OPTIMIZING THE ENERGY CONSUMPTION TOWARD SUSTAINABLE DEVELOPMENT: A CASE STUDY IN MOUNTAINOUS AND COLD REGION

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Received: 22.03.2015; Accepted: 29.05.2015

Abstract. Azarbaijan is a cold region and an appropriate designing is required to reduce energy consumption and using local material. Therefore, the local culture of region, aesthetic and respect to the nature should be focused. The main purpose of this study is to focus on the green architecture in relation to design building in the cold region toward sustainable development and issues including form of building, kind of material, using green architecture and parks and how to place the building based on local culture. To the necessity of reducing energy consumption is a method to reduce the environmental stress. It should be noted that making green space and parks in different parts of city to access sustainable development and preventing the disaster for future generations cannot be done without focusing on the nature. Sustainable architecture is an approach in which several issues should be focused including quality, focusing on the future and environment, using appropriate material and regarding standards to reduce the energy.

Keywords: Sustainable Development, Green Architecture, Building Design

INTRODUCTION

Recognizing and focusing on the green and local architecture requires society recognition. Increasing the popuraltion and urbanism lead to harmful effect including imbalance development of cities and marginalization. Urban parks as a crucial element play important role to increase the happiness of urban harsh environment. In cold regions, due to the rough and steep terrain, only villages and small towns can spread and large cities at the foot of the mountains if the altitude is possible to develop a large flat surfaces on the slopes of the mountain. Due to the very cold weather in most time of the year in the region maximum use of the sun enjoying the daily fluctuations in temperature and preventing heat protection from cold winter wind in a residential environment is essential (Kasmaei, 1998).

Green space as part of the civil service can not placed divorced from the needs of the urban population (Pourahmad et al. 2009: 31). Green space needs in process of expansion is dependent on size, so one of the most important urban planning is planning of green space and attention to the parks. Also, structures that interact with the local climate and in an effort to reduce dependence on fossil fuels is considered as one of the most important design. In other words, the spread of construction based on the design in harmony with the climate can have an impact on reducing energy consumption and the context of the body of the city, because a significant percentage of the population live in large cities or employed, as well as most construction is done in cities. By considering all these issues, many of the problems of energy waste in buildings are related to urbanization.

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Special Issue: Technological Advances of Engineering Sciences

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The definitions of sustainability and green architecture

The term “sustainability” was introduced first time in 1986 by the Committee of global environment (meeting the needs of the present without compromising the resources of future generations to meet their needs) and every day it was added to the range of an appropriate strategy to take on the world.

Healthy city is a city that first provide facilities for humans, animals and the plants. In other words, a healthy city should be in terms of survival and life (Bahreini 1992, p. 91).

Sustainable construction is, thus, defined as managing a healthy clean environment based on effective utilization of natural resources, ecological principles, with the aim of designing sustainable buildings to reduce damage on the environment and natural resources, including the following rules:

- Reducing the consumption of non-renewable resources
- Development the natural environment
- Removing or reducing the use of toxic or harmful to nature in the building industry

Therefore, sustainable buildings is defined as building the least inconsistent and incompatible with the natural environment around the world and across the wider region.

Sustainable development can be considered an approach that requires economic growth and environmental improvements that can be formed at any place and time to be practical, while focused on the historical and cultural features.

Green architecture is raised sustainable development which shows the human need today in front of the disadvantages of the industrialized world.

The study area

East Azarbaijan was considered as the study area. In cold areas, the outer surfaces of buildings should be placed against wind, double windows and thick walls run properly to minimize heat exchange. Moisture also affects how construction and selection of materials. The environmental factors are influence exactly in the form for directing, roads, urban streets and materials (Ghobadian, Mahdavi, 1993, p. 20).

The general characteristics of the urban fabric in mountainous regions are as follows:

- Small urban spaces and enclosed
- Dense urban fabric and buildings connected
- The effects of the sun and the earth, the determining factor in the establishment, development and overall image of the city
- Streets and main thoroughfares parallel to the ground level and with a width less

Due to the very cold weather in most of the year, people in the areas of dense urban buildings are connected with with the cold outside residential areas, hot and less, In addition, the radiation of heat from the hot outer surfaces of the walls of buildings and urban spaces has provided some moderately cold weather. The spaces are small and therefore have the advantage (Ghobadian, 1998, p. 99).

Here are two examples of this type of architecture is shown as belonging to cold rural areas are: Kandovan village is located in 50 km south-west of Tabriz and one of village in the Sahand and is located in 18 of Osku in Daghly Sultan lush, What ancient identity Kandovan data of 117 households and residential homes within the mass of the cone and pyramid-shaped rock.
Rock Architecture shows struggle scenes between man and nature in the service of the natural rock. In the common architecture, by building materials, gypsum and lime and clay, are used to create the main board whereas in architecture of the space rock, it is evident in rock and stone, such as physical, strong creates oscillations around this space.
In the Khalkhal area, at the foot of steep mountain slopes of soaring mountain named "Boldashi" Qezel Ozan River and on the east coast village called "Kazaj" is located in one of the 12 villages and 10 villages with the aim of Tourism of the value of traditional architecture country.

The name of the village "Kazaj" is from the word "Kazeh" the wand (Dgngya Alaghajy). This village as residential rural single village stew Rostam north and height thousand and 250 meters above sea level with the position of the mountain range and within 5.17 kilometers from the center of the village stew Rostam (Hashchin) located to the nearest city (Khalkhal) 5.57 km away.

