

# Practical Application of Environmental Protection and Energy Saving in Building Electrical Design

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**Abstract:** Energy is the lifeline of a country's economic development, but also the important foundation to improve people's lives. With the continuous development of China's social economy, as a big energy-consuming industry, the building industry has been consuming more and more energy, greatly increasing the pressure of the energy supply for our country, and even restricting the development of our national economy, so the practical application of environmental protection and energy saving in building electrical design is of great significance to the economic development of our country. This paper analyzes and discusses the practical application of environmental protection and energy saving in building electrical design.

**Key Words:** Environmental protection and energy saving; Building electrical design; Practical application

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## 1 The Significance of Environmental Protection and Energy Saving in Building Electrical Design

The consumption of energy resources has become one of the important factors restricting the current economic development, and it is necessary to actively carry out the corresponding energy conservation and environmental protection work. Now domestic resources and energy reserves are relatively rich, but the per capita occupancy is not much, especially when the consumption of energy resources is continually increasing. The construction project is closely related to people's production and life, and in the process of construction, waste of energy electric energy is very serious, which affects the development of

economy and environment, so it is necessary to strengthen the energy saving in building design. We should actively carry out the electrical energy-saving work of construction projects, which not only can effectively save social resources, but also promote innovative energy-saving technology in all fields, enhance the overall innovative effect of electrical energy conservation of construction projects, and promote the full integration of social, economic and environmental benefits.

## 2 Principles of Environmental Protection and Energy Saving in Building Electrical Design

### 2.1 Strengthening the Application of Practical Principles

In the process of building electrical energy-saving design, first of all, we should meet the practical principle, and designers should first ensure people's normal life and work, and then strengthen energy-saving design in accordance with that. For example, in the electrical engineering design, we should first understand the use requirements of the project in order to meet the requirements of this electrical engineering in energy-saving design, so as to better ensure the normal use of the building.

### 2.2 Strengthening the Application of Economical Principles

In energy-saving design for architectural electricity, we should also uphold the economical principle. In the process of building electrical design, first of all, we should meet the requirements of building electrical engineering, and secondly strengthen the construction cost control of

architectural electricity. Strengthening the use of economical principles is also one of the links of energy-saving design, so in the selection of energy-saving equipment, staff should strengthen the full application of energy-saving technology and reduce the power consumption of equipment with the help of energy-saving technology, so as to achieve energy conservation and reasonable control of running cost of electrical equipment. In order to better reflect the economic principle, in the selection of electrical equipment, we should also consider the long-term use of equipment and pay more attention to the costs in later stage instead of seeking immediate interest, thus increasing the operating costs of construction electrical.

### **2.3 Strengthening the Application of Technological Principles**

In the process of building electrical energy-saving design, the staff should also strengthen the application of the principle of technology, and through strengthening the advanced energy-saving technology in building electrical design, we can better solve the energy problem of building electricity, and reduce the energy consumption of building electricity. For example, for frequent problems such as power loss of transformers and wires, staff should strengthen the application of advanced technology and effective control of these problems in order to avoid the occurrence of power loss, so as to better achieve energy-saving purposes.

## **3 Practical Applications of Environmental Protection and Energy Saving in Building Electrical Design**

### **3.1 Make Full Use of Solar Photovoltaic System**

The design of the device should be considered from the following three aspects: ① Analyze the daily power consumption, time, and total load. Then to design the voltage level for system output. ② Design system for two-stage voltage output. ③ Put climate change into consideration, design for rainy days to estimate the time it takes to work, and it should also can assess the amount of

solar radiation and the location of the building. In many areas of China, the time of day is long and sunny, and solar energy is rich. We should take the advantage and actively play its role in effectively alleviating the energy shortage problem. The following factors should be considered in energy-saving design: The nature of the load, the required power and the amount of solar radiation in the place where the building is located.

### **3.2 Design of Heating Ventilation and Air-condition (HVAC)**

Electrical energy-saving of HVAC control interface is of great significance for the energy-saving system of HVAC air-conditioning. The HVAC should be effectively adjusted through coordination between HVAC system engineers and electrical engineers, so that the motor can be more energy-saving. Connect the HVAC interface and a weak current sensor, and detect parameters such as wind speed, temperature, particle size and so on, adopt intelligent control system in the interface control to achieve electrical energy-saving design. And add independent communication control and seasonal air-conditioning system, we can achieve optimal control and the starting, variable air volume system, variable flow system and stop of the electrical equipment, achieving the goal of saving energy.

### **3.3 Energy-saving Design of Lighting of Buildings**

Illuminance, color temperature and color rendering index are basic components of lighting energy-saving design. In the energy-saving design, we should pay special attention to the following points: ① to meet the corresponding standards of building lighting. Lighting design, uniform glare rating, and other related conditions are all criteria of a comprehensive and high-standard light source, and usually we need to meet requirements of efficient light source, select high-efficiency lamps, directly open lighting priority, then the reflected rate of light reflector should be relatively high; ② the height of lamp should be low, and of course in an aesthetic height, and ultimately achieve energy-saving purposes. When selecting an electronic ballast, choose the electronic ballast with high

energy-saving power and the product with high effect; ③ design intelligent lighting products such as human body induction, light control, time control, and sound control and other functions, when the product receives an open command, it can turn on lights automatically, and when no illumination is needed, it can shut down automatically.

### **3.4 Energy Saving of Power Equipment System**

This design needs efficient motor to minimize the loss of the motor, and select the motor according to the load capacity of the air, so that the motor can achieve the most appropriate effect and put fine timber to petty use. Light load motor starts buck run, which can minimize the consumption in the beginning and improve the operating efficiency according to the change and the compensation implementation for load on the motor reactive power; the load should choose to adjust the speed of the motor of the equipment, in order to improve the control mode, and through these means, the energy-saving effect will be greatly improved.

### **3.5 Flexible Application of Intelligent Control Technology**

Through the application of intelligent monitoring equipment, we can timely collect data and status of high energy consumption equipment, control energy consumption, current and voltage intelligent detection, active power and other items through remote control device, intelligently upgrade energy efficiency capacity of

equipment, and strengthen integration control of energy network. Implementation of comprehensive analysis and control can strengthen the connection between points, and implementation of energy-saving supervision can achieve effective energy-saving control in the whole LAN.

## **4 Conclusion**

In short, in building electrical design, the practical application of environmental protection and energy saving is a systematic and complex project, and in the face of the current situation of energy shortage, it must be carefully considered and discussed in the electrical design from the aspects of environmental protection, energy saving and applicability to ensure the concrete application of environmental protection and energy saving in building electrical design.

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