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ANALYSIS OF THE CURRENT SITUATION OF BUILDING ENERGY CONSERVATION IN CHINA

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Abstract

With the rapid development of China's economy and the rapid development of the construction industry, building energy consumption has become the focus of China's energy consumption. China has a vast territory and great regional climate differences, so we must combine the scientific view of building energy conservation with the regional characteristics of China, and formulate scientific and feasible energy conservation measures. This paper analyzes the current situation of building energy conservation development in China, which can be used for reference by relevant industry personnel.

Keywords: China; Building energy conservation; The status quo

The introduction

Energy is the basis for human survival. With the continuous development of the social economy, human beings begin to realize the indispensability of energy. In the construction industry, energy consumption is very large. In order to slow down the problem of energy exhaustion, the state has formulated the corresponding energy-saving policy. However, in the development of the construction industry, there is a lot of energy is constantly wasted. For example, the housing area expands, the original old housing area is only 30~60 square meters, the current situation increases to 100~300 square meters of housing area, the original small area of housing construction energy is completely wasted. With the improvement of housing conditions, people's living standards are improving, but this lifestyle wastes a lot of original energy.

Building energy efficiency is to point to in the structure of the planning, design, construction, modification, and use process implement national energy efficiency standards, energy-saving technologies, processes, equipment, materials, and products, improve the heating of the heat preservation and heat insulation performance and efficiency of heating, air conditioning, and refrigeration heating system, improve the operation of the building energy system, increasing the energy exchange between indoor and outdoor thermal resistance, To reduce the heating system, air conditioning refrigeration heating function.

1. Problems of energy consumption in China's construction industry

1.1 The actual service life of the building is shorter than the designed service life, resulting in a waste of resources.

In China, according to the national standard "Unified Standard for Reliability Design of Building Structures" (GB 50352-2005), the durability of important buildings and high-rise buildings should be more than 100 years; General building, durable life of 50 to 100 years; Secondary buildings, durable for 25 to 50 years; Temporary building, durable life for 15 years. However, in the 1970s and 1980s, with the development

of urbanization, the proportion of house demolition remained high. According to statistics, the average service life of these houses was about 30 years, which resulted in a great waste of resources and energy and a large amount of construction waste to be disposed of.

1.2 Construction industrialization process is slow and the energy consumption is high.

The construction method of China's construction industry is mainly manual operation on-site, with machinery processing and production on-site, and extensive management, resulting in high energy consumption. Take the brick concrete structure as an example, under normal circumstances, the cement consumption per square meter is 160 Kg/m², the brick quantity is 140-160 pieces /m², and the steel consumption is 18-20 kg /m² (6~7 degrees seismic fortification). And the market to provide more is roughhousing, but also need to carry out secondary decoration, the cost of this decoration is quite high, the waste caused by a lot of resources waste.

1.3 Building heating energy consumption is high in northern China

China has a vast territory, extending from Hainan Island in the south to Heilongjiang In the north, covering five temperature zones: tropical, subtropical, warm temperate zone, middle temperate zone, and cold zone. Because the regional span is too large, the regional climate difference is obvious, which increases the energy consumption of heating in winter and air-conditioning in summer. Especially in winter in northern China, buildings require heating, and heating materials consume a lot of energy. In recent years from the original high-temperature hot water hanging radiator heating improved to low-temperature hot water heating coil heating and some electric heating.

1.4 The energy conservation of rural buildings is still relatively backward

Although China has issued relevant policies on building energy conservation at present, (The Energy Conservation Law of the People's Republic of China was revised and adopted by the 30th Session of the Standing Committee of the 10th National People's Congress of the People's Republic of China on October 28, 2007, and came into force on April 1, 2008). But they are concentrated in some cities. We should know that China is a largely agricultural country, and the living standard in rural areas is generally low. The energy consumed in life is far higher than its output. And rural buildings still use the traditional construction model, many times the requirements of buildings do not meet the provisions of the relevant technical standards, low technical content, resulting in a lot of waste of energy.

2. Development history of Building energy conservation in China

China's building energy conservation started in the 1980s. At that time, the focus of relevant departments and the urgent need to solve is how to reduce building energy consumption in economic development and construction, so that it is coordinated with the current situation of energy supply is relatively short. In the 1990s, the status of building energy-saving was further improved, and the strategic goal of "energy saving, water saving, material saving, and land saving" was also put forward by the Ministry of Construction. In 1999, the planning of building energy saving in northern China was listed as a mandatory task.

In the 21st century, under the guidance of the scientific concept of development, the construction field has begun to make clear that it must develop towards the new road of resource-saving and environment-friendly industrialization, and "four saving and one environmental protection" has also begun to be the main direction of scientific and technological breakthroughs. In 2008, the State issued the Energy Conservation Law, which clearly stipulates that resource conservation is the basic state policy of national development. The law effectively stipulates that energy conservation should be reasonable and scientific and puts forward the corresponding incentive mechanism and legal responsibility for energy conservation. In the future, energy conservation needs to be placed in the primary development task.

In March 2017, the Ministry of Housing and Urban-Rural Development issued the Action Plan for

Prefabricated Buildings during the 13th Five-Year Plan period and set the work target: by 2020, prefabricated buildings will account for more than 15% of new buildings in China, including more than 20% in key areas, more than 15% in inactive areas, and more than 10% in encouraged areas. Encourage local governments to set higher development goals.