Kazaj village construction texture focus on the initial core and therefore agricultural lands and gardens built in the suburbs and surrounding tissue developed residential.

What made this village important, in addition to the unique architecture and the architectural interest of the people is emphasis on the protection of traditions, customs, traditions and culture of this region.

The importance of research for sustainable design

The purpose of this research is to study the impact of the Iranian laws on the use of energy in buildings. With this intention, one of the issues that adverse effects on the construction of buildings in the city and increase energy loss, the lack of homogeneity is the height of adjacent buildings that in addition to the aesthetic issues city, the building aims to increase energy loss. This entry refers to the laws of thermodynamics in physics to explain the heat transfer in the objects. In the nature of the physical proximity of hot and cold heat exchange between the warmer object to a cooler place and heat transfer and this exchanges until the temperature of the body to reach equilibrium goes out. This exchange speed depends on the material forming. Thermal energy can help in the process of conduction and convection molecules or transferred by radiation. This law is designed to neighboring buildings to avoid energy waste in buildings considered to minimize energy loss. Looking at the architecture of coordination between the climate and the use of local materials, we could avoid energy loss and the appropriate solutions for the design of buildings. Nowadays, climatic characteristics of each region by ignoring not only it does not pay attention to energy waste, but also it is irreparable blow to enter sustainable architecture. To align with sustainable architecture, we should pay attention to how exposure to other neighborhoods and how to create configuration and to save the city by emphasizing the importance of green architecture and nature.
The phenomenon of vernacular architecture is discussed along with the aesthetic and in the mystical concept in the purity of thought and respect for nature.

Another important issue to consider green space in cities, adjustment of temperature, relative humidity, and dust is increasing.

There are trees and grasslands, as well as in public spaces and parks in the cities of today's social dependence is pale strengthen and to reduce aggression and achieve peace charitable mood for intimacy are very effective (Chiesura:2004:130).

**The principles of green architecture**

Energy conservation design principles of buildings, depend on the climate, location of buildings and interior spaces so that fossil fuel consumption can be minimized, the use of new resources can be reduced with respect to site users to green architecture. However, the building is located in such a way that the calm in the international outbreaks- principle of the end is holism, in order not to go into a building, but also it is a stable form of an urban environment.

**Type of materials**

The use of local materials as possible is one way to move towards a sustainable community. Materials that are in the area do not have the energy to move. In the cold climates it is better to reduce the energy consumption due to the material, which would be realized. In addition, the materials that are used materials back into nature. In order to achieve high performance and the stability of the facility equipment maker is the natural energies. Insulation and equipment for the building materials used should not have the effect on the ozone layer. Choice of building materials taking into account two factors: a critical condition and another outside air temperature is determined.

**Sustainable and healthy city**

The city, due to the specific use of resources, avoids overproduction waste and recycling as much as possible and adopt effective policies in the long term in order to be able to survive. Sustainable city of the modern city is characterized by large volumes of material and energy input versus output volume of waste and pollution.

Sustainable city must be based on planners aim to create cities with less energy input and output materials and less waste and pollution should concentrated. (Turner 1997, p. 180). Sustainable cities with less and recycle more input and output (ibid., p. 181).

Green City is a city in which people towards their environment (air, water, soil, plants, animals and humans) is a sense of responsibility. In this city's per capita green space, pollution and waste production at acceptable levels in the lowest level, and the best form of recycling, as well as separating it from the source there. The purpose is to optimize energy which is closer to international standards. The following city is concerned with some issues such as creating ecological, self-reliance urban and urban centers of energy savings through more compact forms of urban sustainable development.

**Sustainable architecture and background of the study**

Sustainable architecture is related to increasing quality and standard in the life. The best concept of sustainability for architect is to increase quality in the artificial environment. History of sustainable architecture in iran is better than west and traditional architecture as it is one of the best sample of sustainable architecture. Iranina traditional architecture show that Irannian emphasize on using renewable energy appropriately and simply but effective methods was used in the past.
Supplying the energy in the sustainable architecture

In the developed countries, there are several resources of energy supply. These resources include solar energy, wind, thermal earth, which are obtained through earth layers.

The role of green space in the urban sustainability

Green space could be defined as entertainment place with some trees. Green place plays an important role to reduce the density of air routes, completing residential and cultural space and is important in term of ecological and mental aspect. Green place plays an important role in the public place to increase spirit of individual in the society and mental balance (Mohammadi deh cheshmeh 2007, 98).

Some of buildings which have paid attention to principles of sustainable development and environmental architecture are as follows:

Figure 5. Green building aesthetics in homes - the architect (Chen Ying) residential complex in Malaysia.

Figure 6. 55-unit housing complex using solar panels in California Auckland.

The Special criteria of green space include locating in the center, regarding the hierarchy, accessing to communication network, increasing population and security of parch and enjoying visual views of park or pedestrians (Saeed Nia, 2003, pp.86 - 87).
CONCLUSION
Using new energies and green park and focusing on green places and designing buildings which minimize waste and energy consumption to prevent pollution and human enjoys physiological and mental comfort and focuses on local pattern of iranian tradition. Building should have two floors and have yard, garden, underground, winter seating, summer seating and balcony. If the situation is cold, energy supply through sun and wind, kind of material, thickness of wall, window dimension is not possible. This leads to wasting the non-renewable energy. By designing the architecture related to the climate of cold region, the energy is saved and resource are free or cheaper. So, sustainability is achieved in the architecture and this is purpose of all informed human.

REFERENCES