Research on New Technology of Energy Conservation and Emission Reduction Based on Environmentally Sustainable Buildings

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Abstract. With the continuous development of the economy, the world's attention to environmental sustainability has risen to a new level. During the construction process, especially in the application of energy-saving and emission-reduction technologies, many key technologies for environmental protection must be combined. Organically integrate energy saving and emission reduction with environmental sustainability. All building technology emission reduction technologies must meet environmental protection standards, such as using corresponding technologies to control indoor air pollution from various building decorations, and give corresponding control and treatment. These key technologies require research today. The effectiveness and environmental sustainability of these energy saving and emission reduction technologies are the key research areas of this paper.

Key words: Environmental sustainable development, Energy saving and emission reduction, New technologies, Environmental science.

1. Introduction
The energy efficiency of residential buildings has received widespread attention from the society. At present, Chinese energy saving and emission reduction technologists have conducted in-depth research on energy conservation issues in residential buildings, and more and more attention has been paid to energy-saving materials and new technologies. However, in the interior decoration energy saving and emission reduction technology, the energy saving and emission reduction technologist did not consider energy saving as a part of the interior energy saving and emission reduction technology and did not consider it comprehensively. According to the survey, the factors that generate energy consumption in interior decoration are mainly divided into two parts: energy consumption during decoration and energy consumption during use. However, the enclosure of the building's external space often accounts for 66% of the total area, and its heat loss amounts to 48%. In the entire space, the heat insulation performance of doors and windows is poor, and its energy consumption accounts for about 42% of the total building area, which is 5-6 times the energy consumption of indoor walls. The direct sunlight greatly increases the cooling energy consumption of the indoor space, and the floor insulation of the stairs and elevator spaces also directly affects the heat transfer function of the upper and lower spaces. In the energy saving and emission reduction technology of the indoor environment, if the interior space energy saving and emission reduction technology is not reasonable, it will cause the convection of the north and south air, which will also affect its ventilation and cooling effect. The size of the furniture and the layout of the
interior space affect the circulation of airflow in the interior space. The choice of indoor color will also affect the psychological temperature of people. Indoor lighting, air conditioning, and heating and insulation systems are the main ways of consuming energy in interior decoration. The energy consumption of indoor lighting generally accounts for 10% to 35% of the total indoor power consumption. The energy saving and emission reduction technology, installation, and use of heating and insulation systems such as air conditioners also have a significant impact on energy consumption.

2. The application of green energy engineering ideas in interior decoration

2.1. The energy saving in interior energy saving and emission reduction technology

(1) the rationality of indoor functional layout

The ceiling and partition decoration in interior energy saving and emission reduction technology should not only beautify the surface and block the view, but also consider the airflow organization in the space. After understanding the circulation of natural wind in the room, the location of airflow guidance should be considered when energy saving and emission reduction technologying the partition. The partition energy saving and emission reduction technology is best to use half-through and semi-solid movable partitions to facilitate the adjustment of the wind direction. At the same time, it can also make the interior space energy saving and emission reduction technology variable and interesting. Sex.

If there is no special requirement, the energy saving and emission reduction technology of the living space is very important to the reasonable division of labor and layout of the space. For example, the living room and master bedroom need to ensure good lighting and ventilation conditions. Natural light can also be used to reduce the use of electric lights, and natural ventilation can be used to reduce the energy consumption of electrical appliances. From the perspective of energy saving, if the bedroom or living room is connected to the balcony, with the permission of the property company, the balcony can be closed as much as possible, so that the balcony becomes a buffer zone. Hot and cold air in summer and winter will not directly enter the room to avoid outdoor Air directly affects the interior, thereby reducing indoor energy consumption. When energy saving and emission reduction technologying the energy saving and emission reduction technology of the kitchen and bathroom, try to consider the energy saving and emission reduction technology using natural light, and each space should have a window. The lighting environment of the kitchen and bathroom is not high. As long as the natural light is used as much as possible, a large amount of power can be saved.

