

Research on New Digital Energy Utilization in Building Energy Saving and Building Design Based on Information Digitization

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ABSTRACT. *At present, energy provides important basic conditions for economic development. Today, resource problems caused by energy shortages are becoming increasingly serious, so reducing energy consumption is the only option for sustainable development. Among all kinds of energy consumption, the proportion of building energy consumption is very large, so the development of energy-saving buildings is related to the long-term development of society as a whole. At present, society's energy demand is increasing, and it also reflects the significant impact of building energy consumption on China's resource development and application. At the same time, in order to design energy-efficient buildings, new energy and new technologies need to be continuously introduced. To this end, this article first analyzes the concept and advantages of energy-saving buildings; secondly, it studies the relationship between building energy-savings and new energy sources; finally, it puts forward measures to fully apply new energy sources in building energy-saving design to promote the further development of building energy-saving causes.*

KEYWORDS: *Information digitization, Building design, New energy*

1. Introduction

Energy is the basic condition for human survival and development. At present, with the rapid development of the national economy, the living environment of human beings is becoming more and more comfortable, and the huge energy consumption has led to an increasingly tight energy supply. Therefore, the construction industry must attach great importance to the application of new energy on the basis of pursuing economic benefits. At the current stage, in the process of designing a building, new energy should be fully used to achieve building energy-saving design, which is not only in line with the long-term development requirements of the building, but also an environmental responsibility that must be fulfilled in the building field.

With the rapid development of China's social economy, environmental protection is becoming increasingly important. Only by strengthening energy conservation and emission reduction in real life can we cope with the current situation of global warming. Therefore, China also attaches great importance to energy conservation and consumption reduction in the construction industry, actively encourages the use of new energy sources, and promotes the rapid development of the construction industry in China. In recent years, with the rapid growth of the national economy, energy shortages have appeared in many regions. China is also the second largest energy consuming country in the world, and the situation of energy tension is getting worse. Energy supply in a country is a basic condition for ensuring economic and social development. Therefore, it is necessary to pay attention to the strategy of using new energy in the construction industry. After entering the 21st century, China's construction industry has shown an upward trend in total energy consumption, of which coal, coke, gasoline, diesel and fuel consume the most. China's construction industry has always been a huge energy consumption industry, which is mainly used in northern towns for heating energy consumption, large public building energy consumption, non-heating energy consumption of residential and general public buildings and rural life energy consumption. According to the current energy consumption trend of China's construction industry, it is estimated that in 2020, 250 million tons of coal resources and 600 billion degrees of electricity will be added annually, and the supply of energy will gradually be in short supply. Therefore, only in the future development, to find a way to save energy and reduce emissions, can we greatly reduce the energy consumption of the construction industry and realize the sustainable development of China's urban construction.

2. Analysis of the Concepts and Advantages of Energy-Efficient Buildings

Energy-saving building refers to a type of building that is constructed by using new-type wall materials and a number of thermal insulation and energy-saving measures, using natural resources as a source of energy to make full use of them, and using facilities with low energy consumption. This type of building has significant structural advantages, which can avoid damaging the natural environment and also benefit construction enterprises and users. First, through the application of natural resources, the cost of procurement and transportation of construction enterprises can be reduced, thereby improving the economic benefits of construction enterprises. In addition, natural resources are also very safe, which can greatly reduce construction risks, ensure the personal safety of construction workers, and achieve safe construction. Second, for users, the use of safe natural energy can prevent large-scale safety accidents, help to ensure the life and health of users, and effectively ensure the smooth implementation of social production. In addition, natural energy has lower costs and is renewable, which can effectively reduce the living and production costs of users, and avoid unnecessary economic costs. In general, energy-saving buildings have very significant advantages in terms of construction and use. This kind of building is economical, affordable, safe, and reliable. It should be widely used in the future.

3. Relationship between Building Energy Efficiency and New Energy

In building energy conservation, environmental protection, ecological balance, and energy conservation do not exist in isolation. They are interconnected. Human beings can independently develop and build a comfortable internal environment, but this artificial comfort is generally inseparable from high energy-consuming equipment such as lighting, air conditioning and ventilation, and the improvement of comfort comes at the cost of increased energy consumption, leading to It not only addresses the current environmental and energy crisis, but also threatens human development and security. With the continuous development of the national economy and the continuous acceleration of urbanization, the living standards of urban people are getting higher and higher, and the proportion of building energy consumption in total energy consumption is also increasing rapidly. The energy is very large, which worsens the natural environment. At the same time, in actual construction, problems such as severe water pollution, low utilization of land resources, and excessive supplies have also occurred. If no measures are taken to avoid contamination of water, soil and air, there will be a serious lack of greening and water surface, the air will also become polluted, and the temperature will be higher. The deteriorated natural environment will seriously damage the benign material circulation and energy inside and outside the building system. The conversion will eventually severely damage the ecological environment. The climate design of the building is not only conducive to the full use of natural energy and the reduction of renewable energy consumption, but also directly relates to the coordinated development of man and nature. In short, the huge challenge facing mankind in the 21st century will be the realization of sustainable development.

