

# Application of Green Building in Real Estate Development

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**Abstract.** With the continuous improvement of people's environmental awareness, more people begin to pay attention to green building. Green building engineering in China's real estate is still in a high-speed development stage. Through the promotion of green technology, it can effectively reduce the cost of investment in the whole cycle of real estate development and further promote the sustainable development of the real estate industry. Based on the characteristics of green building, such as high efficiency and energy saving, low environmental impact, this paper analyzes its specific application in real estate development and discusses the main problems currently faced, and at the same time puts forward solutions. In terms of China's current national conditions, the application of green building in real estate development can not only play a role in protecting the environment, but also provide a new direction for the future development of China's real estate industry, which has a very realistic significance, and I hope that this paper can promote the sustainability of the real estate industry to provide effective suggestions.

**Keywords:** Real estate development; Green building; Green materials; Energy-saving technology; Construction engineering.

## 1. Introduction

In the past 30 years of China's rapid economic development, real estate has become an important type of commodity, that plays an indispensable role. China in 1998 after the reform of the housing system more fully released the urban residents in the housing demand, which further promoted the real estate industry to achieve rapid economic development. However, the rapid economic development of the real estate industry has also brought about the problem of energy consumption in the development of land resources and the manufacture of construction materials, thus causing great pressure on the natural ecological environment. This model does not meet the requirements of sustainable development, which in turn creates a certain degree of bottleneck and severe test for the future development of the real estate industry. At this critical stage of the development of the real estate industry, green building is seen as a new alternative to break through the traditional model and is of great research significance.

Green building, also known as sustainable building, is a building that provides people with healthy, applicable, and efficient use of space by maximizing resource conservation, environmental protection, and pollution reduction through energy saving, water saving, material saving, environmental protection, and pollution reduction measures during the whole life cycle of the building. The emergence of green buildings not only alleviates the problem of energy consumption in all aspects of real estate development but also improves people's quality of life and health.

Relevant normative reports formally and systematically put forward the evaluation and grading standards for civil green buildings. At present, a large number of studies have been conducted at home and abroad on the development of green buildings, which have laid a valuable theoretical foundation and provided practical guidance for the improvement of the development level of green buildings. For example, Ma Lina discussed how real estate companies use green buildings in the fierce market competition to "bend the road to overtake the car" [1]; Chen Zejun focused on how real estate companies in the construction phase of the effective combination of green energy-saving concepts [2]. Therefore, real estate development enterprises should learn from domestic and foreign experience in the practice of green building, combined with their characteristics, to develop a green building development strategy that meets the actual situation and adapts to the low-carbon background, which is of great practical significance for the realization of sustainable development.

The purpose of this paper is to discuss the application of green building in real estate development, firstly, it explores the characteristics and role of green building in real estate development, secondly, it elaborates on the application of green energy-saving technology in the aspects of external wall waterproofing, fireproofing, thermal insulation, and energy-saving technology, green energy-saving respiratory window technology, green management of water resources, and land-saving management, etc., and finally, it points out the problems encountered by the current green building as well as puts forward the relevant solutions.

## **2. Characteristics and role of green building in real estate development**

### **2.1. Characteristics of Green Building**

Green building can effectively solve the problem of resource waste, on the one hand, can play a role in protecting the environment, on the other hand, can save costs, to a certain extent, China's real estate development project development provides a new way of thinking. Green building is characterized by low energy consumption and environmental protection.

In terms of low energy consumption, the traditional building construction time is long, the process of applying more human and material resources, so the energy consumption is huge, at the same time to a large extent there is a phenomenon of waste of resources. However, green building requirements in the construction process to make full use of energy, improve energy utilization, reduce the overall energy consumption of the project, the construction process to minimize the possibility of resource waste phenomenon, so as to achieve the protection of resources and recyclable [3].

Secondly, in terms of environmental protection, green building in the whole process of engineering construction, whether it is engineering design or materials, etc., has fully considered the environmental factors. For example, in the design of the green building, the project can be realized on the basis of topography and climate, which complements the natural ecosystem; in the selection of materials, LED lighting is often used, the use of environmentally friendly coatings and other environmentally friendly materials are often used to meet the conditions of construction, in order to reduce environmental pollution [4].