(2) Indoor greening and color energy saving and emission reduction technology

Placing green plants in an indoor environment has the functions of beautifying the environment, organizing space, and adding color to the interior. If the energy saving and emission reduction technology is reasonable, it will also make a huge contribution to indoor energy saving. For example, in the energy saving and emission reduction technology of the balcony, in the summer, plants can be used to conduct green partitions in the form of heat insulation, thereby achieving the effect of cooling the space. Placing plants, rocks, water and other natural elements in indoor balconies, corridors and other places can make people feel a cool feeling. Indoor greening and natural ventilation energy saving and emission reduction technology, combining indoor temperature and humidity to adjust, can greatly improve the isolation conditions of indoor space and outdoor space. In addition to the physical aspects of people's perception of the environment, there are also psychological aspects. Studies have shown that indoor greenery energy saving and emission reduction technology has a certain impact on human psychology. From the perspective of energy saving, energy saving and emission reduction technologyers can adjust people's psychological feelings in terms of interior colors and textures, and use different colors and textures for interior decoration according to seasonal and physiological needs. Furniture veneers and accessories can improve people's psychological comfort , Can also reduce indoor energy consumption accordingly.

(3) Furnishing arrangement and selection of interior materials

Furniture furnishings and selection of indoor materials also have a significant impact on indoor energy consumption. A good furniture energy saving and emission reduction technology layout has
some flexibility to cope with climate change. This adjustment can be achieved by replacing or reassembling the furniture. In order to effectively block solar radiation in rooms with windows in east and west directions, it is best to choose suitable curtains. Through the combination of thick and thin, light and dark, install light curtains on the outermost, so that a large amount of solar radiation can be reflected. Darker and thicker curtains are installed on the inside of the window. It can absorb more sunlight and greatly improve indoor comfort on the premise of energy saving. In the choice of interior decoration materials, combined with heating, insulation and other requirements, decoration materials with a lower specific heat capacity and thermal conductivity, such as wood, should be selected to reduce the load on heating equipment.

2.2. Interior lighting energy saving and emission reduction technology and application of air conditioning system and water supply system

(1) Interior lighting energy saving and emission reduction technology

In interior lighting energy saving and emission reduction technology, the combination of light education according to the functional requirements and the visual characteristics of the room is very important to cultivate a reasonable selection and energy saving and emission reduction technology of current sources with deep traditional cultural literacy and international vision. Energy saving and emission reduction technologies can use a combination of low-lighting and accent lighting sources to arrange light sources, appropriately increase accent lighting, make full use of natural light and reduce unnecessary artificial lighting. For example, small-diameter fluorescent lamps and compact fluorescent lamps are high-efficiency, long-life light sources. The energy saving and emission reduction technologyer should pay attention to the lighting method and adopt the comprehensive accent type as much as possible. In the lighting energy saving and emission reduction technology of the living room, the arrangement of lights should be less starry. For example, the LED light source theoretically has higher luminous efficiency than the traditional light source, longer life, and the laboratory life can be very high. Even if the light source is turned on and off frequently, its life will not be affected, and the startup speed is very fast. In addition, the light source should not add harmful substances such as mercury to protect the environment.

(2) Installation energy saving and emission reduction technology of indoor air conditioner

The installation and energy saving and emission reduction technology of air conditioners also plays an important role in indoor energy-saving energy saving and emission reduction technology. Affected by the height of the air conditioner, according to the actual state analysis of the hot and cold air flow and people's activities in the indoor environmental space, the installation height of the general air conditioner is 1.85 meters, which is slightly higher than the average height of the human body. In the indoor space where people are active, people tend to sit mainly, and the space above 1.85 meters is basically inactive. In summer, the air in the closed indoor environment is not convective, and hot air will collect on the ceiling. The purpose of air conditioning and cooling is mainly to reduce the temperature around the human body in the environment.

The height of 1.85 meters can make the air conditioner cool quickly, which can save energy and protect the environment in the effective area.

(3) Indoor water supply system

Environmental protection and green energy engineering ideas The application of solar energy and air energy also plays an important role in energy saving of interior decoration. The solar water heater has good heat transfer performance and strong heat absorption capacity, and its system has good thermal insulation performance, large heat storage energy, and the water tank has the function of water storage, which can meet the centralized use of hot water by multiple people, and also has the role of emergency water when the water is stopped. The solar water heater system runs fully automatically and statically, which is safe and reliable, easy to operate, environmental protection and energy saving, and also has the function of sewage purification. Solar water heaters will be affected by weather conditions. If a small amount of electrical energy is used to heat the water, their energy consumption is one-fourth that of electric water heaters, one-third of gas water heaters, and two-thirds of ordinary solar water heaters. The
effect is an all-weather hot water supply system. Its intelligent environmental protection, automatic operation, through the function of the heat pump unit, to provide hot water temperature up to 60 °C. With temperature control device and insulation layer, it can automatically replenish water, heat and power off, and provide hot water for 24 hours.