4. Full Application of New Energy in Building Energy-Saving Design

China has very rich solar energy resources, which is a new type of renewable, pollution-free clean energy. In recent years, new energy sources have been widely used in the construction field. In the process of designing buildings, the application of solar energy is generally divided into three types: indirect acquisition, hybrid acquisition and passive utilization. In the process of energy-saving design of buildings, solar energy is generally used in water heaters, solar stoves, lighting and heating or cooling. First, the window structure can be reasonably designed in the building to prolong the time of sunlight exposure to the room, thereby reducing the power consumption in winter. Second, a large number of solar power generation facilities can be laid on the top of the building, which can not only affect the roof and the sunny side of the building. It can make full use of it, and it can also save electricity. Third, a solar heat collector can be installed on the top of the building, and the solar energy can be stored by using a heat storage device, and hot water or heating can be provided through the end equipment.

Like solar energy, geothermal energy is also a clean new energy source without pollution. In the process of designing building energy efficiency, the temperature of the soil layer below the ground is converted into a heat source in winter by using heat

exchange instruments for indoor heating or for the production of hot water or power generation. In the design, heating by geothermal energy can reduce certain coal heating consumption or electric heating consumption. For example, many universities provide heating or hot water through geothermal new energy, which greatly reduces the cost of heating and hot water supply in the entire school. It is also an important measure to achieve energy conservation and emission reduction. In addition, geothermal energy can be used as a geothermal air conditioner. Olympic villages generally use geothermal energy and convert it to a non-polluting, green geothermal air conditioner, which can not only heat the water in the swimming pool, but also maintain the water temperature of the swimming pool all day, while being clean and pollution-free, thereby greatly reducing coal energy usage of.

Because wind energy is clean and renewable, human beings need to give full play to their own wisdom to maximize the use of wind energy natural resources, reduce the consumption of non-renewable resources, and protect the natural environment. In the process of designing and constructing energy-saving buildings, it is necessary to make full use of the local natural environment and climate conditions, effectively use natural wind energy, and use related materials and technologies to achieve the purpose of thermal insulation, cooling and ventilation through the effective circulation of natural wind energy. At night, cold wind can be introduced into the building to cool down by exchanging hot air inside the building. At the same time, the materials used to construct the outer wall have a certain thermal insulation function, which can give full play to the cold storage function, and then maintain the temperature drop effect of outdoor wind at night, so that the indoor environment can maintain a suitable temperature. In hot places or in summer, ventilation at night can reduce power consumption, thereby reducing carbon emissions and ultimately alleviating global warming.

For the building's energy-saving design, the rational selection of energy-saving and environmental-friendly building materials is also very important. In selecting building materials, we should adhere to the principles of high efficiency, economy, health, and energy saving. First, with the continuous development of science and technology, a large number of new and efficient energy-saving and environmentally-friendly materials are developed and applied in architectural design to further improve the energy-saving effect. Second, local energy-saving should be developed according to local specific conditions. Materials and use them in building energy efficiency design. When designing building energy saving, the application of variable air volume or variable frequency air-conditioning systems can help to save energy resources. In the variable air volume air-conditioning system, the temperature and humidity of the room are controlled through the change of the air supply volume, which realizes that the indoor environment needs are met with minimal energy consumption. The adoption of this new type of air conditioning system can significantly reduce the cost of air conditioning cooling or heating, and truly achieve energy savings through building design. At present, variable frequency air-conditioning systems have been widely used in building energy-saving design. The transmission medium is refrigerant. It combines the change of air-conditioning load to adjust the refrigerant flow to achieve building energy-saving.

When using geothermal energy scientifically and reasonably, the economy and advantages obtained are relatively obvious, which can reduce the consumption of primary energy and prevent threats to the ecological environment. Among them, geothermal energy can be used to provide a large amount of hot water for the living and heating of buildings through heat exchange equipment. When using geothermal heating, deep hot groundwater is used as the heat energy, and then various heating systems are used to provide endless sources of heat for heating users. Geothermal wells, wellhead facilities, peak-shaving equipment, heat exchange stations, and refilling wells are the main structures that form geothermal heating systems. The boiler heating system and the geothermal heating system have only a large difference in terminal cooling equipment requirements corresponding to the heat source, and the thermal energy cycle The system has strong consistency [5]. Under normal circumstances, the heating system combining peak shaving equipment and geothermal is highly economical. In the scientific allocation of resources, the developed geothermal energy can be fully used, and the heating capacity can be assured when expanding the user of thermal energy. At the same time, compared with other heating methods, its heating costs are relatively low.

5. Conclusion

The energy consumption of the construction industry is relatively high, and new energy needs to be fully used in building energy-saving design to lay a solid foundation for sustainable building development. This article analyzes the use of new energy in building energy saving and building design, and starts from various aspects to ensure that the utilization of new energy by building energy saving design is rapidly improved. With the continuous improvement of people's awareness of ecological environment protection, the construction engineering industry needs to continuously use new energy such as wind, geothermal and solar energy in building energy-saving design according to actual needs, so as to realize the ability to save disposable energy and ensure the Ecological environment realizes sustainable development.

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