

Smart grid dispatch control system and grid system safe operation

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Abstract: In today's world, social and economic development is getting faster and faster, and people are increasingly demanding energy. Among many energy sources, electricity is one of the most widely used energy sources. People's social life and economic development are coming, so people can't leave the power. In this situation, the safe operation of the power grid system is particularly important. The emergence and development of the smart grid dispatch control system has greatly improved the safety, stability and operational efficiency of the power grid system.

1. Introduction

With the rapid development of social economy, the development of social economy and people's daily life are inseparable from electricity. Therefore, China's demand for electricity is also growing, although China is currently the country with the most power generation in the world, but still cannot meet the growing demand [1]. In order to meet the demand for electricity in social production and life, while continuously developing new energy sources, in order to ensure the safety, stability and efficiency of power grid operation, the smart grid dispatching control system has also emerged [2].

Nowadays, China's smart grid dispatching control system is quite perfect and is at the world's leading level. However, China's smart grid dispatching control system is not a one-step process. The development of China's smart grid dispatching control system is mainly divided into three stages: first In the mid-1980s, China's power grid system introduced power dispatching control technology from abroad to meet the inter-provincial power dispatch control, and began to learn and develop its own power dispatch control system based on this. [3]; The second stage is the development stage. After the first stage of learning and technology accumulation, China's power dispatching control system technology has developed greatly, and developed a national networked power dispatch control system adapted to China's national conditions. The power dispatching control system technology has also begun to enter the forefront of the world [4]; the third stage is the transcendence stage. From the beginning of the 20th century, in order to deal with various emergencies, such as earthquakes and ice disasters, China began to develop smart grid dispatching. Control the system and quickly promote deployment across the country, at the end of 2013, China has realized the smart grid dispatching control system within the coverage of the national grid. The safety, stability and efficiency of China's power grid system have been greatly improved, and it has begun to lead in the world [5].

2. Status of smart grid dispatching system

China's smart grid dispatching system is mainly developed by the China Academy of Electric Power and the National Electric Power Research Institute, and is used by the State Grid. The dispatching control centers at all levels are responsible for designing the various aspects of the route to participate in the construction of the system. The smart grid dispatching system not only needs the basic power facilities and equipment, but also needs the cooperation of the computer network to play the role of "smart". Computer network is the "brain" of smart grid dispatching system. It is responsible for power regulation and power distribution of power grid system. In order to improve the reliability and security of system operation, computer network must have hardware facilities with high security and stability. And software, only in this way, can meet the needs of the evolving grid modeling in China's current society and solve the security problems of multi-level scheduling

systems.

The role of the smart grid dispatch control system is mainly reflected in the following three aspects:

(1) The smart grid dispatch control system has the characteristics of automation and intelligence. Compared with ordinary power managers, it can share a large number of work tasks and perform long-term standard operations according to procedures, which improves work efficiency and reduces the cause. The rate of failure caused by operational errors.

(2) The smart grid dispatching control system can continuously collect various power information data during operation and analyze and process it, and finally obtain the result. In the past, power information processing personnel often required a large amount of time to process various power information data and may even make mistakes. With the smart grid dispatch control system, the information processing personnel's work efficiency has been greatly improved, and power information is guaranteed. Timeliness and correctness of the data.

(3) The smart grid dispatching control system can analyze and process the power information data in time. Through these instantly updated data information, we can better find the operating rules of the grid system, so as to better update and develop the power dispatching control system. Promote the in-depth development of the theory of power dispatch control.

Nowadays, China's smart grid dispatching control system has covered all regions in China extensively. The power and range of power control dispatching are constantly increasing, and the difficulty of power control scheduling is also increasing. The smart grid dispatching control system can effectively guarantee. The safety and stability of the power grid system to achieve a reasonable distribution of power resources.

3. Structure of smart grid dispatch control system

Computer operations are faster, more accurate, and more secure than manual operations. The smart grid dispatching system is a computer-based intelligent operation control system. This system enables the grid security system to ensure the security and stability of the power network system during long-term operation. The smart grid dispatch control system integrates up to ten independent application systems in each dispatch center into one

A unified platform and four types of applications. In this unified platform, different levels of dispatch centers operate the operating system according to the unified application, ensuring the uniform specification of data information, national adjustment (national-level general scheduling), network adjustment (large-area-level scheduling), and provincial adjustment (Provincial level scheduling and ground adjustment (regional level scheduling) cooperate with each other to realize timely sharing of data information (as shown in Figure 1). Taking Chengdu Power Supply Company as an example, Chengdu Power Supply Company is responsible for power dispatching and control in Chengdu. Then, the obtained data is uploaded to the provincial provincial adjustment center. The provincial adjustment center then analyzes and predicts the electricity and electric load according to the data uploaded by each locality, formulates the distribution plan and power generation control, and then reports the obtained data to the network. Adjust the center, and so on, the final data will be uploaded to the national adjustment center. According to the national grid's operation status, the national adjustment center will analyze and calculate the national electricity usage through the smart grid dispatch control system, conduct statistical analysis and formulate production reports, and then Passing down in turn, and finally reaching the center of the ground, which achieves "unified scheduling, hierarchical management" Good mode. "Unified scheduling" can achieve centralized control, which is conducive to optimizing the allocation of production resources and concentrating on major tasks. "Grade management" solves the shortcomings and shortcomings of unified scheduling that cannot be adapted to local conditions.

