

Analysis on Economy of Green Industrial Building

Ying Gan

Qinhuangdao Vocational and Technical College, Qinhuangdao, China

Abstract: *Nowadays, people pay much attention to the development of green industrial buildings. Although green industrial buildings have many advantages in ecological protection and energy consumption, its economy is also the focus of people's attention. This paper mainly analyzes the economy of green industrial buildings based on the general situation of the project, for reference.*

Keywords: green industrial building; Economy; Ecological and environmental protection.

1. INTRODUCTION

Although the cost of industrial green building is high in the early stage, the energy consumption is less in the later stage, which can effectively reduce the project cost. The initial cost, space and comprehensive benefits of green design should be considered in green buildings, so as to continuously enhance the economy of green industrial buildings in the development.

The total construction area of the project is 53240 square meters, and the total construction investment is 85 million yuan. The project is mainly composed of 1# and 2# factories and affiliated office buildings. The delivery room is mainly in the form of light steel structure, color board roof and color board wall. The main structure of the office building is light steel frame, planting roof, waterproof coil and color board wall. According to the requirements of the green industrial building evaluation standard, the design is based on the three-level green factory standard. The design adopts the all-steel structure frame system and integrates various energy-saving technologies such as natural ventilation, natural lighting, geothermal heating, cold roofing, intelligent control and solar water heating.

2. ANALYSIS OF THE APPLICATION OF GREEN TECHNOLOGY IN BUILDINGS

2.1 Land conservation and sustainable development of land use

The first is the roof greening. The auxiliary office building of the project is set as the green roof. Low shrubs and flowers are used as the main green plants, and at the same time, lawn is used. The second is the development of underground space. The use of FCB welding process can increase the utilization rate of production site and reduce the space occupied by welding. Finally, the setting of permeable ground. Green space and hollow out design should be used in the parking lot. Lawn should be planted in the hollow place. The pavement rate of permeable ground is higher, which not only fully complies with the requirements of rain infiltration, but also can meet the operation needs of the parking lot.

2.2 Energy saving and effective use of energy

2.2.1 Maintaining energy Conservation of the Structure

At present, there are still no energy saving standards for industrial buildings, but a variety of measures have been taken to save energy for industrial buildings. Fly ash with a thickness of 200 and blocks with a thickness of 80 rock wool board are used to keep heat in the location of the walls 2m below. For the position of more than 2m, the blanket insulation cotton structure with double color plate joint thickness of 80 is used. The roof is mainly used with double color plate joint thickness of 150 blanket Thermal insulation cotton construction. And should be in the roof purlin location of the thickness of 40 extrusion cold bridge, set up insulation doors and Windows.

2.2.2 High reflective roof

In order to effectively avoid the building heat island effect, the roof of the workshop is treated with highly reflective paint to make it become a highly reflective material with solar reflection coefficient greater than 78.

2.2.3 Infrared radiation heating

The plant is equipped with natural gas infrared heating system. The radiation tube is arranged in a non-equidistant way based on the work area, so as to meet the basic requirements of different heating areas. At the same time, the automatic control system is set in the heating design, and the system can adjust the running state according to the weather changes.

2.2.4 Lamps with high reflectance shall be used in the design of lighting system

The electrical lighting of the workshop is mainly energy-saving and efficient light source lamps. Lighting panel is a common natural lighting method. Roof lighting panel arranged in the raw material workshop can be used as an aid for workshop lighting. Artificial lighting equipment can not be turned on in the workshop under the condition of sufficient sunlight during the day. Moreover, the light guide lighting is also an important form of natural lighting, because the light guide corner too much will lose a lot of light source, so the number of corners should not be too much. In this project, a natural light import system can be installed in the office underground garage to reduce energy consumption.

2.3 Water conservation and rational utilization of water resources

2.3.1 Rainwater Collection

The plant roof of the project is equipped with drainage equipment and reservoir, which can be used to irrigate the garden landscape with stored rainwater and increase the utilization rate of water resources.

2.3.2 Effective utilization of reclaimed water

There is no sewage discharge in the production process of this project, and most of the water discharged is domestic bath sewage. To solve this problem, an integrated intelligent MBR membrane bioreactor, combined with membrane separation technology, biological treatment technology and intelligent control technology can be used. The treated sewage can be applied to afforestation irrigation.

2.3.3 Use of water-saving appliances

The faucet, sanitary ware, washbasin, rain shower and toilet seat used in the toilet are water-saving sanitary ware, the faucet should be sealed with ceramic plate water nozzle, and the water-saving shower should be used as the workshop rain appliance.

