



# The Application of New Energy in Architectural Design Under the Influence of Green Low-carbon Concept

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**Abstract.** In recent years, people's concept of energy conservation and environmental protection is becoming stronger and stronger. Therefore, in the face of the above problems, we should pay more attention to the green and healthy development of the construction industry. In the context of the new era, new materials, technologies and new energy are emerging one after another. There are certain drawbacks in the design process of traditional high-rise civil buildings, which gradually do not meet the requirements of sustainable development advocated by the state, and it is difficult to meet the development requirements of modern green buildings. To this end, through the use of new materials, new technology, new energy in the application of architectural design, to reasonably deal with the construction of waste gas, waste water and waste; Understand the problem of building energy consumption in the current era, in line with the concept of green building design in the new era, and effectively reduce the waste of resources in the process of building construction, improve the quality of modern urban building design.

**Keywords:** New energy · Green build design · Low carbon · Environmental · Pollution · Architectural design · Development

## 1 Introduction

With the continuous development of China's economy, it has also brought about the vigorous development of all walks of life. In order to improve people's material living standards, China is also constantly improving the level of urbanization development. As an important part of urbanization development, construction industry is also an important part of China's socialist market economy, which plays an important role in driving economic development and urbanization development. At present, in order to balance the shortage of construction land resources caused by the rapid development and improve the utilization rate of land resources, the construction industry generally adopts the method of increasing the height of the building to ensure that the maximum efficiency can be increased in the unit area. However, this practice is also constantly expanding the scale of construction, if the construction unit in the construction process of the lack of green awareness, in the actual construction will cause a great waste of resources, resulting in environmental pollution and overall ecological damage. So we

must improve the construction industry practitioners of green low carbon environmental protection consciousness, make fusion green low carbon environmental protection is also emphasized in the architectural design concept, using the low carbon design to reduce resource consumption construction, in order to effectively balance the rapid development of urbanization and urbanization brings environmental pollution problems, and promote the sustainable development of the architectural design industry in China.

## **2 The Significance of Green and Low-carbon Concept for Architectural Design**

### **2.1 Necessity of Green Low-carbon Concept**

The topic of protecting the natural environment is constantly mentioned in the context of the new era, because the practical problems we are facing are always very severe. The deterioration of the natural environment has not been effectively contained in today's technological development, and global warming is still the focus of global concern. In the process of social and economic development, China also takes the protection of natural environment as an important work, forms a scientific concept of development, and promotes the concept of sustainable development to various industries. Into the concept of green low carbon in the architectural design, optimize the structure of industry of building, increase the utilization rate of materials, using range and improving circulation use of recycled materials, avoid unnecessary loss and waste to save costs, not only for enterprise or individual to increase profits, and improve the construction industry in the market competitiveness and sustainable development ability.

### **2.2 Integration of Green and Low-carbon Concept into Architectural Design**

The development of the construction industry is always centered on "people". Architecture exists to meet people's living needs, improve people's living environment and improve people's living quality. Therefore, practitioners of architectural design need to take various design considerations to improve the quality of architectural design. In the process of construction engineering, each link needs to be designed with green and low-carbon concept, so as to effectively integrate the building with the surrounding environment rather than blindly changing the environment, effectively control the environmental pollution in the construction process, and further improve the livability of the building according to people's requirements for the living environment. Through the overall planning and design of the architectural design industry, the organic coordination of the green and low-carbon concept in each link, and the proposed targeted design scheme can reduce the unnecessary waste of resources in the implementation process, save the repeated procurement of construction materials, improve work efficiency, and optimize the structure of building resource allocation. Therefore, the integration of green and low-carbon concept in architectural design is conducive to the sustainable development of the construction industry, and also conducive to the protection of the urban environment and natural environment.

### **3 Problems Existing in the Current Architectural Design**

#### **3.1 The Speed of Energy Consumption in Construction Industry Keeps Accelerating**

In recent years, affected by the epidemic, the development speed of the construction industry is not as fast as that of previous years, but it is still on the rise. The epidemic has only played a role of slowing down the urbanization process. Energy consumption in the construction industry has also been rapidly consumed due to the development of the industry, and there is also waste of materials and energy in the epidemic years. The improvement of living standards and the steady development of the industry have increased the consumption of materials in the construction industry. If we do not control the energy consumption within the entire construction industry at the current stage, it is not only against the concept of sustainable development, but also a huge resistance to the efficiency of the industry content. The reduced efficiency of the construction industry is bound to cause people's desire for a livable environment to fail, which is not in line with China's urbanization development, is not conducive to the sustainable industry, and can not bring green, low-carbon, environmental protection and energy saving quality results.

