Research on the Key Technologies of the Ubiquitous Electric Internet of Things

Zhu JiaDong
Foshan Polytechnic 528137
Jodonchu9307@fspt.edu.com
Corresponding author’s e-mail: aierlankafei666@163.com

Abstract: With the rapid development of social economy in China, the demand for electric power resources for all the industries is increasing, and it also puts forward higher requirements for the development and operation of electric power industry. In this context, the power industry is also constantly using new technologies for positive and efficient innovation. The Ubiquitous Electric Internet of Things is a new technology. In the practical application, the Ubiquitous Electric Internet of Things mainly relies on electronic information technology, uses the big clouds move wisdom and other network means to combine with the power system to ensure the power production and the user's connection more closely and to implement the one-stop service and the management for the user and so on. The construction and application of the Ubiquitous Electric Internet of Things can speed up the development of electric power industry in China, and realize the far-reaching development of electric power industry, so it is of practical significance to study its key technologies.

1. Introduction
At present, the continuous development of science and related technologies and the speed of social economic development are accelerating, people's demand for energy is also growing, which also brings greater pressure to energy supply.\cite{1} The environmental pollution caused by traditional oil, coal and other energy sources is serious, so the proportion of renewable energy access to the grid has increased, which brings great challenges to the quality and safety of power grid operation. At the same time, there is still a large amount of power data has not been fully mined and used, and its own value has not been maximized. The application of Internet technology can help the relevant departments of the power system to effectively perceive the state of power operation and implement intelligent control over the power grid. Therefore, the Ubiquitous Electric Internet of Things came into being, which can effectively improve the level of information grid and improve its operational efficiency and security. For the relevant personnel, it is important to grasp the key technology of the Ubiquitous Electric Internet of Things.

2. the Concept of the Ubiquitous Electric Internet of Things

2.1. The Ubiquitous Electric Internet of Things is a emerging product mainly based on the background of current network technology and the rapid development of electronic information technology, its internal core is large cloud material transfer technology, and its anther core is to choose a more user-friendly human-computer interface in the process of power transportation. \cite{2}\The Ubiquitous Electric Internet of Things can collect the operation information of the power grid more effectively,
and use the corresponding software, hardware to process data in real time and efficiently, so as to strengthen the management of the power grid system and ensure that the operation of the power grid is more intelligent.

The Ubiquitous Electric Internet of Things can be regarded as the second network of power companies in power network construction, but its intelligent characteristics are more obvious, and there are diversified characteristics, which can help power companies to establish smart grid system, and the Ubiquitous Electric Internet of Things can work with the state-built power grid to form a more powerful power platform, which has a better driving effect on the application and transmission for power energy. In summary, the Ubiquitous Electric Internet of Things can ensure a significant increase in the ability of interacting people with things, things and things, and ensure that data can be shared, resulting in interconnectedness. China’s current research on the Ubiquitous Electric Internet of Things is mainly reflected in the following figure:

Figure 1: the Current Research on the Ubiquitous Electric Internet of Things in China

3. the Characteristics of the Ubiquitous Electric Internet of Things

3.1. Information Perception is More Comprehensive
The characteristics of the Ubiquitous Electric Internet of Things are reflected in the comprehensive aspects of information perception. The networking of the Ubiquitous Electric Internet of Things is very flexible. It is possible to find all kinds of devices in the power system quickly by using Internet of things sensors. Compared with traditional Internet technologies, the Ubiquitous Electric Internet of Things is more accurate. The corresponding components can be deployed more flexibly with wireless communication technology, and the information and data of the power system can be fully grasped, which can be faster and more promising. [3]

3.2. More Fusion and Flexibility
The combination of Internet of things technology and power system can be carried out on the operation of power system, scheduling and so on, its time and accuracy are more obvious. Sensors in the Ubiquitous Electric Internet of Things can filter information before it is passed on and comb the vast amounts of data to avoid information clutter. After the gateway receives the information, it can be secondary processed and eventually passed to the power system user. In addition, after the sensor filters the information data, it can use the multi-hop method to help the data establish multiple channels, ensure that the communication method is very flexible, but also allow the information fusion is higher. [4]
3.3. High Level of Intelligence

For the Ubiquitous Electric Internet of Things, data collection and transmission are the most basic functions. The collection and transmission of data information of the Ubiquitous Electric Internet of Things can use sensors to control information, to achieve remote control of power grid data, but also to obtain the internal information of multiple sensors. Its intelligence is very obvious.