2.4 Saving materials and rational use of resources

The first is the selection of structural system and the application of high strength materials. The workshop mainly adopts the portal frame light steel structure system, effectively reducing the use of materials. And strictly control the structure of the size coefficient, to ensure the utilization of building maintenance materials, primary and secondary structure using high strength steel plate, secondary structure using high strength continuous Z-purlin. The second is the integration of civil decoration design and construction. The integrated design of civil construction and decoration can enhance the integrity and unity of the building, but also ensure the rationality of hole reservation, thus reducing the emission of construction waste. The third is the use of recycled materials. The main structure, sub-structure and plate of the project are made of metal materials, and 80% of the materials can be recycled. Before the building is scrapped, some materials can even be directly applied to the construction of new industrial plant. Finally, the building components can be prefabricated. Item decomposable modular production and design of steel frames, steel columns, support parts and maintenance system materials to meet the requirements of standardized design can not only improve construction efficiency, but also reduce noise pollution during construction.

2.5 Control of outdoor environmental pollution and pollutants

First, noise processing. The project is equipped with a 200-ton punch, which has a high noise intensity during operation and is located indoors. In this project, an independent foundation is set up in the installation and construction of the punching machine, and a sound-absorbing board is set around the equipment to absorb noise, so as to effectively control the noise and vibration generated in the operation of the punching machine. The second is the treatment of dust and soot pollution. The welding process will produce a lot of sulfur dioxide and manganese dioxide mixture, the above substances are usually mixed in smoke, resulting in serious pollution to the working environment of the workshop. This project has purchased a set of welding smoke purification system, each work table is equipped with a large suction cornice, the operator can adjust the Angle and height of the smoking mouth based on the actual situation, so as to effectively purify the smoke before the diffusion of the smoke, after reaching the emission standards outside.

3. INCREMENTAL BENEFITS OF GREEN INDUSTRIAL BUILDINGS

3.1 Land Benefit

Compared with the ordinary roof, the green roof consumes 0.2kwh/d of electricity per square meter. The green roof area of the project is 3000 square meters, where the project is located The annual heating and cooling days are 170 days, the industrial electricity price is 1.18 yuan, the roof greening benefit is: $0.2 \times 3000 \times 170 \times 1.18 = 120360$ yuan. Due to the FCB welding process, the land area is reduced compared with the standard land area 10%, FCB welding workshop area of 4245 square meters, such as the purchase price per mu of land 2.65 million yuan, about 666.6 square meters per mu, the underground and above-ground space development and utilization benefit of the project is $4245 \times 0.1 \times 265 / 666 = 1,689,100$ yuan.

3.2 Economic benefits of energy saving projects

Using the enhanced maintenance structure to save 1.36kg standard coal per square meter per year, according to the equivalent of 0.404kg standard coal per kilowatt hour, the annual energy saving benefit of maintenance structure is $52120 \times 1.36 \times 1.18 / 0.404 = 207,000$ yuan. The main workshop uses infrared radiation heating, which is 30% more efficient than traditional heating and can save 1.2kwh per square meter per year. The building area of the main workshop is 49120 square meters, and the annual benefit of infrared radiation heating is $49120 \times 1.2 \times 1.18 = 6952.56$.

Ten thousand yuan/year. The plant and auxiliary office building are equipped with intelligent lighting system, energy-saving lamps, natural lighting and other equipment. Combined with the information provided by the project greening design engineer, the annual electricity consumption of the building lighting can achieve a green lighting benefit of 78,300 yuan/year.

3.3 Water-saving benefits

The minimum average annual precipitation is 507.7mm, and the price of industrial water is 7.9 yuan/ton, the workshop roof of the water benefit area is 49120 square meters, the annual economic benefit of rainwater recovery is 177,500 yuan. The working days of shower sewage recovery are 250 days, and the waste water treatment cost is 0.36 yuan, the annual benefit of reclaimed water utilization is Ten thousand eight hundred thousand yuan. Toilet faucet sanitary ware is water-saving type, total number of 420 people, per capita water consumption of 40L,250 working days, the annual benefit of green water-saving appliances is Six hundred thousand yuan.

3.4 Economic benefits of material saving

Compared with traditional structural materials, the cost of structural high-strength materials can be reduced by 0.5% to 1%. Therefore, the economic benefit of structural system and high-strength materials is 410,000 yuan. The application of the main structure and process equipment of the project is equivalent to 0.1% economic benefit, so the integrated design and construction benefit is 82,000 yuan.

3.5 Environmental Benefits

The project reduced pollutant emission benefits of 254,500 yuan/year, roof The environmental benefit of greening is 18,300 yuan/year.

4. CONCLUSION

In this paper, the economy of green industrial building is briefly analyzed with examples. The results show that green industrial building has good economy and is worth promoting vigorously.

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