The rapid development and accelerating consumption will also lead to energy shortage in the construction industry. In today's industrial development, the degree of dependence on energy is gradually increasing, and the construction industry is no exception. Because energy utilization is inseparable from modern industrial construction, no matter what kind of industry wants to seek long-term development, it cannot do without the degree of energy utilization in the industry. It can be seen that the speed of energy consumption in the construction industry leads to the shortage of energy in the industry. In dealing with the problems in construction, we should focus on the rational application of energy.

#### **3.2 New Energy and Green Environmental Protection Materials Are not Fully Utilized**

At present, China's construction industry is in the stage of development, which is relatively backward in many design concepts. The main reason is that the concept of green and low-carbon is not integrated. Is because of this idea indeed caused we pay more attention to practical, here the practical also contains the energy price, the architectural design of too much focus on the practicality and ignore the building energy consumption and the protection of ecological environment, after put into production will be waste energy waste of resources caused environmental pollution problems such as frequent. In addition to the lack of practitioners' ideas, architectural designers do not have a correct understanding of the value and characteristics of green materials and new energy, which also results in the low application degree of non-toxic and harmless decorative materials that are safer in the market, and they cannot apply green materials and new energy according to building needs.

The energy consumption of the construction industry is also largely influenced by architectural designers. Designers need to avoid excessive use of inferior materials and non-recyclable materials in the design stage. Instead, they need to know more about

and correctly understand green materials and new energy, and apply it in the process of graphic design and decoration materials. To provide people with a safer, more comfortable, green living environment.

### **3.3 Relatively Backward Construction Technology**

The rapid development of modern science and technology has a profound impact on all walks of life. There are also many technological innovations in the construction industry. For example, the direction of improving energy efficiency in the construction process is rarely applied in China because of practicability. Energy technology can alleviate the current situation of energy shortage caused by increased energy consumption in the construction industry, but the construction technology to improve efficiency has not been popularized in China, and even some enterprises are still backward in technology, which can not make full use of modern energy to improve energy efficiency, and the utilization rate of building space will therefore be reduced. The backward technology not only focuses on practicality, but also has something to do with the market information collection ability and analysis ability of the construction industry. For example, in terms of building appearance and building insulation performance requirements, China's design practitioners have not kept up with the level of developed countries, far from meeting the development needs of low energy consumption. If we do not make full use of the new energy brought by market information and technological innovation, it is not conducive to the formation of green and low-carbon architectural design concept, and increases the construction cost and people's use cost intangibly.

## **4 Application of Green and Low-carbon Materials**

The application of materials in the process of architectural design will be directly reflected in the specific construction process. The quality of building materials has a great influence on the overall effect of the construction project and the safety and quality of the whole construction, and it is also a decisive factor that directly affects whether the project is livable and environmentally friendly. In the current situation of many new materials, we need to combine the actual construction needs with the actual economic strength to choose green environmental protection materials rationally and scientifically, to ensure the quality and safety of engineering construction.

### **4.1 New Waterproof Coating**

At present, the new water release coating mainly includes polymer cement and polyurethane coating. In terms of green environmental protection, polymer cement material is better. It can be relatively convenient to operate on the wet base surface for construction, with a certain tensile strength, but the tensile rate is not high, which requires certain operating skills. Polyurethane coating is mainly applied on the base surface will produce a layer of composite coating film, its performance, strength, elasticity are higher, but also has a strong sealing, but polyurethane waterproof coating in the application of construction engineering has significant toxic side effects, the need to control the amount.

## 4.2 New Sealing Materials

Current new sealing materials mainly include silicone sealant, which has good adhesion, a wide range of products, including acidic, neutral and structural sealing paste, etc., can be used in a variety of natural weather conditions. Widely used in many fields, it can be used to bond glass, walls, metal materials, ceramic tiles, etc., with remarkable effect. Acrylate sealing paste, the use of low cost, showing a strong cohesiveness and sealing, part of the base surface water content is high, the temperature is greater than 5°C using this material has good application effect, in the construction of wall joints, repair water cycle is a long building location is widely used; Polyurethane sealant, applied in non-leakage parts of construction engineering, has high deformation strength and elasticity, and large elongation.

