Design and Research of New Energy Technology in Electric Power Information Intelligent System

Chongqian Huang1,*

1College of Mechanical and Electrical Engineering, Guangxi Science & Technology Normal University, Laibin, P. R. China, 546199

*Corresponding author e-mail: Chongqian12@gxstnu.edu.cn

Abstract. After the Industrial Revolution, with the continuous improvement of people's living standards and the great changes in science and technology, the traditional energy has been unable to meet people's new needs of production and life and the concept of sustainable development. As a hot topic in recent years, new energy can become one of the new ways to promote the continuation of resources. The traces of the rapid development of new energy can be found in various fields related to people's lives. Electric power information system is one of the aspects. It is well known that human beings can not live or work without electricity. Therefore, it is very important to apply new energy technology in electric power information system. This study studies from the overview of new energy technology, the overview of power information intelligent system and the application of new energy technology in power information intelligent system.

Keywords: New Energy Technology, Electric Power Information System, Electric Network

1. Overview of new energy technologies

1.1. Definition and principle of new energy technology
New energy generally refers to renewable energy developed and utilized on the basis of new technology. Nowadays, new energy usually refers to clean energy that can be recycled, such as hydropower, solar energy, wind energy, geothermal energy, hydrogen energy and so on. With the exploration and utilization of non-renewable resources such as oil and coal, the storage of non-renewable resources that have been proved by human beings is pessimistic that they can only be used for decades. In a few decades, people's food, clothing, housing and transportation will become a big problem. For new energy, the most promising is still sustainable, pollution-free renewable energy. The most convenient, cheap and safe energy sources are solar energy, wind energy, hydropower energy and so on. And most of these energy sources rely on the carrier of "electricity", and China's electricity production has been the first in the world for many years. While wind energy, solar energy, hydropower and other renewable energy generation, China is still the first in the world [1].
Most of the energy is first converted into electricity, and then converted into other forms of energy. Most of the transmission of electricity is not simply stored in a large storage device, as we thought. The transmission of these energy is directly generated and transmitted to the user location through the power transmission equipment [2]. In this way, extravagance and waste and dissatisfaction between supply and demand become difficult problems. Although in recent years, China's strong power grid system has greatly improved this situation. The problem of new energy is how to develop and how to store, so as to promote energy upgrading.

1.2. Application of new energy technologies
Take new energy vehicles as an example. Hydrogen-powered vehicles, fuel cells, solid-state batteries, and even nuclear power, these relatively high-tech energy carriers are supposed to subvert the energy industry and gradually replace traditional fuel vehicles. At present, these high-energy materials are difficult to promote because of the following difficulties [3]. For example: 1) It is difficult to manufacture; 2) Difficult to store; 3) High investment; 4) The price is high.

Despite the difficulties, the next 20 years are full of infinite possibilities. These difficulties have also reversed the development of lithium batteries. The enterprise's calculation method for the target value of fuel consumption of various models is as follows.

\[ T_{CAFC} = \frac{\sum_{i=1}^{N} T_i \times V_i}{\sum_{i=1}^{N} V_i} \] (1)

i: Passenger car model serial number; Ti: The first model corresponds to the target value of fuel consumption; TCAFC: Enterprise average fuel consumption target value; Vi: The annual production or import of the i model.

The development of new energy vehicles in China, on the one hand, speeds up the upgrading of the domestic automobile industry, on the other hand, it also makes a great contribution to the cause of human environmental protection. Even so, we still face a series of difficulties: 1) The cost is high, as shown by the fact that the price is generally higher than that of fuel vehicles; 2) Lack of safety, as shown by the chemical instability of the battery; 3) The difficulty of replenishing energy is shown in the difficulty for users to charge and find piles [4].

Even if there are so many difficulties, there are always more ways to solve them than difficulties. For example, as for the cost, with the gradual decline in the price of lithium batteries, the cost of new energy vehicles compared with fuel vehicles, gradually narrowing the gap. In terms of the use of cars, the reduction in maintenance costs and electricity costs also reduces the lifetime cost of new energy vehicles, as shown in figure 1. It is expected that around 2022, the cost of new energy vehicles will be the same as that of fuel vehicles.
For security, the state has recently issued safety standards for the first time. The introduction of standard documents, for the new energy vehicle manufacturers, to improve their own product safety performance, enhance consumer confidence, is particularly important. At the same time, a good thermal management system can promote the stability of the working environment temperature of the power battery in order to achieve a stable working environment. For energy replenishment, the uneven distribution of charging piles, poor utilization, insufficient vehicle-pile ratio and other problems can also be gradually improved. Solving the problems of difficult charging, slow charging and finding piles is the key to solve the problem of replenishing energy, and it also improves consumers' confidence and desire to buy new energy vehicles, so as to promote the transformation and development of new energy.

