

Research On Rural Residential Design Based On Cological Energy-Saving Building Energy-Saving Technology

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Abstract

Under the background of sustainable development, ecological and energy-saving building is a building system gradually developed under the continuous development of economic, cultural, scientific and technological social factors, environmental deterioration and the continuous improvement of people's living conditions. It has a significant impact on the resources and the environment due to the large number of buildings. Similarly, if eco-energy-efficient buildings want to effectively improve resource and environmental problems, they must be built in large quantities. Human beings themselves are also moving towards a high quality and a high standard of life, which are two contradictory aspects. Strengthening the construction of ecological and energy-saving buildings is one of the effective ways to solve this contradiction. The scientific concept of implementing architectural design is for ecological energy saving building, energy saving, land saving, comprehensive consideration and overall planning to add luster to the beautiful rural construction. Using the existing local materials and conditions, we can form ecological energy saving buildings with local characteristics. Traditional buildings are consistent with the current concept of ecological energy saving building, and there is a certain degree of interaction between the two. The strategies and methods to improve the adaptability of ecological energy saving building technology hope to provide some help to improve the adaptability of ecological energy saving building technology.

Key words: ecological energy saving building; energy saving; rural housing; design

Introduction

Rural areas are a typically complex ecosystem. Regeneration of the coordinated material cycle among the various components, low consumption of energy

transfer, optimal use of resources, and synergistic symbiosis between man and nature. Because the traditional rural development system and the building model are not sustainable, polluting the

environment and reducing the quality of life, the architects are inspired by the green culture. In the design process of rural ecological and energy-saving buildings, the actual situation of rural areas should be fully considered, starting from the economy, practicability, practicability and suitability. Ecological and energy-saving buildings take resources and pollution as the basic elements, and strive to protect the natural environment and improve the health of users without reducing the use function of buildings. To build an ecological village, we must attach great importance to the protection of natural landscape, historical and cultural heritage landscape, especially the diversity of natural species, so as to maintain the unique characteristics in the process of construction. As one of the concrete measures to achieve sustainable development, ecological and energy-saving buildings have the responsibility to contribute to the continuation of local culture and the realization of global cultural diversity. Its means include: protecting and inheriting traditional communities, the characteristics of local residents, and the continuation of appropriate traditions and local architectural techniques. Ensure that construction projects are more coordinated with the natural environment. Ecological and energy-saving building technology can simulate biology from different angles, whether it is biological form, structure or movement mode, which can be applied to architectural design.

I. Basic characteristics of ecological and energy-saving buildings

Ecological and energy-saving buildings not only create a small environment for the people living in them to meet their physical and psychological needs. At the same time, we should also consider the relationship with the local natural environment. After the reasonable site selection in the environmental design, the climate characteristics should be analyzed, the surrounding environment should be designed, and the climate conditions should be improved. In order to effectively correct the shortcomings of traditional buildings and improve resources and the environment, eco-efficient buildings must be built and used in large quantities. Only in this way can we achieve the goal of ecological and energy-saving buildings want to achieve. In the design process, an important principle is followed to maximize efficiency. At the same time, some very mature process technologies in the field of design are exactly the technologies needed for ecological and energy-saving buildings. If the construction industry can adhere to the concept of "ecology" in the construction of beautiful countryside, the environmental resources and ecological problems in the region will be greatly improved.

In the construction of beautiful rural ecological energy-saving buildings, we should first fundamentally understand the natural process of the environment of the village, make full use of the natural resources and conditions in the development

and construction of the village, so that the artificial system and the natural system are coordinated and unified. Due to the complexity of functional space and the use of underground floors, the comfort of some spaces can no longer meet people's needs, which needs to be solved by huge energy consumption, mechanical ventilation, lighting and central air conditioning systems. Secondly, for some more developed economies, the promotion of high-tech ecological and energy-saving buildings not only sets a good example, but also plays a huge role in the promotion. According to the ecological requirements, the application of high and new technology as the main body, even the use of some traditional technology, is also on the basis of scientific analysis and research, through advanced materials and technologies. Participate in the construction process of ecological and energy-saving buildings. Such multi-level and multi-faceted coordination and cooperation must have unified evaluation standards in order to reach consensus among all parties. Truly meet the needs of rural buildings, enhance the value of buildings.

