

Application of Network Information Communication Technology in Power System

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Abstract: Network information communication technology in power systems is the key to ensuring the safe and efficient operation of power grids. The network information communication technology itself has advantages in automation operation and information transmission, thus is widely applied to the power system. In the case of ensuring that the power system is compatible with the network information communication technology, the control of the power system can be strengthened, and the operational efficiency of the power system can be improved. This paper mainly analyzes the specific application of network information communication technology in power system.

Keywords: *power system; network information communication technology; application*

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0 Introduction

Power communication technology is one of the important components in power systems. It is beneficial to improve the stability of power systems through the scientific and rational application of power communication technology in power systems. However, from the current situation of power system network information and communication technology, it is still in the initial stage of application. There are still many imperfections, which cannot meet the diversified needs of power system network information communication. Hence, it is necessary to strengthen the network information by research in communication technology.

1 Analysis of network information and communication technology and power information business

1.1 Analysis of network information and communication technology

The development of social economy and science and technology has made network technology gradually applied to various industries. From the perspective of power communication, the development and integration of power information, and network communication technology, power communication systems operate more efficiently and safely. Therefore, for power communication, the development has a huge impetus^[1]. The power network information technology itself has the advantages of wide information coverage and advanced technology equipment. The power network communication technology includes various technical forms such as computer and automation network technology, and the equipment required in the application process of the system is also relatively advanced. This also requires the power system staff to fully understand the various expertise and knowledge in the power system and improve the efficiency and speed of information transmission. At the same time, network information and communication technology itself have obvious regional characteristics. There is a definite difference in the construction, operation, and management of power system in different countries and regions such as the voltage. The heartland of the main voltage is 220 volts and 380 volts. In two forms, the voltage in Hong Kong is 120 volts and 220 volts, and the voltage in Canada is 120 volts and 240 volts [Table 1]^[2]. Due to the different voltages, power network information technology is more difficult

in terms of productization. In the actual work, it is necessary to take the national infrastructure as the main guiding principle and pay attention to the regional characteristics of the power network information technology.

1.2 Analysis of power information business

The communication system is the main platform for power management and dispatching in the power system. To promote the health, stability, and safe operation of the power system and provide better service for power users, it is necessary to ensure fast and accurate power communication transmission speed and improve power transmission. The reliability and security prevent the leakage of information in the process of the transmission of power information, threatening the healthy operation of the power system^[3]. The power communication system includes the following aspects in the daily information service: First, the application of the administrative and dispatching telephones is also the voice service function in the power system, and is the communication guarantee for the power resource dispatching activities of the power enterprise, through the information speed and reliability. Improve the development needs of the power system work^[4]. Second, the application of management information systems. The management information system is mainly used for the query function of the service and needs to rely on the power information to form a communication private network. The application of the communication private network relies on protection signal. In the development of the relay protection signal, the information security and reliability requirements are relatively high. In the process of work, the 703/64 kbps interface is mainly used to connect with the transmission platform. At the same time, for the video surveillance information of the substation, the main application is the 10/100Base-T and TCP/IP network interfaces, which can realize the functions of telemetry, remote control, and remote

signaling of the communication system, and promote the development of the power communication system business [Table 2].

2 The advantage of network communication technology

The application of network communication technology in the power system is conducive to improving the power control capability of the power grid. At present, automation and intelligence have been gradually comprehended in China's power grid system. The smart grid has gradually become the main trend of network development. Therefore, it is necessary to change the operation mode of the power grid system, improve the operating efficiency of the power system, and ensure the effect of power transmission and grid control^[5]. The construction of the power grid directly affects the development of the national economy and society. Most of the power enterprises are state-owned enterprises. They have economic and policy advantages, but there are also many shortcomings. The state-owned enterprises are under the influence of the planned economy. It is too cumbersome, and this inherent business model cannot meet the development requirements of the current market economy. To get better development, power companies must actively change the traditional development model, rationally apply network technology, provide advanced science and technology for the development of power systems, strengthen innovation in power communication systems through the application of computer systems promotes power grids and power enterprise development and innovation^[6].

3 Third, the application status of power system network communication technology

3.1 The network structure is not scientific

From the analysis of the current power development in China, the network communication technology structure cannot meet the actual needs of power companies in terms of power resource sharing. If this problem cannot be paid attention to and improved in time, long-term accumulation will lead to serious impact

Table 1. Voltage survey of different regions

Country and region	China Mainland	China Hong Kong	Canada
Voltage	220 v/380 v	120 v/220 v	120 v/240 v

Table 2. Connection method of basepoint protection service

Connection category	Basepoint protection connection	Video surveillance information connection method
Connection method	G.703/64 kbos interface and SDH platform for PVM devices	10/100 Base-T interface with TCP/IP network interface

on the maintenance and quality of power equipment^[7] including the maintenance of technical equipment and the maintenance of power systems. The stability and safety of the operation of the power system are affected.

