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ENERGY SAVING MANAGEMENT SYSTEM IN BUILDINGS CHINA

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Abstract

Different approaches of scientists to solving the problem of energy saving of residential buildings in China are considered. An effective system for managing China's construction potential under various policy scenarios is proposed. This system will serve as the basis for the rational development of strategic energy saving planning of buildings and the selection of effective combinations of energy saving policies.

Key words: construction waste, thermal insulation, climate characteristics, air-conditioning power, energy saving policies.

INTRODUCTION

Building energy conservation in China began in the 1980s. Building energy conservation mainly includes: research and development of energy-saving technologies and energy-saving products, formulation, promotion of technical standards and pilot projects. In terms of technical research, the research on building energy conservation related technologies in China has experienced two stages, from scratch to catch up with the world's advanced level. Building energy conservation researchers have made significant contributions to China's building energy conservation work.

Wang Peiming [1] analyzed the mechanism of external wall thermal insulation. Through comparative experimental research, it is shown that external wall thermal insulation can achieve an energy saving rate of more than 40% compared with non thermal insulation walls, which confirms the significant energy saving value of external wall thermal insulation. Wu Weiwei and Zhuang Yanyan[2] used Visual DOE4.0 to simulate the energy consumption of the same model in seven cities (Wuhan, Nanjing, Shanghai, Chongqing, Nanchang, Changsha, Chengdu) in hot summer and cold winter areas, and analyzed the energy saving rate under the external walls, windows, roofs and other energy-saving measures, Verify the correctness of energy consumption simulation software. Fu Xiangzhao analyzed the climate characteristics of the Yangtze River basin and the necessity of implementing building energy conservation in residential buildings in this area. In view of the current energy conservation standards in this area, he gave specific technical routes and guidelines for energy conservation in residential buildings.

Fang Xianfeng [3] conducted a questionnaire survey on residential buildings in different periods in Hangzhou, and calculated the actual heating and air-conditioning power consumption of residential buildings by category. Finally, he compared the survey results with relevant building standards and theoretical or simulation results, and found that the results obtained only by theoretical analysis and software simulation exaggerated the energy saving effect. In practice, the method of combining theory with practice should be adopted to study the role and significance of building energy conservation.

Wang Yan [4] studied the energy conservation of residential buildings, considered the impact of climate factors in hot summer and cold winter areas on residential building energy consumption, and considered the impact of building planning and design, body shape and thermal performance of enclosure structure on residential building energy consumption, proposed the idea of staggered east-west sun visor, double skin and other energy conservation measures.

Yan Chengwen [5] established a building model of typical residential buildings in Ningbo, and simulated the model with DeST-h software to analyze the impact of changes in heat transfer coefficient of external windows with different orientations on building energy consumption. The results show that no matter which direction, the change of the heat transfer coefficient of the external window has a greater impact on the heating energy consumption of the building, and has a smaller impact on the air conditioning energy consumption.

Zhou Yan [6] used DeST-h software to simulate and calculate, and discussed the relationship between the figure coefficient and the annual heating and air-conditioning energy consumption. The research results showed that: with the increase of the figure coefficient of residential buildings, the annual air-conditioning and heating energy consumption of buildings also increased, and the annual energy consumption also increased.

Yan Chengwen [7] established a building model of typical residential buildings in Ningbo, and simulated the model with DeST-h software, and analyzed the impact of changes in roof heat transfer coefficient on building energy consumption. The results show that only changing the heat transfer coefficient of the roof has no significant impact on the overall energy consumption of the building, but in winter, it has a significant impact on the indoor thermal environment of the top room of the building.

In view of the high energy consumption of heating and air conditioning equipment in residential buildings in hot summer and cold winter areas in China, Lu Jun [8] proposed a new air conditioning system mode, which is composed of floor radiation and fresh air air conditioning units. The system can not only improve indoor thermal comfort but also improve energy efficiency.

Wang Zhaojun [9] conducted an experimental study on improving the indoor thermal environment by night ventilation in several rooms of an office building in Harbin. The experimental results showed that the use of night ventilation in rooms facing north could reduce the air conditioning by 2.75 hours a day, and save 4.95 kWh/d of electricity at most.

Zhou Jing [10] established an office building model, used CFD software to simulate the flow field of the model, and analyzed the air conditioning energy consumption of the building under the four joint operation schemes of ventilation and air conditioning. Compared with the energy consumption, it was concluded that increasing the ventilation at night can greatly reduce the air conditioning energy consumption of the building.