### **2.2. The Role of Green Building**

With the increasing public concern about environmental issues, green building is gradually becoming the main trend of future building development. Green buildings maximize their role in guaranteeing the quality level of engineering and construction materials, reducing pollution, meeting market demand during their whole life cycle, and providing people with healthy, suitable, and efficient use of space, realizing a harmonious coexistence with nature.

First of all, the application of green building guarantees the quality level of engineering construction materials. The energy-saving technology of green building is especially remarkable for its green environmental protection characteristics. In the construction process, the selection of building materials is crucial, so it is necessary to choose environmentally friendly building materials and strive to improve the efficiency of energy use in construction. In real estate construction, new energy-saving materials should be actively adopted to enhance the overall energy-saving effect of the project, and at the same time ensure that projects using environmentally friendly materials can meet the standard requirements for construction quality [5].

Furthermore, green building also reduces the pollution problem. In the field of green building energy saving technology, the degree of realization of pollution control has been significantly improved. During the construction phase, the construction unit faces environmental problems such as dust pollution, and must take strict environmental protection measures. Taking the transportation of concrete materials as an example, the process may be accompanied by significant dust emissions. In this regard, through the implementation of sprinkling operations, dust diffusion can be effectively inhibited, preventing pollution from further aggravation, thereby increasing the degree of environmental protection of construction projects [6].

Finally, green building can meet the market demand. Green building as a kind of environmental protection at the core of the design and construction paradigm, its main purpose is to minimize the negative impact on the natural environment, and at the same time improve the comfort and health of the occupants. With the growing popularity of environmental protection and sustainable development, the concept of green building has gained widespread recognition and respect. We are committed to incorporating green building concepts into our development projects and continue to strive to meet the public's expectations of green, environmentally friendly, and sustainable development needs.

### **3. Application of green building energy-saving technology**

#### **3.1. Exterior wall waterproofing, fireproofing, and thermal insulation energy-saving technology**

Waterproofing and heat preservation are the basic factors that determine the quality of housing, and they are also common “common problems” in the construction field. The use of multiple waterproofing, fireproofing, heat preservation, and energy saving technology for external walls not only has excellent waterproof performance and fire safety, but also significantly improves the effect of heat preservation and energy saving, improves the indoor temperature environment, and enhances the overall performance of the building.

Adhering to its strategic concepts of foresight and durability, the Sino-Ocean Real Estate project makes full use of advanced and mature green technologies and materials from home and abroad. The projects are highly ecological and intelligent and comprehensively use green and energy-saving materials to maximize living comfort. One of its projects, Zhongyang Golf Residence, carries out its innovative strategy. Take the design of the thermal insulation system of the exterior wall of Zhongyang Golf Residence as an example [7]: firstly, the thermal insulation performance is enhanced by increasing the thickness of the concrete of the wall; secondly, rock wool with a thickness of 80 mm is selected as the main thermal insulation material, and innovatively aluminum foil is used to wrap the material in all directions, combined with stainless steel mesh brackets for fixing, which realizes the fireproofing and moisture-proofing functions of the material; thirdly, the steel cavities of the dry-hanging stone are utilized to further enhance the thermal insulation effect. Steel cavity to further enhance the thermal insulation effect; ultimately, the thermal insulation properties of the stone make the energy-saving efficiency of the exterior wall exceed 80%, effectively reducing the cost of living. In addition, the polyurethane waterproof layer used on the wall effectively prevents problems such as rainwater leakage and improves the living experience of the owners.

#### **3.2. Green energy-saving breathing window technology**

Breathing window technology is an innovative method of environmental protection and energy saving, which realizes natural ventilation and reduces reliance on artificial ventilation systems by improving the structure of doors and windows and strengthening the circulation of indoor and outdoor air by utilizing natural wind power. The use of breathing window technology not only significantly reduces energy consumption, but by maximizing the utilization efficiency of natural wind and optimizing the layout of indoor space, it is able to extend the duration of indoor natural light, thus achieving the energy-saving goals of building construction.

