

# **Analysis of energy and power engineering in the power industry for energy saving and emission reduction applications**

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## **Abstract**

**Energy and power engineering has an important position in the development of the electric power industry, and it can have a direct impact on the energy conservation and environmental protection of electric power. Therefore, in order to improve the scientific nature of energy and power engineering and promote the healthy development of the electric power industry, this paper analyzes the energy and power engineering based on the concept of energy conservation and environmental protection through actual investigation and analysis of relevant information, in order to provide a reliable basis for the relevant personnel to carry out their work.**

## **Keywords**

**Energy conservation and environmental protection; energy and power engineering; analysis.**

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## **1. Introduction**

In the context of the continuous promotion of the concept of energy conservation and environmental protection, electricity is gradually attracting the attention of society because it accounts for a large proportion of energy consumption in China. Therefore, in order to improve the energy conservation and environmental protection of electricity, the concept of energy conservation and environmental protection must be analyzed in depth and combined with energy and power engineering, so as to achieve the purpose of effective energy saving and environmental protection, which is of great significance to the sustainable development of China's power industry.

## **2. Energy and Power Engineering**

### **2.1 Energy saving in power generation**

First of all, considering that traditional hydropower and thermal power equipment is not in line with the development of the times, it is necessary to take transformation measures and apply advanced thermal power equipment at home and abroad in order to achieve the purpose of improving the operational efficiency of equipment[1]. Secondly, we should attach great importance to cogeneration and take corresponding measures to promote its healthy development, so as to achieve effective improvement of thermal energy utilization efficiency. Finally, considering the strong application value of nuclear power and renewable energy, we should conduct in-depth research and promote the use of such energy to promote its stable development.

### **2.2 Loss and energy saving**

In the actual operation of the power grid is very easy to produce a lot of losses, the point and the concept of energy-saving serious inconsistency. Therefore, in order to solve this problem, we must take scientific and reasonable measures to solve the problem. First, the grid structure should be optimized to improve the overall quality of the economic operation of the grid, and strictly do a good job in the configuration of the transmission circuit to ensure that it has a good rationality. Secondly,

in order to realize the control of power generation losses, the power generation of nuclear power and thermal power must be scientifically adjusted, so as to effectively reduce the purpose of plant power. Finally, advanced technical means at home and abroad should be used for the transmission of electricity. This point is of great significance to reduce line losses. In addition, energy and power engineering should be realized as much as possible, so as to reduce the degree of substation losses.

### **2.3 Electricity demand energy saving**

First of all, in the actual working process, the power efficiency of the equipment must be adjusted, and then realize effective power saving. Secondly, at the end of the above work, optimization measures should be taken in time for the supply and distribution lines and equipment, and the power factor of the equipment should be improved as much as possible. This point has an important role in realizing energy saving of electricity demand. Secondly, load forecasting should be done in strict accordance with the relevant standards, so as to lay a good foundation for the subsequent work. Finally, electricity demand research activities must be carried out strictly to clarify the actual electricity demand of the people.

## **3. Analysis of energy saving and emission reduction application of energy and power engineering**

### **3.1 Problems**

From a realistic point of view, it can be found that although the continuous development of electric power business plays an important role in improving the quality of national life, the process of power generation is very likely to have a serious impact on the ecological environment, which is extremely unfavorable to promoting the concept of energy conservation and environmental protection in China. Therefore, in order to improve the economy and environmental protection of power dispatching, it is necessary to analyze different types of power generation in depth and fully clarify their impact on the ecological environment. In terms of the problems that exist in different power generation and their possible impact on the environment, the main points include the following.

#### **3.1.1. Thermal power**

Through actual investigation, it can be found that most thermal power generation in China is coal-fired. For this type of power generation, it not only consumes relatively high energy, but also has a direct impact on the ecological environment, which even poses a threat to people's physical and mental health in serious cases. For example, in the process of thermal power generation, a large amount of harmful substances such as nitrogen oxides, sulfur dioxide and dust will be formed[2]. Among them, nitrogen oxides are likely to be transformed into nitric acid, which has a serious impact on many aspects. For example, nitric acid may lead to the unhealthy growth of crops, resulting in a significant decline in the economic efficiency of rural residents; this substance can cause damage to the structure of buildings, resulting in its reduced stability, which is extremely detrimental to the safety of people's lives and property. Sulfur dioxide may be transformed into sulfuric acid and have a serious impact on buildings and human health. Dust is likely to enter the human body and cause damage to the respiratory system, resulting in a decrease in the physical and mental health of the people. In addition, the combustion process of coal will form a large amount of greenhouse gases and cause damage to the ecological environment, thus leading to an increase in global warming. Thus, thermal power generation has a serious impact on the ecological environment and must be given high priority.

