

Study on Energy Conservation of Urban Buildings and Green Development Strategy in Lanzhou

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Keywords: Lanzhou, Urban building energy conservation, Sustainable development, Green development strategy, Policy interpretation

Abstract: With the continuous development of modernization and industrialization, human beings are facing social problems such as environmental pollution and resource shortage, and the concept of sustainable development has emerged. With the deepening of people's concept of environmental protection and ecological knowledge, sustainable development has become the primary issue of economic and construction development. In recent years, in the context of sustainable development, green buildings are gradually known by people. Lanzhou has also increased the development of green buildings. Various reconstruction projects of old buildings have improved the appearance of Lanzhou, as well as the utilization efficiency of solar energy, wind energy and other green energy.

1. Introduction

Based on the development of green building technology, through advanced construction methods and scientific construction concept, the green building construction will be prepared in many aspects, which can effectively improve each green building construction process, and in the green building maintenance link, the concept of environmental protection should also be implemented. At present, the development of green building in our country has just begun, and there are still many defects that have not been studied, which to a large extent restricts the development of green building in our country. At the same time, because of the strict requirements of construction technology, so many new green energy-saving technologies can not be well used.

2. Characteristics of Green Building

2.1 Life Cycle

The application of life cycle in green building is very extensive. It is not only reflected in the green building cycle, but also reflected in the construction process of green building because the preparation and construction process in the early stage of the building have a great impact on the environment.

2.2 The Basic Function Demand of Green Building is Health

The purpose of green building is to make the building meet the needs of environmental protection and energy conservation from construction to use. Therefore, the use of green building materials can greatly reduce the sand pollution in construction and energy consumption in use, which can effectively reduce the damage to human health caused by environmental pollution. Of course, we can't save energy by any kind of means. We still need to use proper ways and technologies to choose building materials that are not harmful to our health.

2.3 Harmonious Coexistence of Green Building and Nature

The cities and buildings we live in are man-made environments for people's living, which are derived from man-made changes in the natural environment. Therefore, the urban construction (building) environment should be fully considered to avoid damaging the harmony between man and nature.

In the construction process and the use of energy by the building itself, we should also try to use

more renewable energy (solar energy, wind energy, geothermal energy, etc.), so as to improve the building itself and achieve the role of energy conservation and environmental protection.

3. The Development of Green Building in Lanzhou

3.1 Overview of Lanzhou

Lanzhou, known as Jincheng in ancient times and the capital of Gansu Province, is the primary transportation hub in Northwest China and one of the important central cities in the western region, as well as an important node city on the Silk Road Economic Belt.

(1) Physical geographical conditions

Lanzhou is located in the Loess Plateau area of the mainland of China, which is basically in the center of China. Its topography is also complex and diverse, and it is formed by basins, mountains and loess gullies. Lanzhou city is generally high in altitude. The Yellow River runs through the whole urban area from west to East, thus forming a valley type urban area with two mountains and one river. The city belongs to the typical continental arid climate, with little and concentrated rainfall, large annual change rate and prominent drought phenomenon. The annual average temperature in the urban area is about 10 °C. Due to the deep inland and the blocking of mountains on both sides, the wind speed in Lanzhou is relatively small, and the number of days without wind is more than half.

(2) Social and cultural conditions

As the first city crossed by the upper reaches of the Yellow River and an important hub on the Silk Road, Lanzhou has rich regional characteristics and culture after long-term construction. Lanzhou has been an important traffic fortress in the northwest since it was built in ancient times. At the same time, it has also become an important channel to promote regional cultural exchanges between the East and the West.

(3) General situation of modern Lanzhou City Development

As one of the first batch of key industrial cities and logistics centers in China, Lanzhou now has an industrial development system based on chemical industry, metallurgy, machinery, textile, medicine and other major industries, combined with regional resource development. After long-term construction and development, especially under the policy of national reform and opening up, Lanzhou, as the capital of Gansu Province, has made rapid economic development, and has become the second comprehensive economic city after Xi'an in Northwest China.

3.2 General Situation of Local Policies and Development of Green Buildings in Lanzhou (2014-2019)

2014 is the first year of implementing green building in an all-round way. In order to promote the all-round development of green building in the shantytown reconstruction project, Lanzhou city has adopted the working idea of promoting the overall development by local demonstration and extending the development from single building to area. First, two guarantee housing projects are determined to take the lead in implementing the green building standards, and then drive other projects to consciously implement the green building standards, which will be extended to Chengdu district by 2015.

From November 19 to 20, 2015, the Ministry of Housing and Urban-Rural Development of the People's Republic of China carried out a special inspection on the implementation of green building development in Lanzhou and Gansu, and carried out a group random inspection on the policies formulated by multiple projects. After the inspection, the inspection team fed back the inspection results, affirmed the achievements of building energy conservation and green building work in the province, and reported the problems found in the inspection. Finally, Chen Yiming, the chief engineer, put forward the requirements for building energy conservation and green building work in "the thirteenth Five-Year Plan" of the whole province from five aspects: sorting out problems, strict management according to regulations, long-term adherence, improving quality and doing a good job.