## 4.3 Exterior Wall Middle Layer Material

Rock wool, showing good heat insulation performance, stable chemical structure, in the design of building exterior wall efficient application; Glass wool, corrosion resistance and high ignition point, in building insulation design has a good applicability; Construction design cement polystyrene board, good firmness and formability, low application cost, easy to use.

# 5 Application of New Energy in Architectural Design

At present, China's construction industry is in the stage of development, and the application of new energy in architectural design also needs to be combined with the current development of China's construction industry, as well as the technical development level of this new energy, to comprehensively consider the suitability of new energy and China's construction industry.

## 5.1 Application of Solar Energy Technology

In various fields, especially in the construction industry, the more representative of the new energy is solar energy technology. Solar energy as a representative of new energy, China's research on it is also more in-depth, solar energy is a sustainable renewable energy, is a typical energy from nature, compared with other traditional energy, the use of solar energy can be said to be a greatly reduced environmental pollution of green energy. Solar energy technology is mainly used in architectural design to form a heat collection system through heat storage or insulation devices, and then convert heat energy into other energy sources such as electric energy. In the conversion process, more external equipment is needed to achieve this. When applied to specific links, relatively high requirements for construction technology, but the combination of solar energy and architecture is undoubtedly the right choice to realize the concept of green and low-carbon architecture.

## 5.2 Application of Geothermal Energy

Similar to solar energy, geothermal energy has lower application requirements than solar energy technology in terms of technology, so geothermal energy is also one of the more widely used new energy sources at present. Geothermal energy has low requirements for the surrounding environment, which is also the advantage of its development. It mainly uses steam formed by the heat flow underneath as a power source, and converts kinetic energy into other energy sources, which is also a kind of green renewable energy. It is widely used in buildings, such as indoor heating system, and geothermal power generation technology, etc. Geothermal power generation technology is also a relatively novel power generation technology in building energy-saving design. Geothermal energy heating and power generation are not limited by time and region, and the restrictions on construction technology are not very strict, so it will be more used in architectural design.

## 5.3 Design and Application of Lighting System

At present, the close combination of new energy utilization and architectural design is the key to promote the design concept of green and low-carbon buildings. On the one hand, it is necessary to clarify the process and steps in the architectural design process, on the other hand, it is necessary to rationally develop and apply clean energy to find more new energy suitable for use and construction. Lighting is an indispensable part of architectural design, and lighting design is a key part of building green and low-carbon.

Lighting design often has two forms in architectural design, one is artificial lighting, that is, artificial lamp, and the other is natural lighting, that is, natural light. These two forms of lighting form the lighting system in modern buildings. The application and design of natural light to all aspects, the planning of the interior structure of the building and the reasonable planning of the facade of the building will affect the degree of use of natural light. If designers can set reasonable building interior spacing and building facade, as well as the building orientation, that is to say, the building can be obviously illuminated and the interior pattern has good lighting, which can meet the lighting needs of residents without turning on the light during the day, so as to achieve the effect of energy conservation and environmental protection. At the same time, non-refracting light source materials are mostly used for the facade of the building, and energy-saving Windows are also used for Windows, which can greatly reduce light pollution.

For artificial lighting, connectors and materials with low energy consumption and low resistance should be adopted as far as possible in the design, so as to optimize and improve the whole lighting system through technological innovation. This is a relatively detailed work, and the design direction is also multiple industries. It not only needs to meet the use needs, but also needs to meet the national safety standards, and needs to reduce energy consumption as much as possible according to the actual needs.

## 6 Conclusion

In the context of continuous economic growth, people's material life is more and more abundant, so people also begin to pursue high-quality life. Now we not only need to

pay attention to our own living environment, but also focus on sustainability, energy conservation, environmental protection, green and low-carbon high-level spiritual experience. Therefore, the construction industry can not stagnate, must be combined with the new concept in the new era, increase the application of new energy to form green and low-carbon building design. In the process of promoting the application of new energy to form green and low-carbon building design, it is necessary to combine the reality, clarify the current domestic development trend, grasp the focus of the current work, and make specific problems specific analysis. At present, China's construction industry has a large energy consumption, and there is pollution problem, which is also an objective existence. It is necessary to have a concept before starting the actual action track, so as to create a more comfortable living environment.

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