ISSN 2663-1563 Vol. 5, Issue 5: 28-32, DOI: 10.25236/AJAGE.2023.050505

# Research on the Development Path of Green Building Materials from the Perspective of Dual Carbon

**Ying Chen**

*China Energy Longyuan Environmental Protection Co., Ltd., Beijing, China*
*12027760@chnenergy.com.cn*

***Abstract:*** *With the rapid development of green buildings, "green" and "dual carbon emission reduction" have become the development trend of today's architecture. At a large level, human society must consume a large amount of resources in order to develop. The concept of dual carbon economy needs to consider how to reduce resource consumption while increasing technological content. Taking a green and dual carbon economic development path and actively developing a green and dual carbon economy is not only a parallel approach, but also an inevitable choice to properly respond to global climate change, safeguard the overall interests of China's economic and social development, and national security. In terms of architectural planning and design, green buildings should be reflected in a very reasonable indoor layout design, fully utilizing sunlight and natural ventilation, maximizing energy savings, and creating a safe, healthy, and comfortable living space for residents, as well as a good feeling of being close to nature, harmony, and comfort. By recognizing the benefits of using green and energy-efficient buildings for individuals, society, and the future, a consensus will be formed and relevant policies will be implemented to award the label of "green and energy-efficient buildings" to those who meet the standards.*

***Keywords:*** *Dual carbon perspective, Green building materials, Development path*

## 1. Introduction

"Low-carbon emission reduction" has become the development trend of today's architecture. Because carbon dioxide has the greatest impact on the climate, it is urgent to reduce the carbon emission of buildings. Green buildings should not only meet the requirements of basic buildings, but also minimize the impact of their entire life cycle on the environment. With the rapid development of green buildings, "green" and "double-carbon emission reduction" have become the development trends of today's architecture [1]. On a large scale, human society must consume a lot of resources if it wants to develop. Although green and double carbon are two different concepts, they are highly consistent in their development direction. Taking the road of green and double-carbon economic development and actively developing the green and double-carbon economy are not only parallel, but also the inevitable choice to properly cope with global climate change and safeguard the overall interests of China's economic and social development and national security [2]. The concept of green building has different expressions: double carbon, double carbon, but its basic connotation is to express the harmonious relationship among people, buildings and the environment. Double carbon means that buildings must save energy and resources in the process of construction and use, and double carbon reduces environmental pollution. Double carbon requires people to create a good and healthy living environment by using natural conditions and technical means, and double carbon should control and reduce the excessive use of the natural environment and destroy double carbon as much as possible [3]. In terms of architectural planning and design, green building should be very reasonable in indoor layout design, make full use of sunlight and natural ventilation, save energy to the maximum extent, and create a safe, healthy and comfortable living space for residents and a good feeling of being close to nature, harmony and comfort [4]. Accelerate the transformation of economic development mode, adhere to the development of dual-carbon economy and green economy, and promote and guarantee scientific development with the green dual-carbon economy as the leading factor.

## 2. The importance of developing a green and dual carbon economy

Under the influence of the international financial crisis, especially in the development situation of

ISSN 2663-1563 Vol. 5, Issue 5: 28-32, DOI: 10.25236/AJAGE.2023.050505

resource and energy shortages and deteriorating ecological environment, promoting the development of green industries and green dual carbon economy will inevitably receive more and more widespread attention from the international community. Addressing global climate change, mitigating greenhouse gas emissions, and developing a dual carbon economy are the overall trend. The promotion of green buildings should adhere to the principles of government leadership, participation of the whole society, and a combination of education and scientific research. The government vigorously promotes and advocates the importance of developing green buildings, arouses widespread attention from the whole society to the development of green buildings, and introduces effective policies to guide the healthy development of green buildings [5]. Of course, with the development and progress of society, it is inevitable that people's living standards will improve. How to achieve energy conservation and dual carbon in this increment is worth our serious research. In the process of pursuing dual carbon emissions in energy-saving buildings, its historical mission should also include new carbon reduction content in order to continue its development.