In the design of rural ecological and energy-saving buildings, we should make full use of local materials to create reasonable ecological value in a simple technical building way. Let the building and the natural environment be combined into an organic whole, while having good indoor climate conditions, so that the user can live a more comfortable and healthy life. Structural components should be

standardized and serialized. Green, ecological and energy-efficient building technology is used to ensure that the life-cycle cost of building projects is reduced. During the design process, attention to the selection of architectural technology, materials, natural ventilation and landscape design. The imitation of ecological and energy-saving building design is not an artistic requirement, such as modeling, nor the expression of cultural concepts. We mainly learn the adaptability of biological, mechanical and traditional buildings to the external environment changes, and the rationality and efficiency of resources and energy use. According to the climate characteristics of the region, appropriate building materials and structural forms are selected to adapt to local conditions and select local materials locally to reduce the energy consumption of material transportation. In view of the requirements of ecological and green design, we must pay more attention to whether the building material has a high degree of safety when choosing it, including whether it is radioactive, and whether it has a certain harm to the human body. Establish and improve the building environment evaluation system, supervise the building environment, and realize the optimal configuration of the building and the environment.

2. Factors considered in the current rural ecological housing design

2.1 Centralized and reasonable residential functions and flexible layout

And a variety of characteristics of the new residential area, and the implementation of the front street backyard road layout, in front of the street as the main exit of vehicles, Putuo Temple in front of the house with agricultural vehicle entry gate and motor vehicle lane, another biogas digester in the pig house, to realize the distribution of people and cars, clean pollution distribution.

2.2 Scientific layout of hydropower facilities

But farmers because of the lack of special water supply equipment, water is extremely inconvenient. In addition, the water supply and drainage equipment is basically not taken into account, resulting in urban sewage cross flow. Circuit layout is mostly open installation type, with great safety. In the residential construction of China's new rural areas, it is necessary to do a good job of the overall planning of water supply and drainage, and scientific and reasonable layout, so as to carry the new modern life of China's rural friends.

2.3 Diversification of structure and types

Since the 21st century, China has banned solid clay bricks nationwide. However, at present, solid clay brick is still widely used in rural China. The key reason is that the structure of rural houses is simple, most of which use the traditional brick and stone structure. Many rural houses have not been measured and seismic design, facing huge

safety risks. Rural friends built basic does not require the approval of level building supervisor, is building, as long as registered in the local government departments, get building certificate, will be able to gather some mason began to build houses, no architectural design pattern, no structure, not basic survey and design, not seismic thinking. In the new agricultural environment energy-saving residential building design should pay attention to people-oriented, comprehensive respect for agricultural traditional value, in the farm house function, space configuration, according to the local geographical, meteorological, economic conditions, make its spatial structure more suitable, and strive to with the most economic construction cost, to provide the most suitable living conditions.

2.4 Localization of building materials

For a long time, the rural construction in China still follows the traditional independent construction method, and the construction is basically no plan, a large number of vacant buildings, and the problem of backward construction concept is also relatively obvious. The current situation of rural housing construction in China is: on the one hand, some ecological, environmental building materials such as cement brick wall materials, basic thermal insulation design, so the thermal stability is low, comfort is poor, new energy saving materials cannot be applied due to economic problems; on the one hand, a large number

of local environmental building materials are vacant or burned. The number of rural residential floors is about two floors, and the main local building materials such as renewable energy can be fully used in the construction of single buildings, so as to realize the construction of economical, affordable and rich energy-saving houses with rural characteristics of China. We will carry out reasonable, characteristic and feasible research on rural energy conservation construction according to the local ecosystem, human habits and local advantages, so as to improve the problem of rural residential construction.

3. Energy-saving design elements of rural housing

3.1 Location of the residence

The choice of houses does not need to choose in remote river valleys, depressions, ditches and other concave places, the main reason is that buildings built in the low temperature season can easily lose heat, so people need to spend more energy to maintain the room temperature, resulting in more energy consumption.

3.2 Residential Plan Layout

(1) The direction of the house. The direction of the bedroom must be conducive to natural daylighting and ventilation already, want to give consideration to the requirement of environment condition and weather again. Summer is given priority to with ventilation, to prevent the direct sunlight to shoot into the room and the bedroom outside, to

prevent the cold wind in winter, and to obtain a good sunshine condition is appropriate.

(2) A closed outdoor passageway can be set up to the south of the house, which can achieve the effect of sunscreen and heat insulation in summer and keep warm in winter.

(3) Save building materials through multi-household contact to arrange to reduce construction energy consumption.