In 2017, Lanzhou firmly established the concept of green development, fully implemented “*the implementation plan of Lanzhou green building action*”, and promoted the green building work with high standards. Through the joint efforts of all levels, 186 green buildings were directly identified through the review of construction drawings throughout the year, with a building area of 8.5138 million square meters; There are 209 green buildings under construction, with a building area of 11.2374 million square meters; the completed area of new buildings in cities and towns is 5.1178 million square meters, among which the area of green buildings passing the acceptance is 2.0226 million square meters. The completed area of green buildings in cities and towns in the whole city accounts for 39.52% of the completed area of new buildings in cities and towns, exceeding the proportion requirement of 32% stipulated by the Provincial Department of construction.

In 2018, according to the deployment of the municipal Party committee and the municipal government, the Municipal Construction Bureau continued to fully deepen the green building work. Up to now, there have been 12 construction projects with green building signs in Lanzhou New Area. Green building standards have been fully implemented in new indemnificatory housing, large-scale public construction and commercial housing development projects. Green building accounts for 100% of new urban buildings.

3.3 Taking the Green Design of Gansu Science and Technology Museum as an Example

At the beginning of the design of Gansu science and Technology Museum, the state did not enforce the green building standard, according to the characteristics of science and Technology Museum, the design team put forward the concept of green building into the design, hoping that Gansu science and Technology Museum is a building integrating design and green technology. After careful consideration of the team and long-term construction and development, the project has passed the national green building evaluation system, and has been recognized by the state and people.

The science and technology museum building with this green design concept should not only meet the requirements of space use, but also be the product of the combination of green technology.

In the architectural design, it emphasizes the coordination of man and nature, and the coordination of man-made and nature. And develops carriers that are beneficial to people's use through technology. Combined with the climate and regional characteristics of Northwest China, the design of science and Technology Museum emphasizes the concept of integration of space and environment, adopts the combination of passive energy saving and active energy saving, and uses advanced computer modeling and simulation analysis technology to optimize and analyze the building orientation, layout, building light, heat, wind, water and other energy technologies, so as to adjust the design plan reasonably.

Timely introduce the roof courtyard of ecological environmental protection and energy conservation in the form of traditional building courtyard, technical measures of green building (building envelope heat preservation and insulation, green roof suitable for local climate, permeable ground, total heat recovery fresh air system, rainwater and water utilization, renewable energy utilization, light guide lighting, LED lighting, automatic monitoring technology of building equipment, etc.), as well as the measures of wind and light wall formed by the combination of East-West and north side facades, the integrated design of buildings, the steel frame support and suspension structure system of the building structure are all green technical means to reduce energy consumption and improve the use comfort.

In the process of architectural design of science and Technology Museum, it is through the above-mentioned strategies that the harmonious unity of space environment and green ecology and other appropriate technologies is established, and an experience space of building and city integration is created, which is finally realized with the joint efforts and precise cooperation of the whole profession.

3.4 Problems in the Development of Green Buildings in Lanzhou

Climate problem: as Lanzhou is located in the northwest, the climate is dry year after year, which

is a great challenge to the growth and survival of green plants. And Lanzhou is a typical hot summer and cold winter. In order to improve the comfort of the building, the requirements of thermal insulation and energy saving for the development of green buildings are greatly strengthened.

Traffic conditions: Lanzhou has a long and narrow terrain, inconvenient traffic and dense congestion, which has a great pressure on the environment, especially in Chengguan Area. And in front of the construction of Metro Line 1, it occupies a large traffic area, but the completion of this year's metro should make this situation effectively improved.

Economic conditions: Lanzhou's economy is relatively backward, so it has an obstacle to the development of green buildings. In particular, the transformation of some old buildings and the improvement and replacement of facilities need economic support.

Indifference of residents' awareness of ecological environment: Due to the late development and the weak popularization of the concept of green building and ecological development, people's awareness of ecological and sustainable development and the concept of green building are weak.

The old and inadequate of facilities:

(1) Parking facilities are not perfect: due to the limitation of site and facilities in many residential areas, the problem of parking and placing vehicles at random is serious. However, some old residential areas have some technical and economic problems in rebuilding and adding parking facilities.

(2) Garbage classification and collection facilities are not perfect: garbage classification has recently been piloted nationwide and has not yet been applied to Lanzhou. The idea of throwing garbage is relatively casual and the awareness of classification is weak.

4. Conclusion

Green building is not only the inevitable trend of the development of the current construction field, but also a problem that must be considered in the process of building a well-off society in an all-round way and building a socialist modern powerful country. Green buildings can not only provide comfortable and elegant living environment for people's living, but also conform to the sustainable development concept of green ecology in China, making "green and healthy" a synonym for our living environment.

Lanzhou, as the capital city of Gansu Province and one of the important cities in the northwest region, should start from its own, actively learn the excellent policies and measures of other regions, vigorously develop green buildings, strive to improve the regional ecological living environment, improve traffic conditions, increase publicity, and make the green and ecological deeply rooted in the people's hearts, only in these ways can we benefit the sustainable and long-term development of Lanzhou.

Acknowledgment

Lanzhou Jiaotong University -- Tianjin University Innovation Fund Project (2018068), soft science project of Gansu Provincial Department of housing and urban rural development (JK2018-35), construction science and technology plan project of Gansu Provincial Department of housing and construction (JK2019-43), Lanzhou Jiaotong University College Students Innovation and entrepreneurship training program project (2019107).

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