3.2 The quality of resource transmission cannot be guaranteed

The development of the economy and the increase in the demand for electricity by the society have made the transmission of power resources more demanding, which leads to the development of power enterprises facing greater difficulties. Especially the quality problem in the transmission of power enterprise network resources. For example, communication network cable packaging, signal interference, and single-strand copper wire structure will raise the problems of communication network lines. Any of these issues can affect the quality of information transmission.

3.3 The geographical imbalance is obvious

China's vast territory, the economic situation of each region also has a large gap. Hence, there are also large differences in the construction of power network communication systems in different regions^[8]. For example, for the central and eastern regions, due to its relatively sound economic development, the construction of power network communication systems and facilities is also more complete, and there are fewer problems; while the western region is relatively backward in economy, and thus, there are many problems in the construction of power network communication systems. As a result, this leads to a large gap in the power system in different regions.

4 Fourth, the application of power network information and communication technology

4.1 Application of optical fiber communication technology

Optical fiber communication technology power network can be divided into two types, namely OPGW technology and self-supporting optical fiber

cable technology. The material used in the fiber-optic composite overhead grounding technology is a special optical cable structure, which is a cable formed by a combination of a composite structure and a phase line, which is beneficial to improving the flexibility and stability of communication and improving the resistance of the line. Electromagnetic interference capability, the advantage of self-supporting cable technology is to improve the efficiency of overhead cable construction, and the construction method is relatively simple, convenient, and effectively solve the ground distance problem [Table 3]. The application of the power network communication technology through the optical fiber communication technology is conducive, to satisfying people's high requirements for network communication. When the load capacity of the power system is improved; then, the information and signal transmission are more stable. China's power network information can use this form of network connection as a main road for any access. Through the application of optical fiber communication technology, it can reduce the probability and time of power grid failure based on smart grid.

4.2 Application of mobile communication technology

The upgrading and transformation of the power system makes the power system more powerful and intelligent. Moreover, telephone communication technology has become the main form of the current power system operation and supervision^[9]. People will use modern telephone communication technology to achieve automatic control of the power system. In this way, the advantages of telephone communication technology are exerted to enhance the remote monitoring and maintenance of power equipment. In the construction of telephone mobile network, it has the advantages of convenient construction and short construction period. The mobile phone short message operation mode is simple and convenient, and plays an important role in promoting the safe and stable operation of the power system. Therefore, in the application of modern telephone communication technology, the performance of the

Table 3. Fiber communication technology analysis table

	Optical fiber composite overhead ground wire technology	Self-supporting fiber optic cable technology
Structure	Phase line combined with composite structure	Optical fiber
Advantage	Improve communication flexibility, stability, and improve resistance to magnetic interference	Convenient construction, solving the problem of distance from the ground

system can be improved only at a low cost. Applying modern telephone communication technology to the power automation system is beneficial to ensure the quality of power system management and improve the scheduling efficiency of the power system. The current communication technology has been combined with aerospace technology to further promote the development of mobile handset communication technology. The traditional mobile phone information is mainly transmitted through satellite. With the development of technology, the Bluetooth system can realize the transmission and reception of signals in a wireless manner, and improve the management efficiency of power automation.

4.3 Wireless communication technology application

With the development of intelligent automation and power system, where the amount of information and data related to more and more, through the collection of these data, collation and analysis to make an accurate judgment of the situation of the power system, including failure location, reason, and countermeasures. Through the application of wireless communication technology, the operation of the power system is more stable and safer. The principle of its application is mainly to set up sensors in the power grid, which can automatically monitor and control the running state of the power grid, and at the same time have low-energy consumption, small volume, and strong. The advantage of information transmission capability can guarantee the role of wireless communication technology^[10]. In specific applications, the application of wireless network technologies such as Wi-Fi and Bluetooth can improve the monitoring of the power grid. In the process of data and information transmission, the smart grid needs to ensure the stability and efficiency of information transmission. In the power communication technology, through the integration with intelligent technology, people's power application needs in work and life are further improved, which provides a strong guarantee for the development of power systems.

5 Conclusion

The power system is the foundation of the country's economic and social development. It plays an important role in the growth of the national economy and social stability. Network communication technology is an important technical guarantee for the healthy and stable operation of the power system, so it must be strengthened. Research on network communication technology ensure the advanced nature and security of its application, timely discover by the problems existing in it, and take corresponding solutions to improve the level of network information communication technology in the power system.

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