4. the Key Technology of the Ubiquitous Electric Internet of Things

4.1. Smart Terminal of Power Grid

In the operation and construction of power network, the types of power intelligent terminals are more extensive and kinds, including smart meters, regional automatic power distribution devices and so on. However, in practical application, the standards of each type of terminal are not uniform, which leads to the differentiation of power operations. In the Ubiquitous Electric Internet of Things, the grid smart terminal technology is mainly to the intelligent terminal connection protocol, data format and other unified specifications, and in the intelligent terminal installation of higher precision computer chip, to ensure that the grid smart terminal formation of large-scale construction. In addition, the relevant personnel will also collect cross-professional data, so that the intelligent terminal data can be used across the professional, thereby improving the efficiency of the operation of the intelligent terminal. [5]

4.2. Wireless Communication Technology

Wireless network communication technology has been developing rapidly in China, especially 5G technology. In many cities 5G technology has been taken a pilot operation and obtained a better evaluation, which is also one of the key technologies in the future development of the Ubiquitous Electric Internet of Things. Power companies need to realize the integration of the power Internet of Things and 5G technology as soon as possible, and actively introduce network technology, edge computing technology, etc., to ensure that 5G network technology can improve the transmission capacity of power intelligent terminals, further improve the information capacity of power intelligent terminals, but also improve the efficiency of power information dissemination. From the level of large broadband analysis, 5G technology can improve the efficiency of the power grid in scheduling, operation, maintenance and construction, and constantly improve the communication technology and intelligent transport and inspection technology. If 5G technology can be actively applied, the delay of power information transmission can be reduced, and the power grid can be automated in distribution, avoiding delays, thus providing a more efficient service to users.[6] 5G technology can also be combined with the grid to ensure that the application of power intelligent terminals is more diversified and intelligent, the scale of application will continue to expand.

4.3. Big Data Analytics Technology

For the construction and application of the Ubiquitous Electric Internet of Things, the construction of big data platform can be more rapid and accurate statistics of power operation data, and can also build data models, simulation and application of data, so as to carry out more efficient research and analysis. The application of big data analytics technology can help the Ubiquitous Electric Internet of Things to integrate energy, operational data and real-world business, and help the power sector plan for the next phase of development. At present, the scale of power network construction has obviously expanded, if the big data analysis technology can be applied, regional management can be constructed, and the data of different regions can be analyzed comprehensively, so as to realize the maximum use of power resources. Big data analytics technology can also enable that multi-sector to communicate and analyze the development and application of power resources, so as to maximize the development of power resources and achieve sustainable development of the power industry. [8]
4.4. Network Security Technology
Among the key technologies of the Ubiquitous Electric Internet of Things, network security technology is also a more prominent and important technology. In the construction and application of the Ubiquitous Electric Internet of Things, in order to ensure the security of data, relevant personnel need to choose more targeted technology to ensure the security of the network and the protection of data privacy. The data dynamicity and diversity of the Ubiquitous Electric Internet of Things are obvious, it is easy to reduce network security, and the relevant personnel need to conduct in-depth study of network security and choose reasonable encryption technology.

5. the Application Prospect of the Ubiquitous Electric Internet of Things

5.1. Integrated Energy Services
The application prospect of the Ubiquitous Electric Internet of Things is first reflected in the comprehensive energy services. In the future application, the Ubiquitous Electric Internet of Things can realize the efficient construction of user-centric service platform, and set up more effective communication bridges for users and manufacturers, service departments, etc. After the construction of the service platform, the power sector can learn more about the needs of users, and combined with the actual needs to provide users with better quality and efficient services, so as to reform the consumption pattern of power energy. The Ubiquitous Electric Internet of Things can not only help the power industry to innovate its own service model, but also guide users to actively participate in the use of new energy, thereby promoting the development of new energy and new industries.