#### **3.1.2. Utilities**

Hydroelectric power generation is environmentally friendly compared to thermal power because it does not produce harmful substances during the actual generation process. However, the actual investigation shows that although the process of hydroelectric power generation has no impact on the ecological environment, the process of constructing hydroelectric power stations is very likely to cause serious damage to the ecological environment[3]. For example, when the hydropower station

is formally constructed, the construction unit will cause serious damage to the environment around the river, resulting in mudslides and soil erosion and other disasters. On this basis, not only the growth and reproduction of river organisms will be affected, but also the safety of people's lives will be threatened.

### 3.2 Measures

In order to effectively solve the impact of different power generation methods on the ecological environment, the staff must adopt scientific and reasonable solutions to achieve the ecological environment protection. For the measures, they include the following.

#### 3.2.1. Thermal power generation

Through actual investigation, we can find that thermal power generation has a more serious impact on the ecological environment than other power generation methods, so in practice, we should focus on taking control measures for thermal power generation[4]. For this measure, it mainly includes the following points: (1) Reduce the pollution of thermal power generation. Considering that the process of thermal power generation will cause serious pollution, it is necessary to pay great attention to the treatment of pollution sources. In the actual work process, we must change the way to deal with the pollution source of thermal power plants, for example, we can choose to take corresponding desulfurization and denitrogenation treatment measures for coal-fired power generation, and discharge after scientific treatment of power plant exhaust gas, so as to achieve the reduction of thermal power generation pollution; (2) optimize the structure. From the perspective of reality, it can be found that the main reason for the strong pollution of thermal power generation is coal-fired power generation, so the structure of thermal power generation should be changed. For example, natural gas can be used to generate electricity. In addition, the efficiency of thermal power generation can be improved and the pollution of thermal power generation can be controlled by high efficiency large units.

#### 3.2.2. Comprehensive development of power generation industry

First of all, hydro and solar energy are clean and renewable energy sources. This kind of energy not only has the significance of promoting the protection of ecological environment, but also has renewable characteristics. Therefore, it is necessary to pay great attention to these energy sources in practice, improve their utilization efficiency and reduce fossil fuel consumption as much as possible. Secondly, for nuclear power generation, it has a very high efficiency, but because of the safety risks of this type of power generation, it is necessary to do a good job of safety protection in the process of nuclear power generation, so as to achieve the purpose of promoting the healthy development of nuclear power generation[5]. Finally, China should formulate and introduce guiding regulations and policies, so as to lay a good foundation for the healthy development of clean renewable energy industry.

## 4. Conclusion

To promote the development of the national electric power industry, it is necessary to strictly follow the concept of energy conservation and emission reduction, to promote the development of electric power and energy engineering from the actual situation, to ensure the reasonable development of electric power enterprises, and to provide power for national development.

## References

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## Notes

In the process of energy and power project implementation, the following contents should be duly referred to: (1) Intelligent load forecasting should be carried out in strict accordance with relevant standards, so as to lay a good foundation for the subsequent work; (2) Great attention must be paid to the combination of units to ensure that it has good scientificity and reasonableness; (3) In order to avoid the impact on the quality of energy and power project, the allocation of unit power must be done strictly; (4) (5) Coordinate hydroelectricity and thermal power in strict accordance with relevant standards; (6) Combine the economic dispatch of power system in strict accordance with relevant standards; (7) Consider the economic dispatch of safety constraints and adjust it appropriately; (8) Consider the economic dispatch of network loss; (9) Analyze the economic dispatch of environmental protection in depth; (10) In the process of adopting energy and power engineering The process of energy and power engineering must be based on energy saving and environmental protection scheduling.

Conclusion: In conclusion, as the concept of energy conservation and environmental protection continues to advance, the power industry is gradually receiving the attention of society. Therefore, in order to meet the needs of society, it is necessary to form a correct cognition of energy and power engineering, fully implement the concept of energy conservation and environmental protection, and strictly follow the relevant standards to control the power generation methods and promote the healthy development of clean and renewable energy industry. Based on this, China's electric power business will achieve sustainable development.