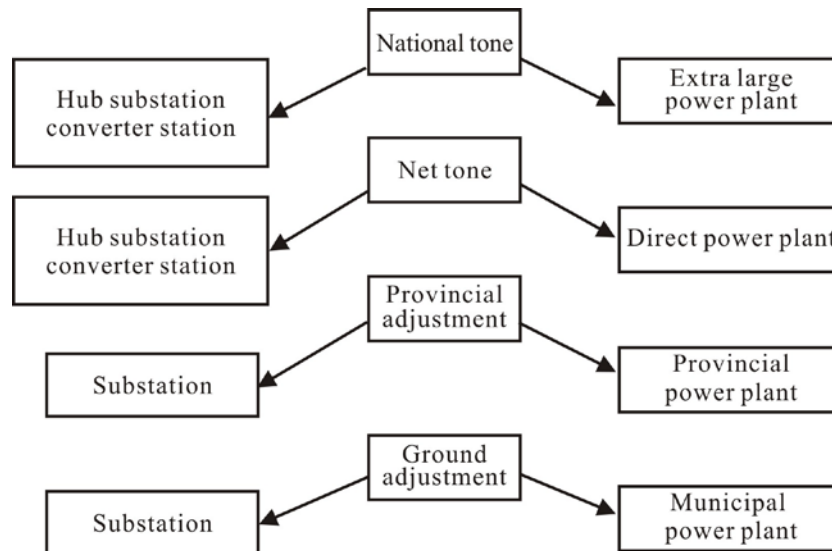


Figure 1 Coordinated control of multi-level grid dispatching

4. Information transmission system

The smart grid dispatch control system can be divided into four systems according to functions, which are the most basic information collection and command execution system, information transmission system, information sorting and control system, and human-computer interaction system.

4.1. Information collection and command execution system

Information collection is the basis of all functions of the smart grid dispatch control system, and command execution is the terminal processing system of the smart grid dispatch control system. Information collection can collect various raw data of the power grid system, and then send out signals after simple processing through relevant procedures. For example, when the power equipment is suddenly short-circuited, the acquisition system will collect the fault information and then process it. Converted into what we know, and then passed to the system, we can know which location of the device is short-circuited, and then through the command execution system to power off the range of the region and other operations, timely deal with the phenomenon, reduce The loss caused by the accident.

4.2. Information transmission system

An information transmission system is a communication system. Data must be processed before it can be transmitted. Data may be lost during transmission. Therefore, a good information transmission system can transmit data faster and more reliably, ensuring timely data. Sex and reliability. Nowadays, with the rapid development of communication technology, the continuous upgrading of communication technology makes the transmission between data and information more secure and fast, which ensures the stable operation of China's power grid system.

4.3. Information sorting and control system

The information collation and control system is processed inside the computer. The data we obtained in the grid system was obtained after the system was sorted out. A series of operations on the grid system must be processed through this system to operate the equipment of the grid system.

4.4. Human-computer interaction system

The human-computer interaction system is our system for operating the smart grid dispatch control system. Although the smart grid dispatch control system has the characteristics of intelligence and automation, it also requires people to coordinate operations. People can't communicate with electronic devices. Human-computer interaction system is a tool for people to

communicate with electronic devices. The original information generated by electronic devices belongs to mechanical language. It is a low-level language composed of 0 and 1. We are in human-machine. All the visual information seen by the interactive system is displayed after the mechanical language has been processed. The operator can quickly make judgments and operations based on these intuitive information.

5. Influence of smart grid dispatching control system on safe operation of power grid system

The smart grid dispatch control system has a positive impact on the safe operation of the grid system.

(1) The smart grid dispatch control system can guarantee the quality of electrical energy during transmission. The quality of electric energy is affected by two indicators: voltage and frequency. The quality of electric energy is not only determined by a certain part of power generation or power supply, but also the requirements of users for power quality are different. The coordination of the coordination can guarantee the quality of the power required by the user.

(2) The smart grid dispatching control system can reasonably allocate resources to ensure the revenue of the grid. Reasonable allocation of resources can effectively save the cost of the power grid and improve the efficiency of the power enterprise on the premise of meeting social needs. When the revenue of the grid is guaranteed, the power company can operate normally, and provide funds for research on power resources and improve the utilization of resources.

(3) The smart grid dispatching control system can ensure the safety and stability of the grid operation. People's daily life and economic development are inseparable from electric energy. The main purpose of the power grid is to provide people with sufficient electric energy. The safe operation of the power grid greatly affects all aspects of social life. Therefore, the safety of the power grid system must be guaranteed. In production and life, the power required by different equipment is different. To operate normally, the voltage and current stability must be guaranteed.

6. Conclusion

In today's society, people's demand for electricity is increasing, and the influence of electricity in human society is growing. The safety and stability of power grid systems directly affect people's daily production and life. Smart grid dispatching control system It can effectively improve the safety and stability of the power grid system and ensure the safe operation of the power grid system.

References

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