

Original Research Article

# Research on the Application of Power Communication Technology in Smart Grid

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**Abstract:** The continuous development of modern society, science and technology has promoted the rapid development of various industries in China and greatly supported social development and people's lives. Among them, the power system is an important part. Perfecting the power system and building a high-quality power grid system need to be focused on at present. This article mainly analyzes the necessity of applying power communication technology in smart grid and the demand of smart grid for power communication technology. Some specific application suggestions are put forward for reference.

**Keywords:** Smart Grid; Power Communication Technology; Application

The continuous development of computer and communication technology provides sufficient power for the development of power industry, but at the same time, certain challenges emerge. To achieve better development, electric power enterprises need to keep up with the pace of the times and improve the application of advanced technologies, thus promoting the development of the power industry. Based on power communication technology, a smart grid should be constructed in an all-round way to better meet the needs of society and people for power resources. During the actual construction of smart grid, it is necessary for power enterprises to give full play to the role of power communication technology. Meanwhile, they need to strengthen management and effectively improve the main position of smart grid, to effectively accelerate the further development of power industry in China.

## 1. The necessity of applying power

## communication technology in the construction of smart grid

In combination with the development trend of networking and intelligence, the construction of smart grid is beneficial to meeting the needs of society and people and promoting the development of society. For constructing smart grid, it is necessary to apply power communication technology to the power system and fully play its role in serving the whole power system. Thus, it can ensure the stable transmission and reception of power resources, provide sufficient support for all links in the construction of smart grid, and greatly improving economic benefits while reducing costs for power enterprises<sup>[1]</sup>.

Reasonable application of power communication technology to the construction of smart grid can guarantee the safe and stable operation of smart grid. Meanwhile, with the help of this technology, smart grid termi-

nal equipment can successfully resist external illegal attacks, thus the stable operation of smart grid can be guaranteed, as well as the economic benefits of power enterprises. In addition, the power communication technology can also be applied to the management of smart grid. It can greatly improve the work efficiency and the overall work quality, and promote the smart grid management to better serve the development of power enterprises and provide services of high quality for the society and people.

## **2. The power communication technology required in the construction of smart grid**

Compared with the traditional power grid, the application and development of smart grid are more complicated in structure and use of related equipment. Therefore, it puts forward higher requirements for the application of communication technology. At the same time, it is also necessary to reasonably control and manage various kinds of equipment, which can ensure that the advantages of smart grid can be fully realized. So, power communication technology should be properly applied in the construction of smart grid, so as to better guarantee the function of smart grid<sup>[2]</sup>.

### **2.1 To obtain a variety of data**

Data, as an important part in the actual operation of smart grid, needs to be obtained for issuing instructions, including cable operation data and data of distribution cabinet operation status. In terms of the current data acquisition mode, hardware facility sensors are mainly used as the main channel to guarantee the safety and stability of the overall operation. In the process of data acquisition, it is necessary to ensure the stable operation of the communication system, because abnormal operation will cause signal loss, offline, etc<sup>[3]</sup>. In either case, it will bring negative effects to the operation quality of the whole power grid system. Besides, if the stable operation of the communication system is failed to be guaranteed, it will be difficult to transmit the acquired signals to the control center in time, directly affecting the system's collection and analysis of accident information, and leading to difficulty in carrying out relevant work. On the other hand, due to not being solved in time, those serious accidents may easily cause a wider range of impacts, or

even a system crash, resulting in greater losses.

### **2.2 To transmit relevant information**

The smart grid needs to rely on the communication system to realize the work scheduling. At the same time, the communication system needs to give full play to its functions, to transmit the analysis data, results, improvement of operation modes, etc. to the controlled components, finally achieving the purpose of reasonably controlling the power grid operation state. However, it should be noted that the traditional communication technology cannot be well connected to the smart grid, so it cannot be applied to the civil communication technology when the grid controls the information transmission. Moreover, the power communication system is the main carrier in the transmission process of various information<sup>[4]</sup>.

### **2.3 To control and manage equipment**

The actual engineering situation of power grid during the operation of smart grid mainly depends on its actual operation state and mode. So, the automatic control system should be applied to improve the equipment control. The main reason is that the power grid will generate corresponding signals in the operational process. With the help of the automatic control system, the power grid can collect the relevant signals and then transmit the commands to the corresponding control equipment. In this process, in order to guarantee the transmission of different information, it is necessary to apply the power communication system and realize the goals by means of the communication network.

## **3. The application of power communication technology in smart grid**

### **3.1 Application in power transmission**

The power transmission process generally involves the safe operation of relay protection devices, power control, data transmission and scheduling, etc. The application of power communication technology in power transmission helps to better grasp the actual operation status of different lines in the transmission process and find problems in time, providing guarantee for the monitoring information obtained by various regulatory departments and ensuring the accuracy of the data infor-

mation. It is conducive to strengthening the management of power transmission, effectively ensuring the safety and stability of power system, and better meeting the public demand for electricity and services. Power enterprises should scientifically and reasonably select the communication mode. By adopting an appropriate mode, they are able to efficiently monitor transmission lines, timely understand and master the actual operation state of power system, terminal equipment and other aspects, and take the obtained information as a reference to choose an effective way to solve the problem<sup>[5]</sup>.

### 3.2 Application in power distribution

The setting of distribution network is an important content in the process of constructing smart grid. By optimizing the setting of distribution network, the safety and reliability of power network can be ensured, so as to effectively monitor and deal with faults. It is beneficial to the follow-up fault maintenance, and the comprehensive improvement of the power supply management effect of power enterprises. The application of power communication technology in distribution network design can further optimize and adjust the original design. Through comprehensive analysis on the potential problems, targeted solutions can be proposed to promote the more stable development of the power industry.

### 3.3 Application in substation

The proper application of power communication technology to power system helps effectively achieve the automation and visualization of substation. The development trend of smart grid will have a direct impact on the construction and operation of distribution network. Through the application of power communication technology, more accurate information can be obtained to provide reference for the intelligent substation and enable it to run more stably and safely.

### 3.4 Application in power consumption

Power consumption system is the terminal of power supply system, referring to providing services for various types of power users, including commercial power consumption, personal power consumption and plant power consumption. Due to the complexity of power user structure, it puts forward higher requirements for data information in each link, such as statistical accuracy and processing efficiency. The application of power commu-

nication technology can to a great extent achieve efficient collection of power information, strengthen the connection between power supply system and power users, and help to provide various high-quality services for users.

### 3.5 Application in green energy

Environmental protection has already become the goal of all walks of life in the development process. So, it is necessary to promote the development and utilization of green energy. Based on the previous practice, transformation should be carried out to fully realize the rational utilization of green and renewable environmental protection energy. On this basis, the power industry together with professionals should make continuous efforts and establish the idea of new energy. To realize power grid connection, comprehensive consideration should be taken and a solid foundation should be provided for power grid connection and smart grid construction under new energy starting from the current power communication structure and implementing optimization based on the overall situation. Through this, both power output and power conversion can be achieved, and finally the goal of intelligent and automatic construction can be realized.

## 4. Conclusion

To sum up, this article analyzes that the application of power communication technology in the construction of smart grid fully reflects its advantages in transmission, substation, distribution, power consumption, green energy and other aspects. Power communication technology can provide a strong guarantee for the efficient operation of the power grid system.

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