

Functional Plans for Designing Residential Units in Hot and Humid Climate Based on Sustainable Architecture and Ecological Systems

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Abstract

Buildings are one of the main energy consumers and thus, trying to find ways of creating structures that get their energy from alternative sources rather than from fossil fuels has created a new challenge among architects and designers. If the environmental conditions of the location are taken into consideration, the shape of the building, the way it is positioned and interior design can make living in that house much more comfortable. Each building must be designed in a way that minimizes the use of new sources of energy. In this article, different methods of overcoming critical situations or benefiting from favorable climatic conditions have been introduced; hence, it will become possible to take advantage of natural environmental conditions and provide considerable heat and comfort.

In order to reach this goal, first, the influence of weather conditions on a house in a hot and humid area was studied in Bandar Abbas, Iran. The final form was gained through the study of the consistency and the efficient use of useful sources of energy in nature such as sunlight and wind. Given the nature of the subject, descriptive research and observation have been employed in this study.

Keywords: Sustainable development, Renewable energy, Fossil fuel, Eco-tech, Climate, Wind-catcher (Badgir)

Introduction

The population increase in the world has caused problems such as the destruction of forests, the extinction of certain species of plants, the waste of energy, global warming, etc. Certain measures have been taken to protect the environment in the past two centuries. The definition of sustainable development is based on new solutions for problems such as the destruction of natural resources, the destruction of ecosystems, pollution,

etc., as opposed to traditional structural, social and economic patterns.

Objectives of the Study

The following have been considered the objectives of the design:

- Maximizing the consumption of solar energy and minimizing the consumption of fossil fuels.
- Creating a space which coordinates with the local climate and architecture.
- Optimum use of wind power while considering the natural form of the building.
- Minimizing the amount of water used and the efficient use of rain water in the building.
- Creating a man-made environment based on sustainable principles.

The Framework of the Study

In this article the characteristics of sustainable architecture and ecological systems have been used. The climate chosen is hot and humid and thus the city of Bandar Abbas, which is a port city in the South of Iran and enjoys hot and humid weather, has been chosen. The characteristics of this kind of climate have been efficiently used. The characteristics of sustainable architecture, the geographic position of the city of Bandar Abbas, and the qualities of hot and humid climates are explained below.

Literature review of sustainable development

The roots of the campaign to protect the environment and have sustainable architecture can be found in the 19th century. Among global efforts to reduce the threats to the environment and to promote sustainable architecture was UNESCO's program called "Human and Biosphere" in 1971, Human Settlement Program 1987, Montreal Protocol (1987), and finally the most interesting and innovative was the UN Conference on Environment and Development in Rio De Janeiro