MAIN PART

Nowadays, the trend of buildings all over the world is towards low energy consumption buildings, near zero energy consumption buildings, green buildings, etc. In China, the heat transfer coefficient of building envelope is relatively high, and the building energy consumption is relatively high. How to further reduce the energy consumption level of residential buildings in China is a problem worthy of discussion. At the national level, Building energy efficiency is important for China to realize the "4045" emission reduction commitment and build an environment-friendly and resource-saving "two oriented society" It has important strategic development significance. The realization of low energy consumption and low emissions in the whole life cycle of buildings is the internal requirement for achieving the goal of energy conservation and emission reduction in China and taking the road of modern and sustainable development. From the regional level, with the gradual deepening of urbanization in various regions, the rise of the total number of buildings will become an inevitable trend. According to the development experience of developed countries, the increase of urbanization rate will further increase the proportion of building energy consumption in the total social terminal energy consumption. At the same time, the improvement of living standards will also lead to the corresponding improvement of people's requirements for building comfort, which means that the energy consumption demand and carbon emissions in the construction field will continue to intensify. By analyzing the potential of building energy conservation in China, we can make scientific plans for various channels and tasks of building energy conservation and formulate reasonable policy tools, which will help reduce the cost of building energy conservation and effectively achieve the goal of energy conservation and emission reduction.

The purpose of this study is to determine the level of building energy consumption in China through qualitative and quantitative methods, and systematically evaluate the existing policy tools. Through the analysis of China's building potential under different policy scenarios, it provides a basis and reference for the rational formulation of building energy conservation strategic planning and the selection of effective energy conservation policy combinations. In view of the current development and characteristics of China's building energy conservation, this paper intends to use a qualitative and quantitative method to conduct an in-depth study of China's building energy conservation potential and its policy system. The specific research framework is shown in Figure 1.

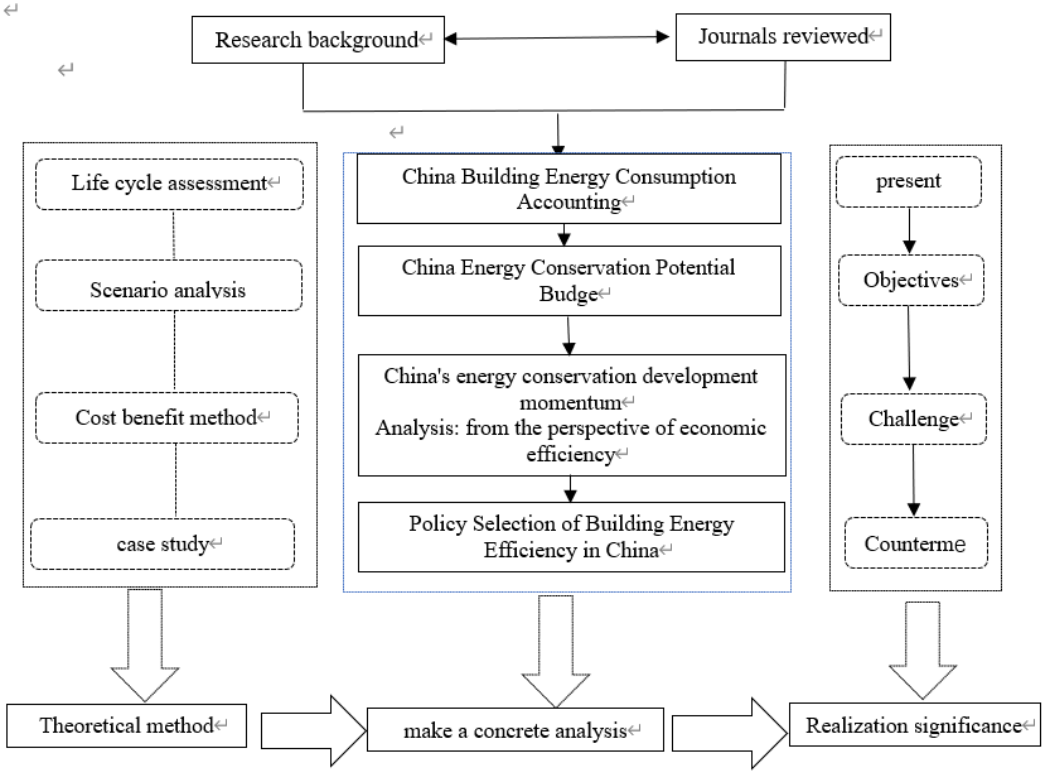

Figure 1 Research Technology Route Framework

CONCLUSION

Different approaches of scientists to solving the problem of energy saving of residential buildings in China are considered. An effective management system for China's building potential under various policy scenarios will provide a basis and reference point for the rational formulation of strategic energy-saving planning of buildings and the selection of effective combinations of energy-saving policies.

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