

Journal of Urban Environmental Planning and Development

Vol 2, No 6, Summer 2022

p ISSN: 2783-3496 - e ISSN: 22783- 3909

<http://juepd.iaushiraz.ac.ir/>

DOI: 10.30495/juepd.2022.690527

DOR: 20.1001.1.27833496.1401.2.6.5.0

Research Paper

Identification and introduction principles of green architecture in Iran to reduce energy consumption, case study of Bushehr green building

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Received: 2022/02/07 pp 61-76 Accepted: 2022/05/16

Abstract

High energy consumption and its adverse consequences are among the greatest concerns of today's world. One of the ways of balancing energy consumption is sustainability, particularly in buildings since according to Iran's annual energy records, more than one third of the country's energy is consumed in the building sector. Today, sustainable architecture is among the most important approaches in architecture, aiming to reduce consumption of resources, preserve the natural environment, and promote health. Given that the applied aspect of this approach requires further attention in Iran, this study sought to explain the principles of sustainable architecture and outline the applied sustainable principles in Iran by examining an instance built in Bushehr. In addition, it intended to investigate how successful the project was as many of these principles have been studied and defined in different parts of the world and given that they are specified for a particular climate, they cannot be used as principles prepared and suitable for the climate of Iran. Their success can only be evaluated using software applications and through the passage of time. In this study, first, the concept and aims of sustainable architecture were explained through library research on the subject and real definition of sustainability principles. Then, the building that has been introduced as a sustainable structure in Bushehr was simulated and analyzed in DesignBuilder. The results indicated that in this project, with 235.85 kWh/m² energy consumption, cooling required the most energy and to reduce energy consumption and move towards the principles of sustainability, principles such as proper definition of the dimensions of openings (for example, openings with medium dimensions since large dimensions do not fit warm and humid climates) and canopies (such as vertical canopies) should be used in constructing such buildings.

Keywords: sustainable architecture, Iran, energy consumption, sustainable architecture principles, architecture.

Citation: Mohammad Behzadpour, Behnaz Kashanizadeh (2022): **Identification and introduction of green architecture laws in Iran to reduce energy consumption, a case study of Bushehr green building**, Journal of Urban Environmental Planning and Development, Vol 2, No 6, Shiraz, PP 61-76.

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Extended Abstract

Introduction:

The green process in architecture is an ancient process, for example, since cavemen first realized that choosing a cave facing south is much more suitable in terms of ambient temperature than a cave opening to the north. The new issue is understanding the importance of green architecture for artificial and human environments. Creating the best process for designing buildings; In such a way that all the resources entering the building, its materials, fuel or objects used by the residents, need to create a sustainable architecture. Keeping up with nature is a fundamental thing in traditional Iranian architecture and the principles in traditional Iranian architecture try to use energy efficiently, but today constructions in this region do not pay attention to this or by using laws defined for other climates. Are created. In recent years, many laws, regulations and assemblies have been created in this field, the most prominent of which are Leed, Breem, green globes, DGNB and many others, most of which are the foundations of sustainable buildings in general and public or Explained for other climates except Iran. In Iran, some projects have tried to create buildings called green buildings due to the prevailing conditions in terms of climate and energy consumption, but due to the lack of specific laws specific to the climate of Iran, no source for Measuring the success rate of their performance is nothing but the passage of time. With the current situation of energy consumption and its shortage in Iran, recognizing and introducing these laws will be very important. Given the issues raised, the main question of the research is what are the current laws of green and sustainable architecture in Iran , And after recognizing and studying the principles of sustainable architecture, measuring the success of projects made in Iran as sustainable architecture, because there is no rules for sustainable architecture in Iran and this ecosystem, in view of all the cases that will change the determination of these laws according to the geographical location of the region, and on the other hand by looking at the cost and energy shortage in Iran and inconsistency The sources of existing regulations with the current conditions in Iran This issue is very important.

Methodology:

This research has been done by descriptive-analytical method and then by simulation with the help of Design Builder software, a case study has been researched and studied, which finally leads to the conclusion of the studies. The context of sustainability, sustainability in Iran and the goals of sustainability in the construction industry has been prepared and read to provide a basis for identifying and determining the key criteria. And then the building designed based on sustainable architecture in Iran, which is the study sample, has been studied with the help of simulator software.

Results and discussion:

The building has an energy consumption of 235.85 due to its location in hot and humid climates and on the coastline. According to the above diagram, the consumption of each of the heating, cooling and electricity energies can be seen. As a result of this analysis, Find that the building in question has the highest amount of energy consumption in the field of cooling and with the help of passive and active systems this consumption should be reduced, for example, vertical canopies can be used and the amount of openings should be neither too big nor too small. Systems can minimize energy consumption in this building

Conclusion:

According to the issues raised, it can be seen that the need to reduce the consumption of fossil fuels in each sector is a requirement, and in the field of architecture with the help of sustainable architecture can be achieved to a very significant extent. In many developed countries, this is important with the help of pre-determined laws and in the form of specific instructions, but in Iran there are no specific laws for this. Since buildings in Iran are built with the method of sustainable architecture and principles derived from it, which also existed in traditional architecture, and with the help of design builder software, we examined one of these examples to find out the amount of energy consumption with the help of sustainable process. How much will be reduced? The results of the analysis show that the energy consumption in the building under construction for cooling is higher than heating and lighting. Thus, it seems necessary to find solutions to reduce the need for energy for

cooling due to its significant effect on increasing the amount of initial energy in this study. One of the things that helps reduce the amount of cooling energy consumption is shading and shading forms, which prevented the amount of sunlight from entering during the warm seasons.