The problem of home decoration pollution has become a "hidden killer" that seriously endangers human health and safety. According to experts, "indoor environmental pollution" has become the world's third largest air pollution problem after "soot pollution" and "photochemical pollution". Everyone knows poison in home decoration, but little is known about where the poison comes from. As a result, even if all the houses decorated with green and environmentally friendly Environmental Engineering are still toxic, it still exceeds the standard. The pollution of the building decoration Environmental Engineering to the indoor environment has become a major issue affecting people's actual physical health and safety, and the indoor decoration pollution is a new environmental pollution. In particular, people's use of unqualified building decoration Environmental Engineering and unreasonable over-renovation during the interior decoration process will cause serious violations of pollutants, especially formaldehyde and benzene-based pollutants, which will cause abnormal smell and irritation (thorn Nose, tears), allergies and other symptoms, long-term inhalation of pollutants from building decoration Environmental Engineering can cause nasopharyngeal cancer, colon cancer, neonatal chromosomal abnormalities, stillbirth, infertility and leukaemia and other diseases.

3. The sampling analysis of indoor environmental survey

3.1. The Sampling and analysis results of office decoration survey

The office will continuously monitor and monitor the indoor formaldehyde content volatility changes from 3 months (late autumn) to the second year (early summer) after the renovation.

| Time after decoration (month) | Room temperature (°C) | Concentration range (mg/m³) | x ±s (mg/m³) | Over-standard rate (%) |
|-----------------------------|------------------------|------------------------------|--------------|-----------------------|
| 4.0                         | 14                     | 0.04-0.36                    | 0.22±0.14    | 57.1                  |
| 5.5                         | 12                     | 0.07-0.16                    | 0.11±0.03    | 42.9                  |
| 7.0                         | 10                     | 0.08-0.11                    | 0.09±0.01    | 0                     |
| 8.5                         | 20                     | 0.06-0.29                    | 0.18±0.10    | 71.4                  |
| 10                          | 26                     | 0.08-0.58                    | 0.22±0.17    | 85.7                  |

3.2. Sampling and analysis results of hotel decoration survey

Several hotels with the same grade and similar decoration time types were selected. According to the length of their interior decoration years, they were divided into 3 investigation groups for sampling analysis and testing. The results are shown in Table 2.

| Group | Renovation period | Sampling point | Room temperature | Mean formaldehyde | Mean benzene | Toluene mean | Mean xylene |
|-------|-------------------|----------------|------------------|------------------|--------------|--------------|-------------|
| A     | Within 1 week     | 6              | 10               | 0.035            | 2.188        | 2.912        | 0.106       |
| B     | Within 1 year     | 5              | 25               | 0.141            | 0.058        | 0.064        | 0.004       |
| C     | More than 1 year  | 14             | 22               | 0.074            | 0.019        | 0.018        | 0.001       |
3.3. **Sampling and analysis results of room decoration survey**

Sampling analysis was performed on 74 newly renovated houses (about 90d renovation time) and 11 unrenovated houses. The test results showed that the indoor formaldehyde concentration in the renovated group was higher than that in the unrenovated group, which were \((0.13 \pm 0.10) \text{ mg} / \text{m}^3\), \((0.05 \pm 0.03) \text{ mg} / \text{m}^3\), the difference was statistically significant \((t = 2.541, p < 0.05)\). The formaldehyde concentration in the decoration room (90d after decoration) is higher than the national standard \((0.08 \text{ mg} / \text{m}^3)\).

From the analysis and testing data in Table 1, during the decoration period of 4 to 10 months, the formaldehyde content in the indoor air did not decrease significantly with the extension of the decoration time, but changed correspondingly with the change of room temperature. From the analysis and analysis data in Table 2, when the room temperature is 10°C, the measured formaldehyde concentration is very low, but the benzene concentration is very high; when the room temperature is 25°C, the formaldehyde concentration is very high, and the benzene concentration is very low. According to China's public health standards \((0.12 \text{ mg} / \text{m}^3)\), only when the room temperature is 10°C, the average value of formaldehyde in indoor air does not exceed the standard. After 10 months of decoration, when the room temperature rises by 26°C, the indoor air formaldehyde content exceeds the standard. The rate is as high as 85.7 percent. Due to the rise in temperature, people use air conditioners indoors, doors and windows are tightly closed, and the indoor air concentration exceeds the standard due to volatilization of formaldehyde, which causes people to experience varying degrees of string halo and respiratory symptoms indoors [1].