Guiding Opinions of The General Office of the State Council on Comprehensively Promoting the Renovation of Old residential areas in Cities and towns In 2020 The State Office of the People's Republic of China (no.23, 2020) put forward a clear target that 39,000 old residential areas in cities and towns will be renovated in 2020, involving nearly 7 million households. By 2022, the institutional framework, policy systems, and working mechanisms for renovating old urban communities will be basically in place. By the end of the "14th Five-year Plan", combined with the actual situation of each place, and strive to basically complete the transformation task of the old residential areas built before the end of 2000. Old residential areas in cities and towns refer to those residential areas (including single residential buildings) that were built earlier in the city or county, which have lost their maintenance, maintenance, and management, imperfect municipal supporting facilities, imperfect community service facilities, and residents' strong desire for renovation.

The basic renovation of the old residential areas in towns mainly includes the renovation and upgrading of municipal supporting infrastructure and the maintenance of public parts such as the roof, exterior wall, and stairs of buildings in the residential areas. Among them, the transformation and upgrading of municipal supporting infrastructure include the transformation and upgrading of water supply, drainage, power supply, weak electricity, road, gas supply, heat supply, fire control, security, household garbage classification, mobile communication, and other infrastructure within and in contact with the community.

In the roof and exterior wall renovation, focus on solving the roof, exterior wall, doors, and Windows of thermal insulation performance, the use of new environmental protection materials. For example, autoclaved masonry blocks are used as wall materials and sandwich methods are used to achieve thermal insulation requirements. For doors and windows, the lighting and ventilation requirements of the house should be considered, the area of the entrance of doors and windows should be reduced as far as possible, and the energy-saving doors and Windows with good airtightness should be preferred. The energy consumption of doors and Windows is minimized, the energy utilization rate is maximized, and the energy-saving goal is realized. Spread light materials with small thermal conductivity on the roof (such as expanded perlite, glass wool, etc.); Heat insulation cooling such as roof water storage or timing water spraying, roof greening, etc. Chemical measures, such as recycling waste paper into the paper fiber, can meet the requirements of roof energy saving to varying degrees.

3. Measures for building energy conservation in China

3.1 Enhance the awareness of building energy conservation, scientific planning, and design

Because the whole society does not understand the building energy-saving knowledge, it does not realize the important role of energy saving in the construction of a harmonious society. When choosing a house, attention should be paid to the appearance and internal structure of the building, and the design requirements of building comfort and humanization for building energy saving are ignored. In view of this demanding concept, developers often pay attention to appearance and structure construction according to consumer psychology and invest less in reducing building energy consumption. Therefore, in order to enhance the awareness of building energy conservation in the whole society, we should not only formulate reasonable energy conservation standards but also strengthen energy conservation education. It is required that designers should pay more attention to and follow the basic principles of green building in their work: respecting the local ecological environment, designing and constructing buildings that meet human needs, and conforming to or even integrating with the surrounding environment.

3.2 Standardize building energy-saving construction, pay attention to building quality, and accelerate the development of building industrialization

In the process of building energy conservation construction, construction units are required to meet the relevant requirements of qualification, in the actual construction process of energy-saving equipment and facilities in strict accordance with the code and standard construction, to build high-quality buildings, reduce energy consumption. At the same time, accelerate the pace of construction industrialization development, so that the production mode from extensive to intensive transformation, to achieve the universality of building components and accessories and on-site construction of assembly, mechanization.

3.3 Strengthen building energy conservation management and increase building maintenance and transformation tasks

Formulate the management and maintenance mechanism of building energy-saving facilities and equipment, avoid large-scale demolition or reconstruction work, speed up the healing transformation of existing buildings, so that the existing building energy-saving equipment can give full play to its role. The government supervision department shall strictly examine the energy-saving planning of buildings, the energy-saving design and construction of individual buildings and equipment, and the construction operation of construction units shall be standardized. At the same time, in accordance with relevant national policies and regulations, we will speed up the renovation of old residential areas.

Conclusion

The construction industry is the key to energy consumption in China and puts forward higher requirements for energy use. Therefore, building energy conservation is the inevitable choice to achieve green and sustainable development in China. Through the continuous improvement of relevant legal norms and standards of building energy conservation, it will better promote the development of building energy conservation technology, improve energy utilization rate, reduce building energy consumption, and create a good living and living environment for our people.

REFERENCES

1. of the State Council general office on comprehensively advancing town old village renovation work guidance countries do hair [2020] no. 23, http://www.gov.cn/zhengce/content/2020-07/20/content_5528320.htm
2. Qian Kun, Jia Lifang, Analysis of Current Situation of Building energy conservation in China [J]. Energy Conservation and Environmental Protection, 2018,
3. Wu Yufu. Research and analysis on the jade trend of China's building energy conservation status [J]. Building Energy Conservation, 2017
4. Liao En 'en, Analysis on the development trend of China's building energy conservation technology [J]. Residential Jade Real Estate, 2018.1
5. Han Zhen, Analysis of Current Situation and Future Development Trend of Building Energy Conservation in China [J]. Science and Technology Innovation and Application, 2020 (13)
6. Dzhezdzhula V. Yepifanova I., Use of apparatus of hybrid neural networks for evaluation of an intellectual component of the energy-saving policy of the enterprise Baltic Journal of Economic Studies. 2018. Vol. 4. №1. P.126-130.
7. Heyets V., Voynarenko M., V. Dzhezdzhula Yepifanova I., Trocikowski T. Models and strategies for financing innovative energy saving activities IOP Conference Series: Earth and Environmental Science. 2021. 628. 012004

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