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The bioclimatic design approach to plateau region buildings: Case of the Lhasa

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Abstract

Bioclimatic architecture design is a connection to nature that requires accurate and concrete climate data of site. Meanwhile, the climate and environment conditions should be taken into account in order to help achieve the optimal energy efficient and thermal comfort inside. The purpose of the paper is to determine the adaptable strategies for Lhasa building design that through the simulate analyses, including temperature, relative humidity, solar radiation and air velocity. Moreover, the structure and materials of traditional dwellings will also be considered in the research. Finally, hoping that the research and exploration of this paper, providing reference to the design and analysis method for ecological building in Lhasa in the future, and other cities also can be used for reference.

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1. Introduction

Currently, oil, coal and natural gas the three kinds of traditional energy resources around the world are exhausted. Mankind will have to turn to the bio-energy, water, geothermal, wind, solar and nuclear energy. Four key issues of China's energy development mainly: low per capita energy ownership. Secondly, still coal-dominated energy structure, accounting for about 75%. Thirdly, the energy distribution is uneven. Finally, energy end-use efficiency is only 33%, 10% lower than in developed countries. Meanwhile, with the rapid development of urban construction, China's building energy consumption increased significantly year after year (Fig. 1), has reached 32% of the total social energy consumption, coupled with an annual energy production of building houses about 13% of the total energy consumption of the building has reached 45% of the total energy consumption [1].

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From smog to pollution, energy consumption to low-carbon. The concept of sustainable development among construction, energy, and environment, tripartite become the most important issue in the building professions. We follow the traditional architectural design patterns, at same time, it began trying to find a not only meets the needs of the present without compromising future generations to meet their development model needs.

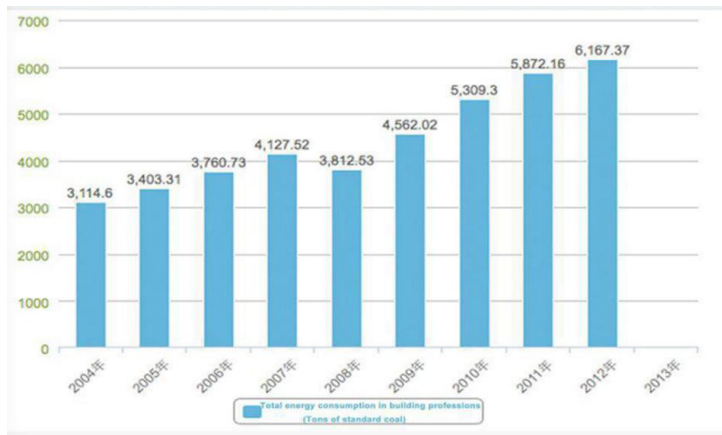


Fig. 1. Total energy consumption in building professions from 2004-2013.

Lhasa is the capital of the Tibet Autonomous Region of China, but also the Tibetan Buddhist shrine. It's in central Tibet Plateau, north of the Himalayas, 3650 meters above sea level, the Lhasa River flows through here, in the southern suburbs of the Brahmaputra injection (Fig.2).

Due to it has the special mountain plateau climate, where year-round sunshine, low rainfall absorption, dry climate, winter without cold, no heat in the summer. The building should be designed to absorb more natural energy (such as solar energy and solar energy) and use full of nature resource to maintain indoor thermal comfort as the goal.

The primary aim of the present work is, therefore, to analysis the climate of Lhasa, where well established strategies could have making good use of the existing natural resources and realize the energy effective or building sustainable.



Fig. 2. The map about the location of Lhasa, Lhasa River and Brahmaputra River.

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