4. **Misunderstandings in the use of interior architectural decoration**

(1) Only luxurious and beautiful are considered in the interior decoration, and the indoor air quality is not considered. Indoors are places where people live and live for a long time. Pollutants in building decoration Environmental Engineering volatilize into the air, which will have extremely adverse effects on human health. For example, benzene, formaldehyde, ammonia and other pollutants in building decoration Environmental Engineering can cause nausea, headache, vomiting, and severely cause various cancers. In recent years, cases of moving into a new home directly after the renovation of a new house but getting seriously ill are common in major media reports.

(2) Some people think that if high-grade and environmentally friendly building decoration Environmental Engineering are selected, indoor air pollution can be avoided. Many so-called high-end building decoration Environmental Engineering and "environment-friendly" building decoration Environmental Engineering contain ingredients that can pollute indoor air. For example, benzene series which are widely used in interior decoration paints and thinners; some interior building decoration uses so-called "benzene-free" paints, which are only free of benzene, which cannot be ruled out without other benzene series. Even if the building decoration Environmental Engineering do meet the environmental protection application standards, after the indoor building decoration is completed, the superposition of various volatile substances on each other will still cause indoor air environmental pollution. Figure 1 shows the environmental protection in the interior decoration.
Figure 1. Environmental protection in interior decoration.

(3) After the interior building decoration is completed, air can be purified by using air fresheners. If no door is detected in the indoor air environment, no pollutants are present. The application of air fresheners cannot fundamentally solve the problem. After moving in for a period, the unpleasant door in the indoor air environment will gradually fade, but continue to volatilize, for example, formaldehyde will continue to volatilize for many years [2].

5. Pollution prevention and control
China promulgated the "Technical Essentials for the Construction of Healthy Houses" in 2004. Among them, the control index for pollutants in the indoor air environment is clearly proposed. The indoor air pollutant control indicators are shown in Table 3.

| Pollutant name                      | standard value | Remark   |
|------------------------------------|----------------|----------|
| Ammonia (mg / m³)                  | 0.2            | 1h average |
| Carbon monoxide (mg / m³)          | 10             | Annual average |
| Benzene (mg / m³)                  | 0.1            | 1h average |
| Radon (mg / m³)                    | 100            | 1h average |
| carbon dioxide (%)                 | 0.1            | Daily average |
| Formaldehyde (mg / m³)             | 0.11           | 1h average |
| Total volatile organic compounds (mg / m³) | 0.6           | 8h average |
| Total bacteria (pcs / m³)          | 2500           |          |

If we want to have a healthy and comfortable residential environment, we must control and prevent the pollution of the indoor air environment. When decorating indoors, we must purchase the interior building decoration Environmental Engineering in accordance with the standards set forth in the "Code for the Control of Indoor Environmental Pollution of Civil Building Engineering". When we purchase building decoration Environmental Engineering, we must require the merchant to show effective detection of relevant indicators. It is reported that once the harmful substances in building decoration Environmental Engineering are found to exceed the standard, procurement must be banned. If you find that the test items are incomplete or you question the test results during the interior decoration, you must send qualified building decoration Environmental Engineering to the testing agency for testing, and you can continue to use them in the interior decoration after passing the test.
6. The ideas for using green Environmental Engineering for decoration and environmental protection

6.1. The Using of environmentally friendly decoration Environmental Engineering and renewable energy

Interior decoration is originally a costly and consumable project. If you do not pay attention to the selection and use of decoration Environmental Engineering and energy, it is likely to cause waste. When energy saving and emission reduction technologying and selecting Environmental Engineering, energy saving and emission reduction technologyers should have a green environmental protection concept, do adequate homework investigations on Environmental Engineering and energy required for decoration, and screen out non-polluting, scientific and environmentally-friendly Environmental Engineering and available natural energy sources. You can also use the remaining Environmental Engineering to make some small parts and small accessories, which can not only make the interior decoration more beautiful, but also reduce the waste of Environmental Engineering [3]. In addition, in terms of energy selection, use renewable energy sources such as wind and solar energy as much as possible to reduce the generation of pollution. If there is an irritating door and some chemical pollution in the decorated room, it can be exhausted by opening the window and using natural wind energy to achieve the desired effect.