(4) The thermal environment of the residence partition, kitchen, storage room and other auxiliary space is arranged in the north direction position, while the master bedroom of the bedroom and living room is arranged in the south direction.

3.3 Design of residential enclosure structure

(1) External wall

Exterior wall materials are easy to lose heat energy, accounting for about 25 percent to 30 percent of the total power of the overall protective building. The selection and quality of the building materials have a very important impact on the overall spatial thermal ring. In relatively cold climate, rural housing exterior wall design focus is mainly exterior wall insulation, and building materials design is also considering the specific situation of the local, using local building materials, through flexible design structure, or use some relatively cheap building materials, to have the effect of heat insulation. Like composite exterior walls usually use bricks and cement as load-bearing building materials, and building

insulation materials combined with the use, can also use reinforced concrete and thin wall processed insulation materials to make exterior walls.

(2) Roofing

The total energy of the facade is a little smaller than that of the ordinary facade, accounting for less than 15% of the total energy of the overall protective building. Slope roof or ceiling can be built, and then the building materials with small thermal conductivity can be selected.

(3) The outer window

The total heat consumption of the outer window cannot be eliminated, accounting for more than 30% of the overall thermal consumption of the whole envelope structure, and the use of double-sided insulating glass and single frame hollow glass, although can save a certain amount of heat, but also to take into account ventilation and lighting.

3.4 Building spacing

Building spacing can increase the sunshine of the bedroom, this not only has certain benefits to the person's living life and health, but also can bring good effect to the person's spirit and soul, but also is one of the heat source.

3.5 The Building takes shelter from the wind

The correct and reasonable layout of buildings can reduce the wind force in cold days, but also can reduce the heating energy

consumption inside the building and on the surface of the site, to avoid the bad wind direction, and to prevent the cold wind from infiltrating into the building is also must be considered.

4. Development and utilization of new energy sources

4.1 Development and utilization of biogas

Biogas is an ecological energy, in agriculture is actually very suitable for using biogas resources, there is a four one way is very suitable for rural housing, the material basis is the land resources, the main driving force is sunshine, biogas, livestock breeding, sunshine greenhouses, plant cultivation, biogas design, four interlocking, interdependent, complementary resource advantages, cultivation, gas fertilization at the same time, a virtuous cycle in a system.

4.2 Development and utilization of solar energy

At present, the application of solar energy is widely used in the energy saving design of rural buildings, such as solar hot water heating system, mainly used for bathing, washing clothes, can also be used for home heating, and solar low temperature ground radiant heating system is also very suitable for the rural areas that can not be central heating. Solar energy will not form pollutants in the whole application process, and the renewable energy source is inexhaustible, which is very suitable for the current sustainable economic development

concept.

4.3 Ground source heat pump

Due to the vast shallow geothermal energy distribution area and sufficient reserves, the advantages of ground source heating are as follows: less energy consumption; will not damage the beauty of the house, and even make the house more beautiful; less affected; and durability. In winter, people can directly pump the heat from the floor through the electric boiler to supply the indoor heating; in summer, the indoor and outdoor heat is taken over and then released to the floor before storage. In this way, people can use natural and artificial supply means to achieve the dynamic balance of earth temperature and heat, so that the shallow ground temperature can be continuously recycled.

5. Application of energy-saving technology

5.1 Medium water system

Due to the repeated utilization rate of industrial water is very low, the reuse of living standards will hardly be valued, and saving domestic water is also an important design of new rural housing in China, so the recycling of domestic water is also an essential aspect of saving. The miscellaneous water and rainwater can be treated and reused, which requires the reconstruction of the water resources system in the building, in order to increase the utilization rate of natural resources, so as to

reduce the time and cost of domestic water, but also to change the natural environment of the building, killing many birds with one stone.

5.2 Energy-saving technology for doors and Windows

Window design is mainly to consider the characteristics of heat insulation, so improving the insulation of Windows is important for energy saving. Traditional solutions have been taken mainly to adjust the ratio of doors and Windows area and exterior wall area, and pay attention to the use of heat insulation system strip. The most critical is in the choice of doors and Windows, can choose hollow glass, heat insulation system window, rebound window.

5.3 HVAC energy-saving technology

The main function of HVAC central is to freely maintain and adjust the indoor relative humidity, temperature and cleanliness. Through the use of the current common social resistance heat source type — heat power station, heat pump, community boiler temperature, regional boiler room, direct combustion lithium bromide absorption heating hot water unit, to achieve heating. In terms of energy efficiency, the most effective technology is the thermal power station, followed by the heat pump technology. And HVAC has made a considerable degree of progress at present.

