

China's power development based on the energy internet

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Abstract. Energy Internet's deep integration of energy systems and modern communication technologies can transform the economy from fossil energy to clean renewable energy. Based on the theoretical framework of business model, it is proposed that power companies can achieve the strategic entry of energy Internet market services through customer concept innovation, appropriate organizational structure adjustment, and more attention to external cooperation. By proactively innovating business models, Chinese power companies will gain sustainable competitiveness and build a platform for subsequent innovations. The development of the energy Internet will also make the construction of the global energy Internet inevitable. In this context, the internationalization process of China's power companies faces both opportunities and problems. China's power internationalization strategy should aim at realizing the global energy Internet. Under the guidance of the "One Belt, One Road" strategy, China's power industry should rely on UHV technology advantages and overseas power operation management experience, strengthen domestic and international cooperation, develop renewable energy and distributed energy, and improve Grid-connected services, fully open the user-side distributed power market, use the Internet to develop diversified businesses, and establish a business model that is in line with the development of the industry.

1 Introduction

Energy is the foundation of human survival and development. With the development of the economy and human society, energy supply is increasingly unable to keep up with the pace of energy demand. Coal, oil and natural gas are the most important primary energy sources in the world today. The excessive consumption of traditional fossil energy will lead to the exhaustion of non-renewable energy. At the same time, the unreasonable development and utilization of harmful gases emitted by fossil energy sources are increasingly jeopardizing our health and surroundings. From the perspective of sustainable development strategy, rational development and utilization of renewable energy and clean energy to replace non-renewable energy is the future strategic development direction of energy structure adjustment [1].

The rapid development of renewable energy represented by wind power will lead to the re-optimization of the global structure and layout of energy. Under this background, the construction of energy Internet requires a relationship between the energy-based energy network and the Internet. The energy subsystems that are different between the two are built together through the Internet as a connection point to create a global energy distribution network that is safe, reliable, sustainable, and environmentally friendly. Electric energy is the only secondary energy form that can use nuclear energy, water energy and various renewable energy sources on a large scale. Therefore, the main body of the future energy system must be electric energy[2]. In this

context, China's power internationalization process will inevitably face a new round of opportunities and challenges. This paper firstly combs and summarizes the relevant theories and concepts of the energy Internet, and then explores and discusses the impact of the national "One Belt and One Road" policy and the idea of building a global Internet on China's power internationalization strategy, and gives corresponding Countermeasures and recommendations.

2 Discussion on the Connotation of Energy Internet and Its Development Trend

The public is increasingly concerned about the environment, placing higher expectations on clean energy, energy conservation and consumption reduction, and spurring energy companies to shift from supply resources to service delivery. The Internet has effectively solved the problem of information asymmetry in the economy, realized resource allocation optimization and reduced transaction costs, and has penetrated into the energy field. The integration of energy systems with the Internet, the Internet of things, big data, cloud computing and renewable energy technologies will form a smart energy system, the "energy internet". Rifkin [3] believes that the energy Internet contains five major connotations:

- 1 renewable energy transformation;
- 2 energy production dispersion;
- 3 energy storage;
- 4 energy distribution;

5 transportation mode has zero emissions.

"Energy Internet" does not yet have a definition of a unified standard. Combined with the discussion of scholars at home and abroad, the energy Internet can be understood as the power system as the core, based on the smart grid, advanced Internet technology, intelligent management technology, etc. can collect and save two energy sources, and the various points are connected in series to establish an energy trading Internet to realize the sharing of Internet energy. At present, the supply and demand of the international energy market is tight, oil prices are rising one after another, and competition is fierce. The issue of energy security is essentially a global issue. For the current energy market, China needs to form partnerships with a number of countries to negotiate global cooperation programs, so that global energy can be properly managed and saved, prevent global warming, establish energy balance, and energy markets. The steady development creates conditions [4].

In December 2015, the State Grid Corporation and the German Institute of Electrical Engineers held a "Global Energy Internet China-Europe Technical Equipment Seminar" in Berlin. The China National Grid Board of Directors stated at the meeting that "China plans to establish a global partnership with international partners by 2050". Grid: The first step is to achieve domestic interconnection, the second step is to interconnect within the continent, and the third step is to intercontinental interconnection. By 2050, the global network will be basically established." [5] In the same year, President Xi also advocated global leaders and scientists to start exploring and building a global energy Internet. The ultimate goal of the global energy Internet is to "build an Arctic wind power base, send electricity to Asia, North America and Europe through UHV AC and DC, form Europe-Asia-North America interconnected power grid; build a solar power base in North America and the Middle East, north Send electricity to Europe, send electricity to Asia to the east, and integrate Africa into Europe Continent - Asia - North American Internet Grid; Construction of the South American North, Oceania Solar Power Generation Base, Do not connect North America and South America, Asia and Oceania." [6].

3 The energy Internet and the internationalization of Chinese power companies

The Third Plenary Session of the 18th CPC Central Committee will jointly build the "Silk Road Economic Belt" and the 21st Century "Maritime Silk Road" strategic concept into a national strategy, which has received extensive attention at home and abroad. The areas affected by the "Belt and Road" include almost all of Asia, as well as some countries in Europe and ASEAN. As the world's largest energy producer and the largest energy consumer, China plays a pivotal role in the innovation of energy trading methods. It is our responsibility and obligation to establish an energy Internet system.