Increase research on green building related theories and technologies, and promote the development of green building scientific research and related engineering technologies. Try to reduce the construction cost of green buildings as much as possible, and turn green building design and construction into a high-quality product that is popular, energy-saving, environmentally friendly, comfortable, and healthy, and accepted by the whole society, rather than just a fashionable luxury pursued by a few people. Promoting building energy efficiency and green buildings should vigorously carry out publicity and education work, so that the general public can realize from the perspective of ideology and concepts that promoting building energy efficiency and green buildings is a good thing for the whole society and individuals, as well as for the present and future generations, and the effect is significant [6-7]. We should actively advocate a healthy and civilized consumption concept, and actively resist extravagant high energy consumption, high emissions, and high pollution consumption. Enterprises are the main body in achieving energy conservation and emission reduction goals, as well as the application subjects of circular technology, dual carbon technology, and ecological technology. They are also important entities in developing a green and dual carbon economy.

## 3. Green building is an inevitable requirement for developing dual-carbon economy

To develop the dual-carbon economy, on the one hand, we should actively undertake the responsibility of environmental protection and meet the requirements of national energy-saving and consumption-reducing indicators; On the other hand, it is to adjust the economic structure, improve the efficiency of energy utilization, develop emerging industries and build ecological civilization. The essence of dual-carbon economy is the efficient use of energy, the development of clean energy and the pursuit of green GDP growth. Green building can not only recycle resources and protect the environment and ecology, but also promote the structural transformation of other related industries by playing its exemplary role [8]. Under the current background, developing green buildings is an inherent requirement to conform to the development trend of dual-carbon economy. Green building also imitates the growth characteristics of natural organisms, which is reflected in the whole life process of construction, use and dismantling. The materials used are harmless to the surrounding environment and human body, and the original water system and energy transmission will not be cut off when the building goes deep underground [9]. The scoring standard of green building is divided into residential building and public building, with the same content and slightly different scores. All the requirements of middle control items must be met, while the number of general items and options of double carbon is divided into three levels: one-star, two-star and three-star double carbon. See Table 1 for details.

*Table 1: Green Building Rating*

| Grade | Land saving and outdoor environment | Indoor environmental quality | Energy conservation and energy utilization | Operation management | Number of preference options |
|---|---|---|---|---|---|
| One star | 5 | 3 | 6 | 7 | - |
| Erxing | 7 | 8 | 4 | 5 | 4 |
| Orion's belt | 4 | 9 | 5 | 7 | 6 |

With the rapid increase of global population and the continuous expansion of economic scale, the total consumption of high-carbon energy has increased sharply, which has caused serious concern to people. Many scientists have confirmed the global climate change caused by the increase of carbon dioxide concentration in the atmosphere. The development of green building in China is affected by many practical obstacles, which is inconsistent with the development trend of the world construction

ISSN 2663-1563 Vol. 5, Issue 5: 28-32, DOI: 10.25236/AJAGE.2023.050505

industry [10]. Modern construction industry is the "booster" of economic development, and its own development concept pays more attention to resource conservation and environmental protection. For a large number of small and township buildings, the technology and operation methods are mainly applicable, durable and economical. An open and flexible structural system is designed, and the space allocation can be adjusted flexibly, so as to prolong the service life of the building and meet the individual needs of different communities, ethnic groups and generations. In the future, China will take a series of powerful energy-saving and emission-reduction measures in response to climate change, and incorporate climate change into its economic and social development plan.

## 4. The Development Path of Green Building Materials from the Perspective of Dual Carbon

### *4.1 Breaking through misconceptions about green buildings*

The development of green buildings must be in line with China's national conditions, acceptable to ordinary people, and suitable for technological green buildings, which is the path to the healthy development of green buildings in China. Previously, intelligent buildings had taken a detour, only focusing on security and sound control. The circuit design was very complex and the engineering cost was very high, but after completion, the power consumption remained high and the operating cost was very high [11]. The current level of architectural design in China is very limited, mostly based on basic construction and insufficient characteristics. To develop green buildings, efforts must be made in design innovation. Green buildings also imitate the growth characteristics of natural organisms, reflected in the entire life cycle of construction, use, and dismantling. The materials used are harmless to the surrounding environment and human body, and the deep underground parts of the building will not cut off the original water system and energy transmission. A small intelligent sensing device can be designed to automatically adjust the indoor radiation amount by controlling the blinds or sunshades when the solar radiation is strong, reducing the thermal effect caused by solar radiation indoors, and thus achieving the goal of saving air conditioning energy consumption. We should establish the concept of "low-carbon living" for various daily activities, gradually correct the traditional concept of "I can buy all the necessary energy and resources with money", and have a sense of environmental crisis and a sense of ownership of the earth.