Figure 2. Relevant measures for reducing pollution in interior decoration.

6.2. The applying green plants in decoration

The application of plants in buildings has an important role. In modern people's lives, being indoors for a long time has become the daily life of most urban people, and the indoor air environment will have an impact on people's health. The application of green plants can optimize the indoor environment so that people will not experience hypoxia and other conditions during long-term indoor activities [4]. At the same time, the application of green plants also has a regulating effect on people's mental health. In plant applications, attention needs to be paid to the location of the plant and the type of plant. For example, in a bedroom environment, the number of plants needs to be reduced. This is because many people are accustomed to complete darkness during sleep. Plants will absorb oxygen in the air and produce carbon dioxide in the absence of photosynthesis, which will adversely affect people's sleep.

6.3. Making full use of natural advantages

In modern life, the use of electrical energy and other energy sources provides a lot of convenience for life, and brings a lot of energy consumption. In green energy saving and emission reduction technology, energy saving and emission reduction technologyers need to pay attention to reducing the consumption...
of resources, apply the natural space and natural advantages around the building, and reduce the use of resources and waste of resources. At present, the more concerned part of green energy saving and emission reduction technology is the application of natural advantages to adjust the lighting environment and temperature inside the building. Regarding the adjustment of light, we must pay attention to the openness of the space and use natural light as much as possible as a source of lighting in people's daily production and life. In the interior of a building, temperature adjustments require more natural resources. Regarding temperature adjustment, the advantages of resources and environment need to be fully applied. For example, on the problem of ventilation inside the building, a special structure can be applied to enhance the flow of natural wind in the space and reduce the consumption of electrical energy.

6.4. Application of special Environmental Engineering and equipment
The application of special environmental protection equipment can also realize the natural advantages of buildings. For example, in areas with better lighting and thermal energy environments, solar energy water heaters and other equipment can be used to apply light and thermal energy. There is a difference between environmentally friendly green Environmental Engineering and general Environmental Engineering. The price of environmentally friendly green Environmental Engineering is usually higher and can also produce better results in applications. For example, in the selection of wall surface application Environmental Engineering, the application of special environmentally friendly green Environmental Engineering can achieve better temperature insulation effects, which makes the application of power resources inside the building saved. The application of green environmental protection Environmental Engineering can also reduce the impact of buildings on human health. In the application of wall paint and other coatings, it usually contains ingredients that are not good for health. The use of healthy wall paint and other Environmental Engineering can reduce harmful factors in decoration.

![Image](image_url)

**Figure 3.** Use of special decoration Environmental Engineering.

6.5. Emphasis on acceptance
In the current market, there are many companies in architectural decoration and energy saving and emission reduction technology, and the quality of the company varies. In order to ensure that the intent of the decoration energy saving and emission reduction technology can be reflected in the decoration process, after the completion of the decoration work, strict acceptance work needs to be applied to ensure the green and environmental protection of the building decoration [5]. To this end, architectural energy saving and emission reduction technologyers need to provide standards for acceptance work, use various instruments in the acceptance, and test the indoor environment to ensure that the environment can meet...
the requirements of green environmental protection. You can purchase formal testing equipment for testing through the correct channels, or you can seek the help of professionals to understand the degree of purification of indoor space and reduce the harm to people by testing various indicators. In addition to placing green plants to purify the air, the air can also be purified by means of air purifiers, multi-window ventilation, etc., so that the indoor air reaches the safety index [6].

7. Conclusion
With the increasing demand of people for living environment and continuous pursuit of quality of life, interior space decoration has gradually become a common phenomenon in life. When customers choose interior decoration Environmental Engineering, they pay more attention to high-grade chemical fibre products, organic solvents, artificial and Interior decoration Environmental Engineering such as natural stone, artificial composite boards, adhesives, coatings and plastics. It is precisely because of these interior decoration Environmental Engineering that problems such as allergic dermatitis, asthma and nerves, hematopoietic tissue diseases, eye and nasal mucous membrane irritation occur repeatedly. Analyse the harmful ingredients that will endanger the health in various interior decoration Environmental Engineering, and put forward the scientific prevention strategies of indoor decoration Environmental Engineering on air environment pollution.

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