Application of Computer Artificial Intelligence Control Technology in the Comprehensive Utilization of Green Building Energy

Dehao Gao*
School of Engineering Management, Liao Ning Jian Zhu Vocational College, Liao Yang, Liao Ning, China, 111000

*Corresponding author e-mail: 42869899@qq.com

Abstract. In order to meet the needs of capital city construction and development, this paper studies the problems of building energy conservation from the aspects of computer intelligent control, green energy-saving building and integrated system of new energy utilization. Using computer intelligence to establish a comprehensive utilization of renewable energy demonstration system, namely the heat pump technology, building CCHP and total heat exchange ventilation system, set up a computer intelligent monitoring system, monitoring and control of building energy consumption, indoor heat and humidity environment, air quality and energy system, optimize the system operation[1].

Key words: Intelligent Control, Computer Artificial Intelligence, Green Building, System Integration, Energy System

1. Foreword

In recent years, with the concept of sustainable development deeply rooted in people’s hearts, many governments are vigorously promoting the development of green buildings and intelligent buildings. With the rapid development of economy and the improvement of people’s environmental awareness, more and more people pay attention to the environmental quality of green buildings, intelligent buildings and residential buildings. When sustainable development becomes the goal of the world, the construction industry is also concerned about the sustainable development of energy and environmental protection[2].

In China, building energy consumption accounts for more than 25% of the total energy consumption, and the trend is increasing. Therefore, building energy conservation has great potential. Building energy consumption not only affects the national energy supply, but also affects the environment. That is to
say, building energy conservation and residential environment are two interrelated and interactive issues.

With the deep understanding of human architecture environment, the sustainable development of human settlements has gradually become a common concern. More and more attention has been paid to the building environment, especially the living environment quality, which includes the air quality in the residential area, the air quality in the office or the living room, the noise level and the traffic condition. The so-called green building mainly considers the influence of comprehensive factors in the physical environment of the building, including temperature, humidity, air flow speed, cleanliness, sound, light, energy consumption, intelligent control and many other aspects. In the design, the achievements of contemporary architecture, building technology science, artificial environment science, ecology, intelligent control technology and other science and technology are comprehensively used to build the house into a small ecological system and intelligent building, so as to provide comfortable, healthy, environmental friendly, efficient and beautiful living environment for the residents. Reasonably select and determine the energy supply scheme of each equipment system in the whole building, optimize the design and operation of each equipment system in the building, take the most effective heating and cooling mode in combination with the specific situation of the residential area, and strengthen the cascade utilization of energy, such as intelligent cooling technology system as following. Figure 1 shows the solar power generation device using intelligent monitoring system in green building.

![Diagram](image)

**Figure 1.** The solar power generation device using intelligent monitoring system in green
2. Green building and intelligent control

Study on the optimal scheme of energy comprehensive utilization and the optimal thermal performance index of building envelope. Including: the feasibility and Economic Research of conventional energy and new energy utilization, the research of thermal performance and evaluation method and evaluation system index of building envelope structure suitable for new energy system in Beijing area, and then put forward the green civil building scheme suitable for China’s national conditions[4].

2.1 Main research contents

The research on the comprehensive utilization of green building energy and intelligent control technology takes the ecological environment and energy-saving effect of civil buildings as the object, starting from the research on technology, economy, environment and energy, and using natural conditions and artificial means to create a harmonious and unified environment among nature, building and human, control the use of natural resources, make full use of renewable energy, and maximize Reduce environmental pollution. Figure 2 shows the energy consumption monitoring data of intelligent control technology in the data center.

![Figure 2. The energy consumption monitoring data of intelligent control technology in the data center](image)

Research on the technology of energy comprehensive utilization of green civil buildings. It includes: low pollution combustion and efficient utilization technology of natural gas; complementary and cascade utilization technology of natural gas, electric energy, solar energy and geothermal energy; heat pump, gas-fired air conditioning, building combined heat and cooling (BCHP) and total heat exchange ventilation technology (residual heat recovery). In combination with energy-saving buildings, a demonstration system for comprehensive utilization of energy is established.

The open intelligent monitoring and control system based on LonWorks computer control network technology and web browsing mode is established to realize the monitoring and control of building energy consumption, indoor heat and humidity environment and air quality, and optimize the system
operation.

The annual energy consumption analysis and evaluation of the energy-saving green buildings in Beijing are carried out.

2.2 Research objectives

It is proposed to establish and improve the design of green and energy-saving buildings, realize the comprehensive utilization of various energy sources, especially the utilization of new energy and clean energy, and optimize the operation and management of intelligent control under the climate conditions of Beijing[4].

In order to provide valuable data for the implementation of sustainable development strategy in Beijing, this paper puts forward the optimal scheme of comprehensive utilization of civil green building energy and the optimal thermal performance index of building envelope, and then puts forward the scheme of green civil building suitable for China’s national conditions.

Through the research and application of energy comprehensive utilization, especially new energy utilization technology, and the monitoring and control of building energy consumption, indoor hot and humid environment, air quality and energy system, improve the energy utilization level and residential environment quality in the capital area, significantly reduce environmental pollution in Beijing, and provide technical support for the implementation of sustainable development strategy in the capital.

Explore new technology and practical design method of new energy utilization in civil energy-saving buildings, and complete heat pump system, building combined heat, power and cooling system (BCHP) and total heat exchange ventilation system.

A perfect data acquisition system, intelligent control method and operation regulation technology are developed to realize the integration of computer control network and data network represented by Internet, so that the user terminal on the data network can access the control network transparently through the server, and can remotely monitor, control and manage the building monitoring objects through the Internet[5].

This paper puts forward the evaluation system index of civil energy-saving buildings, the appropriate design idea and the design method of new energy system of buildings, so as to promote the development of building energy-saving technology in the capital area. The energy-saving rate of civil buildings in the capital area is more than 50%. To provide valuable reference for the realization of the third step of building energy saving in China

3. Research and experimental conditions

In this study, green energy-saving buildings, comprehensive utilization of energy and intelligent monitoring and control are combined to study the problem of building energy conservation. The intelligent monitoring and control system based on computer control network technology is adopted, and the integration of computer control network and data network represented by Internet is realized. The remote monitoring and control of building energy consumption, indoor heat and humidity environment and air quality are carried out, which is excellent System operation. The integration of
control network and data network realizes the data sharing between data network and control network, makes the measurement and control information and operation management decision information sharing, and will promote the development of industrial control technology to the direction of network and intelligence[6].

4. Conclusion

The purpose of this study is to save energy, make full use of renewable energy, and reduce environmental pollution to the maximum extent. Based on the study of the best scheme of green building, energy comprehensive utilization and intelligent control in the capital city, the index of thermal performance evaluation system of building envelope structure in Beijing area is put forward, which makes it more scientific and feasible.

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