

Application of Smart Grid Big Data Analysis Technology in Transmission and Distribution

Lin Xue^{1, a}

¹Department of Electrical Engineering, North China Electric Power University, China.

^a745296080@qq.com

Abstract

The application of new technologies has greatly enriched people's lives and provided technical support for material civilization. Once the power energy comes out, it is widely used in production and life. At present, with the continuous development of science and technology, China's power transmission and distribution technology level continues to improve, and the level of power transmission has also been greatly improved, especially in the smart grid construction has achieved a critical technological breakthrough, while power transmission and transformation technology Because of its high-tech, high security and high degree of cooperation, it is widely used in the smart grid and has a growing trend. The stability and efficiency of smart grid operation have been significantly improved. Upgrade. This paper mainly analyzes the application of power transmission and transformation technology in smart grid and conducts a series of discussions.

Keywords

Smart grid, Big Data, Transmission and distribution technology.

1. OVERVIEW OF POWER TRANSMISSION AND TRANSFORMATION TECHNOLOGY AND SMART GRID

1.1. Overview of Power Transmission and Transformation Technology

If it is conceptually analyzed, the substation technology actually refers to a general term for the technology related to the power grid in the general state. It occupies an important position in meeting the user's power demand and the stable operation of the power grid. Under continuous development and progress, the substation technology has also been upgraded, and the reliability has also been greatly improved. The situation is the safe and stable operation of the smart grid, which provides strong support.

1.2. Smart Grid Overview

As a kind of power grid based on informationization and intelligence, the smart grid is generated by the continuous development of science and technology. The so-called smart grid is based on the first-come communication network, taking advantage of advanced facilities, equipment, technology and measurement, and the safe and stable operation of the grid. The construction and application of the smart grid has not only played a positive role in promoting the normal use of electricity and social and economic development of the residents. The long-term stable development of China's power industry provides strong support for the advantages of high-quality power output and good service of the smart grid, strong anti-invasion ability and strong compatibility of power supply methods.

Table 1. Power transmission and transformation type

Common species	Application field
High temperature wire and cable	Mainly used in aerospace, rolling stock, energy, steel, non-ferrous metal smelting, oil extraction, electrical machinery, etc.
Special wire and cable for use and structure	Fire-resistant cable, flame-retardant cable, low-smoke halogen-free/low-smoke low-halogen cable, termite-proof, anti-mouse cable
Functionalized wire and cable	Fluorine resin self-controlled temperature 135° C heating cable, electroluminescent wire, etc.
New green insulated and environmentally friendly wire and cable	CMP cable, halogen-free new green wire and cable

The construction of the smart grid is aimed at the operation of the power grid, and the economic, environmental protection and stability of the operation are guaranteed. The construction of the power grid in various forms is more valued by the personnel of the smart grid construction, which provides convenience for people's life and work. Countries such as Europe and the United States have relatively deep research on this technology and are among the best in the world. The functions of the smart grid mainly include self-repair function and intelligent optimization function, which can promote the development of the power market more effectively, and the level of power quality provided can be pushed to a higher level. The power grid can form an effective defense against natural disasters. It provides a variety of compatible power supply and storage methods. Based on this, the power grid is perfected to facilitate the promotion of power grid construction and meet the daily needs of people.

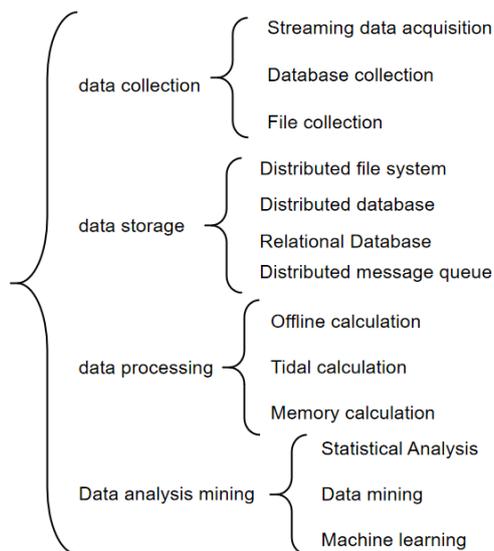


Figure 1. Smart grid big data technology structure

2. APPLICATION OF POWER TRANSMISSION AND TRANSFORMATION TECHNOLOGY IN SMART GRID

2.1. Quality Optimization Technology

The quality optimization technology can realize the multi-level division of the power grid. When a certain method is used to evaluate the power consumption status of the smart grid, the

corresponding measures can be improved in a targeted manner, and the form can ensure the power quality. In the process of construction and transformation of the power grid, the work needs to be based, the analysis and evaluation of a variety of advanced technologies and measures, the quality, technical and economic performance of the power grid as the goal, the interface mode is broken, and the grid technology is improved in a targeted manner. It is a perfect and systematic system evaluation system, and optimizes the quality of the power grid and the development of power supply technology to achieve better construction results.

2.2. Energy Conversion Technology

With the gradual increase in people's emphasis on environmental protection, the energy source is mainly developed in the direction of low-carbon energy. The protection of various forms can effectively improve the environmental quality, obtain better economic benefits, and now have a large application of low-carbon energy. Low-carbon energy pollution is small, enough to improve the ecological environment, achieve better economic benefits, maximize the sustainable use of low-carbon energy, improve energy conversion technology, and promote the utilization of low-carbon energy. To meet people's demand for electrical energy. In the current society, power generation and solar power generation are common types of power generation technologies.

2.3. UHV Transmission Technology

UHV AC transmission and HVDC transmission are two technologies for power transmission at 1 000 kV. Two transmission technologies are used in various transmission processes. The use of professional equipment and high voltage stability Simulation, the use of insulating materials, voltage control, etc., the high-voltage transmission technology of the form is relatively stable, in order to achieve long-distance transmission, greatly improve the efficiency of electrical energy, compared to the general type of transmission technology, the advantages of the technology Significant, time-critical reliability, one of the important technologies for grid operation.

2.4. Flexible Transmission Technology

DC flexibility and AC flexibility are two common types of transmission technologies. For electronic devices with higher power and larger containers, flow flexible transmission technology can achieve smooth transmission. Flexible transmission technology can realize the rapid progress of reactive power coordination, which provides an effective guarantee for the transmission of electric energy and the stability of power. At present, the research level of this technology is relatively low, and can be widely used in the construction process of power grids, and can be applied in individual projects. This requires further research and analysis of flexible transmission technologies, and the realization of technological perfection and intelligence. The application level of the power grid has gradually increased.

REFERENCES

- [1] Huang Pengfei. Application of power transmission and transformation technology in smart grid [J]. Shandong Industrial Technology, 2019 (18): 173.
- [2] Gao Qiang, Zheng Lewei, Tong Cunzhi. Research and application of centralized monitoring big data for power transmission and transformation equipment [J]. Power Big Data, 2019, 22 (03): 13-18.
- [3] Zhu Yandong. Analysis of the application of power transmission and transformation technology in smart grid [J]. China New Technology and New Products, 2018(24): 95-96.
- [4] Li Wei, Ma Ying. Analysis of key technologies and development trends of intelligent power transmission and transformation equipment [J]. Science and Technology, 2018 (24): 118.