5.2. Secure the Operation of the Power Grid
At present, there are many problems in the operation of China's power sector, and the most obvious is the lack of uniformity of power energy distribution, and the grid structure is not perfect, which will lead to the allocation of power energy capacity is weak in the long run, so it will affect the overall safety of power grid operation. The application and development of the Ubiquitous Electric Internet of Things can promote the efficient operation of big data analysis technology, data sharing technology and other technologies in the power industry, and realize the intelligent development of power grid maintenance. After the application of the Ubiquitous Electric Internet of Things, the power department can monitor and observe the operation of the power grid for full time, and if faults are found in the monitoring process, the warning signal can be issued in time, and the relevant people can examine and repair in time, so as to improve the overall efficiency of the operation and maintenance of the power grid.

5.3. Promote the Development of New Energy
The application and construction of the Ubiquitous Electric Internet of Things can also continuously promote the future development of new energy. At present, the development of new energy in China has made great progress, but new energy has not been widely and widely applied. Solar power generation, wind power generation and so on have been better used in some pilot areas, but there is no widespread popularization. Wind power generation, solar power generation itself intermittent period and other related factors result in the situation of unreasonable power management. And if the Ubiquitous Electric Internet of Things can be introduced, the new energy can be reasonable storage and deployment by using analog intelligent power plant technology, so that the operation of power resources can be interoperability to ensure better coordination of the allocation of new energy, so as to use the increase and decrease load in the actual operation to reduce the impact of the grid. In this way, the storage and use of new energy will be efficient and reasonable improvement, which has a better effect on the widespread popularization of new energy.

6. Conclusion
The construction and application of the Ubiquitous Electric Internet of Things have strong intelligent
characteristics, and can achieve automated communication and automatic sensing, information integration is also higher. The Ubiquitous Electric Internet of Things is the development of China's power industry, vigorously developing the Ubiquitous Electric Internet of Things can carry a larger data flow, so that the power industry can effectively control the operation of the power system, and drive the far-reaching development of the power industry. The key technologies of the Ubiquitous Electric Internet of Things are mainly reflected in the construction of power grid smart terminals, big data analysis and wireless network communication technology, etc., the relevant personnel need to grasp points and analyse future application prospects to achieve the efficient operation of the Ubiquitous Electric Internet of Things.

References
[1] Zhen Chuanghe. the Development of Transmission Technology in the Ubiquitous Electric Internet of Things [J]. Integrated Circuit Applications, 2020, 37 (06): 64-65.
[2] Zhao Mengmeng, Tang Pingzhou, Sun Kun, Cheng Runkun, Chen Guangjuan. Pan-electric Internet of Things the Development and Prospects of the Ubiquitous Electric Internet of Things[J]. North China Electric Power University Journal (Natural Science Edition), 2020, 14 (2): 1-13.
[3] Fang Jingjing, Chang Meiqing. Application and Prospects in the Ubiquitous Electric Internet of Things in Smart Substations[J]. Electrical and Electric, 2020 (04): 1-6.
[4] Hu Qi. A Brief Discussion on the Key Technologies in the Construction of the Ubiquitous Electric Internet of Things[J]. Time Agricultural Machines, 2020, 47 (03): 47-48.
[5] Zhang wei. General Discussion on Key Technologies in the Ubiquitous Electric Internet of Things[J]. Communication Power Technology, 2020, 37 (05): 224-225.
[6] Liang Zuofang, Pan Hua, Zhu Zhaoshun, Xiao Yuhan. General Technology Architecture and Key Technology Research on the Ubiquitous Electric Internet of Things [J]. Inner Mongolia Power Technology, 2020, 38 (01): 27-30.
[7] Chen Jie. General Prospects for Key Technologies and Applications in the Ubiquitous Electric Internet of Things[J]. Communication World, 2020, 27 (02): 173-174.
[8] Li yang. General Analysis of Key Technologies and Applications of the Ubiquitous Electric Internet of Things[J]. Digital Communications World, 2020 (01): 87-88.