When carrying out research on the design of indoor ventilation systems, the first step is to analyze the indoor space structure in depth and make full use of the potential of natural wind, with a view to achieving the best natural ventilation effect. Secondly, the impact of lighting on the indoor environment is assessed, and the indoor layout is optimized accordingly in order to prolong indoor light hours. Through these measures, energy consumption can be significantly reduced and the realization of energy-efficient construction can be promoted. To achieve this goal, green and energy-efficient breather window technology can be used to promote natural ventilation. When designing the style of windows and doors, the influence of different angles on the ventilation effect should also be considered.

### **3.3. Realize green management of water resources**

Effective utilization of water resources is a topic that is constantly being explored in engineering construction. During the construction stage, low-flow water equipment should be equipped, and regular cleaning and maintenance should be carried out to prevent clogging, so as to avoid the waste of water resources. In addition, a rainwater collection and reuse system should be set up at the construction site according to the actual situation, and the recycled rainwater can be treated through filtering and sterilization, which can be used for irrigation of green plants and road washing, thus saving water resources to a large extent. This treated rainwater can be applied to many aspects of the construction site, such as dust control operations and concrete maintenance. Upon completion, the rainwater collection system can also be diverted for irrigation of green plants and fountains.

### **3.4. Application in land saving**

In land planning, more attention should be paid to the overall planning of the land to improve the efficiency of land resource utilization [8]. For example, scientific and rational planning of building space, fully implementing the concept of green building, and strengthen the coordination and efficiency between different spaces, to ensure that the use of each part of the function is maximized. While planning the site, a comprehensive and thorough environmental survey is carried out. This not only improves the quality of environmental planning, saves resources for construction, and reduces development costs, but also ensures the stability and safety of the construction project while also obtaining significant economic benefits, which in turn enhances the competitiveness of real estate enterprises in the industry.

## **4. Problems and Suggestions of Green Building in Real Estate Development**

### **4.1. Current problems in green building**

In the current development process of green building is still facing many problems such as lack of energy saving and low carbon awareness, irrationality of urban energy during the use of buildings, and insufficient attention to passive technology.

First of all, many real estate developers are more inclined to the application of active technologies in the current promotion of buildings, but relatively ignore the importance of passive technologies. This practice not only leads to the consumption of large amounts of money, but also often fails to achieve the expected ecological benefits. However, passive green building technology is actually a suitable solution for long-term investment. Furthermore, the weak awareness of building energy efficiency and low carbon is an important factor affecting the development of green buildings.

At present, most real estate enterprises mainly focus on the pursuit of benefits, often ignoring the far-reaching value of low-carbon and energy-saving. This is mainly due to the lack of sufficient energy-saving and low-carbon awareness of the relevant staff, and the blind pursuit of progress in development and construction, resulting in a large number of wastes in the construction process, which not only causes a large amount of waste of resources, but also triggers the problem of environmental pollution. In addition, at present, the main fuel in China's cities is still dominated by coal, and there is a conflict between the urban energy structure and the development trend of green buildings [9]. Although some cities have begun to promote energy transition, trying to replace coal with clean energy such as natural gas or solar energy, this process is relatively slow.

### **4.2. Solutions**

In view of the above problems, this paper believes that the following measures should be given to solve them, in order to ensure that all parties implement the concept of energy saving and environmental protection and reasonably use green energy-saving technologies in construction.

First of all, the energy-saving management mechanism should be improved in order to enhance the energy-saving awareness of relevant practitioners [10]:

In real estate development projects, the application of green energy-saving technologies is crucial. Relevant managers and construction units need to deeply understand the great value that these technologies can bring. At the same time, they should be guided by the latest national industry standards and actively participate in relevant thematic exchange conferences and professional training organized at home and abroad, so as to gain a deeper understanding of the application of energy-saving technologies in engineering practice. This not only helps to efficiently integrate energy-saving technologies in the whole process of real estate development, but also promotes the practice of sustainable development in the engineering field. In addition, in order to ensure the implementation of energy saving and emission reduction awareness throughout the real estate development process, a clear green management mechanism should be established at the project application stage, and these plans should be implemented and regularly monitored during the subsequent development and construction process to ensure that the concept of green and energy saving is reflected in every aspect.