6. Specific application of ecological and energy-saving buildings

Whether the new building meets the requirements of the ecological environment needs a corresponding evaluation system to evaluate it and determine its good standards. The density, strength, heat transfer coefficient, durability and other related characteristics of the material are comprehensively and scientifically tested to ensure that these indicators meet the design requirements. Architects play an important role in organization and coordination, and many structures and details must be designed in accordance with the results of scientific calculations. Also consider the need to coincide with the aesthetics of the building facade. Repeated photovoltaic modules will form a certain rhythm on the building facade, and will create new technical features for the photovoltaic modules on the building facade. In planning the layout of buildings, buildings can be designed and designed in different direction in order to increase lighting and improve ventilation. Try to rotate the natural wind in the room, so that the ventilation effect will be better. In the design and construction of building infrastructure, more emphasis is placed on local resources and the application of recycled materials.

The construction of rural ecological and energy-saving buildings should also follow this principle, and the same model will affect and destroy the ecological balance of the region. Only by combining the characteristics of this region, the construction of regional ecological energy-saving buildings can be integrated into the

ecological balance. Greening and covering the ground can reduce the temperature of the surrounding environment, and the trees can form a shade on the ground, reduce the heat absorption on the ground, purify the air, and improve the oxygen content in the air. At the same time, technology is also developing dynamically, and different levels of technology will change with the development of social and economic technology. Any kind of high-tech, after long-term industrial development, low-temperature radiation heating and refrigeration efficiency is high, the temperature is uniform, the system does not occupy the indoor space, will not damage the overall appearance of the building, basically can achieve no wind, no noise. Improve the utilization rate of renewable and clean energy, so as to reduce soot and sulfur dioxide emissions, purify the air, create a sustainable, zero energy, zero pollution, affordable low-carbon residential image, truly achieve energy conservation and emission reduction goals. In order to ensure the sustainable development of China's ecological energy-saving building technology level, we will continue to promote and apply high-level ecological energy-saving building technology, effectively reduce the investment in construction projects, and promote the development of ecological energy-saving building technology.

Scientific planning, reasonable layout, saving cultivated land and developing economy are the key to the construction of

beautiful rural well-off housing. In the planning of the new rural well-off housing, we should combine the distribution of land resources, try to choose a safe geographical location to occupy less arable land location. Construction projects must establish an ecological index system. On this basis, the economic and technological development speed of Chuge design is still at a low level from the aspects of conceptual design, compilation of ecological energy-saving building performance indicators, selection of reasonable technology and comparison of investment effect. Therefore, when studying the adaptability of ecological energy-saving building technology, we should also formulate the development strategy of ecological energy-saving building technology that is more in line with China's national conditions. Maximize the use of materials and energy input in the rural production process, that is, to minimize the waste of resources and energy, and to minimize the discharge of waste, which can naturally penetrate into the nature. The relationship between biological form and function, and between the form and function of architecture and the principles of the living organism itself. These mutually comparable traits determine that architecture can benefit from biological learning. We will strive to make good use of the existing natural ecological conditions in the environment, combine the natural climate conditions of the base area with the unique small environment of the building base, and carry out site design and

architectural design.

7. Conclusion

Based on the principle of ecological design and targeting the needs of human survival and comfort, this paper studies the adaptability of ecological energy-saving buildings in the construction of beautiful countryside. Maximize the use of energy and materials, minimize environmental pollution in the construction and use, site selection, resource utilization and building forms. In the design of rural ecological and energy-saving buildings, we should fully explore the connotation of the local traditional architectural technology, and strive to seek the combination of the traditional architectural technology and the modern buildings, in line with the regional characteristics. A complete ecosystem can fundamentally change the human living space and optimize the environmental quality. In the process of obtaining ecological energy-saving building technology, we absorb the operation rules of life systems, and apply these laws to the design of construction projects, so that they will gradually develop into ecological energy-saving building technology. In architectural design, aquaculture and household waste disposal should be considered comprehensively to reduce environmental pollution. With the scientific principles of ecology as the guiding ideology, the architectural space environment created is a building site of harmony and organic unity between man

and nature. It is necessary to make reasonable and effective use of land resources to maintain the sustainable use of land and water resources. The appropriate application of ecological and energy-saving building technology in buildings will inevitably realize the harmony and unity of people, buildings and the ecological environment on the basis of ensuring the regional culture.

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