### *4.2 Propaganda and education work to improve people's awareness of energy saving*

People are the ultimate practitioners and beneficiaries of green buildings, so promoting green buildings should not only be the responsibility of the government, but also let all the people raise their awareness and actively participate. In the case of low income of ordinary people in China, when we introduce green building standards and technologies, we should fully consider the construction cost and use cost of buildings, and stipulate that the technologies, products and facilities used in green buildings should be low in cost. Green evaluation should be made on the construction projects within the jurisdiction, and the outstanding buildings and their organizational units that have made outstanding contributions in green exhibitions should be rewarded or exempted from taxes, so as to set an industry benchmark and promote the green development and green concept of the exhibition industry in the whole region. Once people adopt these technologies and equipment, people's daily life habits and energy-saving awareness also have a considerable impact on the overall energy saving. Nowadays, the number of household appliances and equipment is very large, and the power consumption of household appliances and equipment in standby state is generally about 10% of its power-on state; Using energy-saving lamps can save 70% electricity compared with ordinary self-igniting lamps. It can minimize the expenses of electricity, water and other energy costs, and generally recover the increased costs within 5-8 years. Such green buildings and energy-saving technologies are in line with China's national conditions, and China Laobaixin is easy to accept, so that it can be widely promoted and applied in China.

### *4.3 Fully promote the application of building energy conservation and green buildings*

Some real estate developers often misuse the concept of "green buildings" to make false propaganda and deceive consumers in order to increase housing prices or promote their products. To make green buildings closer to the lives of the people and make them understand what truly green and energy-efficient buildings are, we need to promote building energy efficiency and green buildings not only by experts, government officials, and some large enterprises and cities, but also by adhering to the concept of green and energy-efficient buildings. In the context of low income for Chinese people, when

ISSN 2663-1563 Vol. 5, Issue 5: 28-32, DOI: 10.25236/AJAGE.2023.050505

introducing green building standards and technologies, we need to fully consider the construction and usage costs of the building, and stipulate that the technology, products, and facilities used in green buildings should have low costs. Regarding the development path of colored buildings, we will comprehensively promote building energy efficiency and green buildings, as shown in Figure 1.

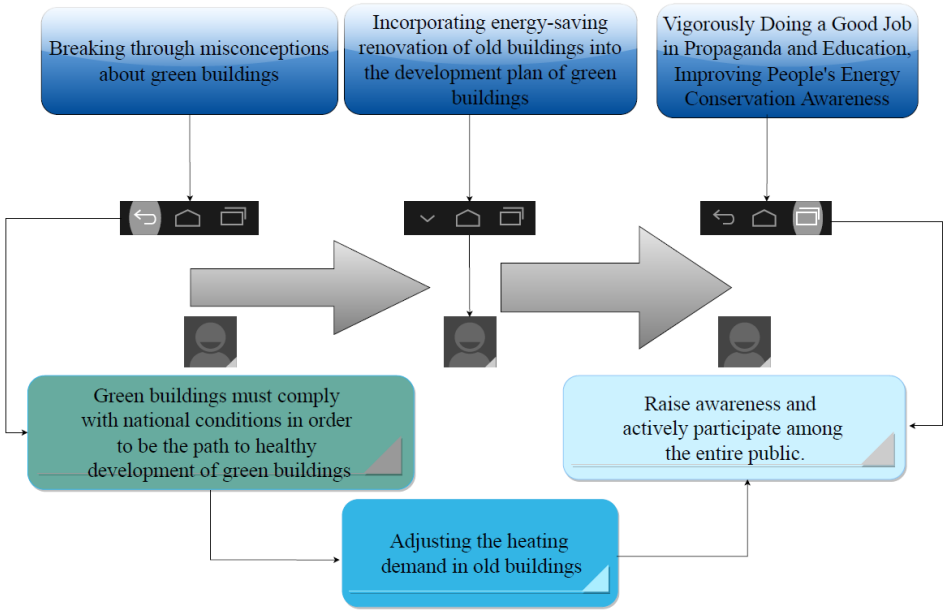


*Figure 1: Development Countermeasures of Green Building*

The healthy development of green buildings in China should focus on drawing lessons from some mature practices of advanced countries on the basis of summing up experience, and constantly explore new paths for the development of innovative construction industry. Let the green building change from a vague concept to a measurable and quantitative standard, pay attention to the energy consumption, materials, impact on indoor environment and carbon dioxide emission reduction of the house, and pay attention to the benefits of using green energy-saving buildings to individuals, society and the future, then everyone's consensus will be formed, and relevant policies will be issued to award the "green energy-saving building" logo to those who meet the standards.