Secondly, perfect energy-saving planning can be established before construction [9]. Real estate development is a complex and systematic process. In order to ensure that green technology is properly used in the research and development and construction phases, and to improve the scientific nature of the construction project as well as the efficiency of the construction process, the relevant departments and enterprises need to formulate a detailed energy-saving development plan before the start of construction. First of all, a series of reasonable and efficient energy-saving management programs and implementation details are determined after discussion and research by the leaders of the construction unit. Based on this program, a comprehensive work plan is developed for the specific processes of the project to ensure the smooth progress of the project. Secondly, establish a series of strict energy-saving management and coordination procedures, actively carry out project analysis, promote energy saving and emission reduction, effectively integrate construction activities with energy-saving management, and provide strong support in the whole process of the project.

Finally, adapt to local conditions and combine with the actual situation on site. At present, the application of green building energy-saving technology in the field of real estate development in China is still in its infancy, and in most cases, it is borrowed or directly copied from foreign models, which leads to unsatisfactory implementation results [10]. Developers need to make appropriate adjustments and optimizations to the technology according to the actual site conditions, recognizing that the introduction of green technologies and materials alone does not fully achieve the goal of green energy saving. At the same time, the use of current popular information technology can also effectively promote energy saving and environmental protection in real estate construction. Under the guidance of green building energy-saving technology, the construction link must be combined with the actual site conditions to carry out site-specific management quality.

## 5. Conclusion

This paper mainly explores the application of green building in real estate development and the current problems still in real estate development, hoping that through the use of green building to explore the integration of housing maximize the use of resources in real estate development on the one hand, and at the same time for people to enhance the quality of life to provide new perspectives. In general, green building characteristics and role in the process of real estate development can have a wide range of applications, such as waterproofing, fireproofing, thermal insulation and energy-saving technology, green energy-saving window technology, green management of water resources, land-saving management, etc., but at present, the development of green building is still subject to a number of constraints, followed by the need for relevant solutions to improve. The application of green building engineering in the field of real estate development has become an inevitable trend of social development. This trend not only ensures the efficient use of engineering resources, but also promotes the sustainability of real estate development, which has a far-reaching impact on the development of China's real estate industry. In the practice of real estate development, the use of green building materials and technical processes can significantly reduce energy consumption and

have a positive effect on environmental protection, thus maximizing the comprehensive benefits of construction projects.

## Reference

- [1] Lina Ma. Promotion and application of green building concept in real estate development[J]. *Urban Architecture Space*,2023,30(S2):171-172.
- [2] Chen Zejun. Application and development of green building engineering in real estate development[J]. *Housing and real estate*,2017,(29):220.
- [3] Xia Faqiang. Research on quality management of construction project based on green construction [D]. Zhejiang university of technology,2014.
- [4] Shan Leilei. Research on the application of green building energy saving technology in real estate development[J]. *Urban Construction Theory Research(Electronic Edition)*,2023,(18):106-108.DOI:10.19569/j.cnki.cn119313/tu.202318036.
- [5] Fu Lihua. Application and development of green building engineering in real estate development[J]. *Urban Construction Theory Research (Electronic Edition)*,2023,(16):62-64.DOI:10.19569/j.cnki.cn119313/tu.202316021.
- [6] Chu Kaiping. Construction of green low-carbon energy-saving residential building to create a long-life 100-year residence[J]. *Residential Industry*, 2013,(Z1):75-78.
- [7] Wang Zhen. Micro-exploration of the utilization practice of green building energy saving technology in real estate development[J]. *China High-Tech Zone*,2017,9:115-116+118.
- [8] Wisdom. Research on the application of green building energy-saving technology in real estate development[J]. *Sichuan cement*,2021,(10):128-129.
- [9] Song Jianfeng. Research on the application of green building energy saving technology in real estate development[J]. *China Construction*,2023,(02):101-103.
- [10] Fan Jun. Application of green building energy saving technology in real estate development[J]. *Residential and Real Estate*,2020,(05):157.