2. Overview of electric power information intelligent system

2.1. Intelligent system

In the context of this era, intelligence is an inevitable trend. Whether in daily life or in scientific and technological research and development, intelligence also has many disadvantages under the condition of providing people with certain convenience. For example, the intelligent recommendation of today's video platform not only makes it easier for people to find their favorite content, but also makes their cognitive surface narrower. This reduces people's cognitive diversity. This is only a cognitive malaise, although we do not rule out that what we see is useful to us, but at the same time, it also reduces the process of critical thinking and is easy to fall into an extreme of self-cognition. Besides, intelligence in daily life can easily cultivate people's lazy character. At present, this kind of performance is not too obvious, but in today's society, people are more likely to stay at home during holidays than in the past. This has also caused a series of health problems. No matter in the physique, or in the eyesight. As far as the current situation is concerned, the fast-paced development of today's era makes people keener on fast food knowledge, and it is easy to eat more than they can chew. If it goes on like this, people may be able to make faster progress after using highly intelligent tools [5]. However, if the proportion of the population based on research falls again and again, it will also be very disadvantageous to the future development. Generally speaking, in this era, intelligence has great advantages, because the basic discipline is still an aspect that people care about. If controlled nuclear fusion or other more efficient production methods are mastered in the future, people's focus is bound to be on smarter goals.

2.2. Electric power intelligent system

Electrification, digitization and intelligence are the development direction of modern society.

During the 13th five-year Plan period, China will accelerate the construction of "Internet +" smart grid. Comprehensively enhance the intelligent level of the power system, improve the ability of the power grid to accept and optimize the allocation of multiple energy sources, and meet the interaction between supply and demand of multiple users. Realize the comprehensive allocation of energy production and consumption, and give full play to the role of smart grid in the modern energy system [6]. Then the development direction of the future electric power intelligent system mainly has the following aspects:

(1) The technology is intelligent

On the one hand, the power system needs to achieve the combination of centralized and distributed supply, so as to build an efficient intelligent power system. On the other hand, advanced information technology provides technical support for the intelligent development of power system. Big data, cloud computing, Internet of things, mobile Internet and other advanced information technologies are deeply integrated with the power industry. Rapid technological breakthroughs in smart grid, electric vehicles, wireless charging and other fields.

(2) The system is market-oriented
At present, China has begun a new round of power system reform, comprehensively promoting the implementation of the plan in many areas, including: 1) Power generation; 2) Transmission; 3) Power distribution; 4) Sale of electricity; and 5) Users.

This kind of multi-field development is that the pilot mode of intelligent power system becomes multi-level. With the gradual maturity of the main body of the intelligent power market, the intelligent power system will form a diversified and competitive transaction scene.

The other two aspects will be introduced in the following chapters.

3. Application of new energy technology in electric power information intelligent system

The operation mode of traditional power system is based on the synchronous power generation of fire / electricity. When the proportion of new energy is relatively low, its impact on the power grid is limited. But in the future, with the gradual improvement of the permeability of new energy technology in various fields, new energy technology will fundamentally change the operation mode of traditional power system [7]. The use of technology and the degree of penetration will directly affect the operation security of the power information system. In fact, there are some defects in the use of new energy in electric power information system [8]. For example, in some new energy power stations in China, the phenomenon of off-grid often occurs. In addition, the new energy grid will also produce some technical problems, such as: 1) Overvoltage problem; 2) Voltage problem: whether it is stable or not; 3) Synchronous oscillations; and 4) Resonance problem.

The impact of these problems on the power grid can not be underestimated. Engineers and researchers should solve these problems quickly so as to improve the adaptability of new energy grid to different conditions. The idealized intelligent system structure of electric power information is shown in figure 2.

![Figure 2. Idealized intelligent system structure of electric power information](image-url)

An important aspect of developing intelligent power information system is the cleanliness of power supply structure. On the one hand, the proportion of clean energy installed will be significantly increased. China's ecological and environmental protection constraints continue to tighten, and the pace of clean adjustment of power structure will be further accelerated [9]. In 2020, the proportion of non-fossil energy installed in China will exceed 40%. In the next 20 years, the increase of renewable energy in China will exceed that of the European Union and the United States combined. In addition, after technological innovation, the clean utilization rate of coal power will continue to improve. In the past decade, the performance of coal-fired power emissions in China has declined significantly.

In addition, in line with international standards, it is also a means for the development of the application of new energy technology in electric power information intelligent system. The state implements the strategy of "going out". In the past decade, China's overseas investment in energy and power and construction projects have continued to increase. The pattern of China's power opening to the outside world has become more omni-directional and multi-disciplinary [10]. The construction of global energy Internet has opened up a broader space for international cooperation in electric power. Because of the differences in economic development and resource endowment in different countries and regions, the construction of global energy Internet has significant economy and competitiveness. Great commercial value is generated in it.
4. Conclusion

With the development of society and the arrival of the information age, new energy technology is widely used in every corner of people's life. In the context of this era, intelligence is an inevitable trend. Power system is the basis of people's production and life, in which the use of new energy is highly respected. With the gradual improvement of the permeability of new energy technology in various fields, new energy technology will fundamentally change the operation mode of the traditional power system, and affect the security performance of the system. Although there are still some technical problems in the intelligent power information system, its development conforms to the changes of the times. In the near future, the intelligent system of electric power information will bring about qualitative changes in people's living environment.

Acknowledgments

Scientific Research and Technology Development Project of Laibin(No.20LKZ202409).

Key Project of Undergraduate Education Reform of guangxi Normal University of Science and Technology (No.2020GKSYGZ01).

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