movement and the rise to prominence of a group of more socially responsive and philosophically

oriented green architects. The American architect Malcolm Wells opposed the legacy of architectural ostentation and aggressive assaults on the land in favour of the gentle impact of underground and earth-sheltered buildings—exemplified by his Brewster, Mass., house of 1980. The low impact, in both energy use and visual effect, of a structure that is surrounded by earth creates an almost invisible architecture and a green ideal. As Wells explained, this kind of underground building is “sunny, dry, and pleasant” and “offers huge fuel savings and a silent, green alternative to the asphalt society.”

### IV. GREEN ARCHITECTURE PRINCIPLELES

There are many points characterized by the green trend in the design of buildings, and to achieve sustainability in the environment must take into account in the architecture all the resources contained in the building, whether material or energy or contribution in providing the needs of the users of the building The points are.

- 1.Energy conservation
- 2.Climate adaptation
- 3.Minimize the use of new resources
- 4.Respecting Site
- 5.Respect to employees and users
- 6.Overall design

Therefore, no additional costs are to be paid in the design and construction phases can be restored quickly, compared to so over-the traditional view of trying to reduce the cost of initial construction could lead to material wasted and energy bills higher on an ongoing basis . But the benefits of green buildings are not limited only to the aspects of the environmental and economic direct , the use of natural daylight in office buildings , for example, in addition to that it reduces the costs of operating capacity is also makes workers more productive , have found the study conducted by Almt\_khasassan in environmental psychology at the University of Michigan (Rachel and Stephen Kaplan) that staff who are available to them a view of the natural areas of their offices showed greater satisfaction toward work , and they were less exposed to stress and disease was less . the use of natural daylight in shopping centers leads to raise the volume of sales kit is specialized consultancy in the techniques of building energy-efficient, based in California , found that sales were higher (40% ) in the stores marketing has lit through roof vents (Skylights). The group also found that the performance of students in the classroom lit naturally better (20%)o ensure a high-quality product.

## V. CASE STUDIES OF GREEN ARCHITECTURE:

this paper have been identified and intentional sample selection included three architectural projects takes into account the disparity between designers and functional contrast between the projects, with projects including recreational buildings and residential buildings, the three projects are:

5-1 Swiss building in London designed by architect Norman Foster and Partners .The tower sits on a street in the City of London, this building as the newest addition to the skyline of the city , and this tower erect a fruit option consists of (41 stories ) , but the wonderful thing about this building is not in the form of architecture is nice but its high efficiency in energy consumption saves anticipated in energy consumption up to 50% of the total energy consumed by a traditional building . The system of weather sensors located on the exterior of the building. The shape of the building is designed to increase the use of natural daylight , and reduces the need for artificial lighting .fig(5-1)

5-2. Tower (Conde Nast) is determined by (Fox, soya Architects).Tower (Conde Nast), consisting of (48 stories) in Times Square in New York, designed by (Fox Architects and soy). It is one of the early examples that have applied the principles of green and sustainable architecture in an urban building large, it has almost used all the techniques imaginable to save energy. The building has been used a special glass let in natural sunlight and keep the heat and ultraviolet radiation outside the building, and reduce internal heat loss during the winter. fig(5-2)

5-3. Mesenja Kuala Lumpur Tower 1992 Menara Mesiniaga, a design of architect Ken Yeang.The building is located in Subang Jaya, near Kuala Lumpur, Malaysia Designed by Ken Yeang to reflect the principles and experience in green Architecture ,the building is considered as a model applied the rules of traditional Malaysian architecture and modern rules in parallel, is also considered as a model for high buildings environmentally friendly, reflects the strong relationship between the building and the climate and landscaping In this regard, says Ken Yeang: it can be routed because the building generates power rather than consumption and through the analysis of site building is located on a major highway leading to the airport of Kuala Lumpur, and represents an important focus of monitoring by the surrounding buildings. Area with hot tropical climate, varying the temperature of the night and the degree of the midday heat a little, as the heat and humidity is almost identical in all parts of the year .fig(5-3)

Practical part : a form was preparing to enter indicators extracted from the theoretical framework and distributed to 30 architect has given a score for each building has on the grounds that the indicators equal in influence reached an arrangement of buildings, in order of preference as follows :Swiss Tower was taken best scores , tower (Conde Nast) comes second building and finally Mesenja Tower as shown in table(1-5)

final Indicators coding	Mesenja Kuala Lumpur Tower	Tower (Conde Nast)	Swiss building
<b>X1</b> : Simulate the shape of the topography of the site and influenced its form and its borders	7	8	10
<b>X2</b> :The use of seasonal colors and reflective materials on surfaces formalism to reduce heat loss and gain	5	9	7
<b>X3</b> :Using the principle of all High tech in the maintenance of the building	7	8	10
<b>X4</b> : Plurality of layers in the building to achieve the principle of investing in the ceilings and walls and thermal insulators to increase the efficiency of ventilation	6	8	9
<b>X5</b> :The use of smart glass surfaces	8	9	10
<b>X6</b> : Adoption of the principle of self-support of the form through the use of IT systems, self	5	7	9
$\Sigma$	38	49	55

Table(1-5) shown the result of questioner



Fig(5-1)

Fig(5-2)

Fig(5-3)

## VI. CONCLUSION

Green Architecture is called “ecologically or intelligent design,” because it

1. involving the cooperation of the architect, corporate leaders, and scientists. This design principle takes into account the “biography” of every aspect of manufacture, use, and disposal: the choice of raw ingredients, transport of materials to the factory,
2. maximum protection against the loss of warm or cool air. Major chemical companies have developed responsibly manufactured
3. to ensure that our actions and decisions today do not inhibit the opportunities of future generations.

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