## 5. Conclusions

No one in the world can stand outside the challenge of climate change, which has brought humanity together to confront a common enemy. By developing green buildings, we aim to create a dual carbon ecological city. To make green buildings closer to the lives of the people and make them understand what truly green and energy-efficient buildings are, we must not only focus on experts, government officials, and some large enterprises and cities when promoting building energy efficiency and green buildings, but also adhere to the concept of green and energy-efficient buildings. Establishing a sound system for the paid use of resources, continuously improving the pricing mechanism of resource factors that can fully reflect market supply and demand, resource scarcity, and environmental damage costs, and striving to build China into a strong country with a green and dual carbon economy are future development goals. Although there are some obstacles to the development of green buildings in our country, as long as we make efforts from the government, industry, system, and social levels, we can continuously improve the ecological and moral nature of human beings in current construction projects. So, each of us will start with the small things around us. If everyone can pay attention to building energy efficiency and green buildings, pay attention to the energy consumption, materials, impact on the indoor environment, carbon dioxide emissions reduction, and the benefits of using green energy-saving buildings for individuals, society, and the future.

## References

*[1] Ma Y, Zhang Z, Zhi L. 65 published by ideas spread development trend of global green building materials industry based on patent analysis [J]. Journal of Financial Management of Property and*

ISSN 2663-1563 Vol. 5, Issue 5: 28-32, DOI: 10.25236/AJAGE.2023.050505

*Construction, 2021, 68(17): 49-61.*
*[2] Mayhoub M, Ibrahim M G, Sayad Z, et al. Development of Green Building Materials' Evaluation Criteria to Achieve Optimum Building Facade Energy Performance [J]. IOP Conference Series Earth and Environmental Science, 2019, 44(8): 36-62.*
*[3] Kioupis D, Tsivilis S, Kakali G. Development of green building materials through alkali activation of industrial wastes and by-products [J]. Materials today: proceedings, 2022, 5(14): 27329-27336.*
*[4] Chen Y L, Zhao D F. Research and analysis on the development status and prospect of green building materials and green buildings in the new century [J]. IOP Conference Series Earth and Environmental Science, 2019, 332(68): 032031-032047.*
*[5] Zhu X, Fan H, Zhu B, et al. Role of Natural Gas in China's Energy Transition under "Dual Carbon Goals" [J]. China Oil and Gas: English Version, 2022, 29(1): 6-18.*
*[6] Liu Z, Hu B, Huang B, et al. Decision Optimization of Low-Carbon Dual-Channel Supply Chain of Auto Parts Based on Smart City Architecture [J]. Complexity, 2020, 20(5): 1-14.*
*[7] Ismail Z A. Planning the maintenance of green building materials for sustainable development: a building information modelling approach [J]. Journal of Financial Management of Property and Construction, 2020, 63(15): 25-68.*
*[8] Zhu N, Yang B, Zhang Z, et al. Application of BIM in green building materials management [J]. Journal of Physics: Conference Series, 2021, 1986 (1): 012024-012058.*
*[9] Wang S, Tae S, Kim R. Development of a Green Building Materials Integrated Platform Based on Materials and Resources in G-SEED in South Korea [J]. Sustainability, 2019, 11(5): 20-33.*
*[10] Wenjie Yang, Qianwen Gong. The scientific connotation and the basic path of rural green development from the perspective of urban-rural integration [J]. Research of Agricultural Modernization, 2021, 42(01): 18-29.*
*[11] Xu Y, Zhao G. System Coupling and Coordinating Evaluation of Green Low-carbon Development in Coal Enterprises [J]. Research of Agricultural Modernization, 2021, 26(11): 31-52.*