At present, China's power companies are characterized by relatively backward technical equipment

and insufficient innovation capabilities. Although a few large power companies have strong independent innovation capabilities, the nationwide development is not balanced, and the backwardness of technological capabilities directly limits the scope of international cooperation. Finally, China's power companies have a weak sense of resistance to crisis. In the process of internationalization, there is no standardized crisis prevention and control mechanism and management measures, and there is a lack of awareness of cooperation risks with developed countries (Liu Tuo, 2012).

4 China Power Internationalization Development Strategy Based on Energy Internet

At the 2016 G20 Business Summit (B20), the State Grid Corporation is based on the national "Belt and Road" The Road's overall initiative proposes that the national power industry's future overseas operations, the "Belt and Road" is the main approach and topic. "One Belt, One Road" effectively helps neighboring countries to establish new types of power grids, and at the same time, near the country.

The smooth route of the power grid can also bring convenience to China. In the future, after the construction of the global energy Internet, I certain lines in the country can also receive protection. In the future, China's energy output will gradually spread outward, not only It only targets the countries around the motherland, but invests in Europe, invests in the United States, and establishes overseas business points to achieve higher yields. According to the above assumption, the strategic goal of China's electric power internationalization development based on the energy Internet of Things

It should be: The future development of the energy Internet will be extended to urban energy with the smallest household energy Internet as the smallest unit. The Internet, and then to the national energy Internet, eventually developed into the continent, the intercontinental energy Internet, and finally completed Ball energy internet. Based on this goal, the following strategic measures can be taken in the future development of China's power internationalization:

Actively develop renewable energy and distributed energy, change the "coal-based" power structure, and mainly establish a power structure based on "clean energy" to reduce pollution and damage caused by energy. The improvement of energy Internet services has enabled the public to understand the concept that Internet energy exchange is a good way to save energy and reduce energy and save energy. Therefore, the general public should support new energy, support renewable energy, support energy exchange and frugal.

5 Innovation of Business Model of Power Enterprises under Energy Internet

5.1 Value proposition innovation

The starting point of business model innovation is how to create added value for customers. As power companies have unique advantages in customer interaction, customer segmentation and smart meter usage data, they can support customers through increasingly rich products and services, and use the power industry data to provide richer value-added services from pure power supply. Transforming to a diversified service oriented to customer needs, meeting user needs in a cleaner, more efficient and sustainable way.

5.2 Customer Interface Innovation

Two-way energy metering and distributed renewable energy production and utilization have changed the passive role of residential users in the tradition. Energy Internet will empower customers to better control their power consumption. It will also encourage the public to participate in energy production, use distributed renewable energy to generate electricity, and make surplus electricity to make money, becoming a proactive "production and consumption unit". To realize the value proposition of the power industry, power companies need to innovate customer ideas, stimulate and utilize the willingness of customers to participate, that is, invite innovative users to enter the innovation support mechanism.

5.3 Architecture Management Innovation

5.3.1 Value structure innovation

Power companies need to re-architect management based on the above value proposition and customer interface. The energy Internet will change the centralized balance model of "power generation – power supply – electricity consumption" transmitted by the traditional value of power companies, making it a value network with higher dependence and closer interaction between power companies and stakeholders. Distributed renewable energy is self-sufficient, reducing transmission and distribution costs, and at the same time combining with the centralized large grid model to achieve optimal social energy efficiency.

5.3.2 Innovation in core resources and capabilities

The acceptance of distributed renewable energy by power companies needs to improve the operational flexibility and regulation of conventional adjustable power supplies, expand grid coverage and cross-regional power exchange capabilities, and change the traditional regulatory monopoly retail electricity market structure and system operation mode.

5.4 Profit model innovation

Various services based on customer needs will bring sustainable income to power companies. Providing

renewable energy acceptance services, with the consent of the customer, the power company can finance, own and operate distributed renewable power; provide innovative pricing and payment solutions based on market supply and demand, enabling differentiated pricing and personalization. Pricing makes it possible to use electricity for free and save electricity to make money – all of which contain rich profit models. For example, American Electric GE has integrated the entire process of power generation, transmission, distribution, use, and electricity, and has combined with power generation transactions to carry out value-added services such as maintenance and energy conservation. Its energy management revenue has reached 44 billion yuan.

6 Prospect

Nowadays, global climate problems are becoming more and more serious. The annual economic losses caused by extreme weather in the world are increasing year by year. Improving climate conditions and promoting green development are the main themes of future economic development and the goal of future energy development. Once again, the energy revolution has been global. The scope can be quietly launched. Many countries around the world are carrying out research projects in the field of new energy. To be the first in this revolution, we must adopt "low carbon, high technology, new standards, and sustainable". Key words, but also to lead the new direction of world energy development, China's independent research and development of power technology, through the application of domestic and foreign applications in recent years, "long-distance transmission of clean energy", "clean energy to replace fossil energy, electric energy to replace other forms The central idea that energy, "one pole, one" and so on, representing the energy Internet, will show its powerful power of a new round of energy revolution in the process of "going out" of Chinese power companies. This will drive a sharp drop in global electricity prices, large-scale electrification of fossil energy-driven equipment, international we will cooperate with each other checks and balances in order to promote world peace and development. It can be seen that the "going out" of Chinese power companies with technology is not only a manifestation of increasing the international competitiveness of Chinese enterprises, but also a great achievement for the benefit of future generations of the world. There will be huge potential and space for future research.

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