

Research on the Practice and Enlightenment of Strategic Transformation of World-Class Energy and Power Enterprises

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Abstract. The global energy transformation is accelerating. Many traditional energy and power companies have made a strategic transformation. This paper selects world-class energy companies such as TEPCO, EDF, E. ON and some oil companies as the research objects, analyzing their strategic transformation practices and the relevant enlightenments, to provide references for the strategic optimization of other energy and power enterprises.

Keywords-Strategic Transformation, Strategic Practice, World-Class Energy and Power Enterprises

1. INTRODUCTION

The global energy transformation is accelerating. In order to adapt to situation, many traditional energy and power companies have made a strategic transformation, which has important enlightenment for the development of other energy and power enterprises. If energy and power companies want to enhance their international discourse power and influence, it is necessary to analyze the strategic transformation experience of world-class companies [1-2]. Therefore, this paper selects world-class energy companies such as TEPCO, EDF, E.ON and some oil companies as the research objects, analyzing their strategic transformation practices and the relevant enlightenments, to provide references for the strategic optimization of other energy and power enterprises.

2. RESEARCH ON THE STRATEGIC TRANSFORMATION PRACTICE OF WORLD-CLASS ENERGY AND POWER ENTERPRISES

2.1 Strategic transformation practice of TEPCO

TEPCO is a large-scale electric power company in Japan that integrates power generation, transmission and distribution. The main business includes electricity, equipment maintenance, fuel supply, environmental protection, real estate, transportation, information and

communication, etc. TEPCO started its strategic transformation to an integrated energy service provider in 2012, proposing that power companies should transform from providing products to providing services, and from single services to integrated services.

1) TEPCO expands integrated energy service business through optimizing the organizational structure and building a supporting platform. TEPCO has built four platforms to support the development of integrated energy service business: power transmission and distribution platform, infrastructure platform, energy platform and data platform. Among them, the infrastructure platform is based on the power transmission and distribution platform, and integrated distributed energy, heating and water supply systems, electrified housing, electrified transportation networks and other infrastructures, to form a regional integrated energy service system, realizing information interaction between power transmission and distribution facilities and other facilities. The energy platform integrates multiple energy facilities to achieve multi-energy complementation and reasonable sharing, such as electricity, gas, combined heat and power, hydrogen energy, batteries, and mobile energy storage based on electric vehicles. It is extension in other energy field of an electricity-centric power transmission and distribution platform. The data platform is the nerve center that penetrates each platform. By collecting and analyzing the information of each platform, device and customer, it provides effective guarantee for the in-depth integration and close interaction among platforms, devices and customers. At the same time, it provides powerful data support for the successful development of integrated energy service businesses.

2) TEPCO innovates electricity sales models actively and participate in the competition on electricity sales market. In response to the reform of the power system, TEPCO proposes a new power marketing strategy. The main idea is to stand on the user's standpoint, use the effectiveness of energy use plans as an important method to attract customers, so as to reduce users' energy utilization costs. It can meet the growing needs of users to the greatest extent, by providing rich energy products and services, including electricity. The main competitive methods include: a) Provide flexible and practical electricity tariff packages. It provides customers with preferential services, personalized electricity tariff plans and electricity tariff trial calculation services to attract users. b) Participate in cross-regional competition actively. It launches different combinations of electricity tariff plans for different electricity sales regions. c) Provide integrated energy services through cross-industry cooperation. It expands integrated energy services through cooperation with companies in various fields, such as electrical appliances, networks, automobiles and communications. The business contains energy-saving diagnosis, energy-saving energy storage, related equipment installation after-sales service, energy supply combination scheme, preferential charging of electric vehicles, home maintenance, etc.

3) TEPCO develops business models of infrastructure operations actively, such as power towers and pipeline. TEPCO has carried out resource sharing and value realization of power towers, electric poles, and pipelines, and established a mature business operation model. It mainly operates space leasing, co-building services, digital maps and other businesses through market-oriented method.

2.2 Strategic transformation practice of EDF

EDF is France's largest state-owned power company, Europe's largest energy company, and the world's largest nuclear power operator. EDF's business sector contains power generation, transmission, and distribution, natural gas supply and other energy services, almost controlling electricity throughout France. In order to cope with the institutional changes and operating pressures brought about by the French power reform, EDF transforms energy structure actively, striving to become a low-carbon power company [3].

EDF uses its strong advantages on power system to get involved in the fields of energy services and energy efficiency management. It digs into data assets, improves response capabilities of customer energy service, provides energy consumption management services for users in the European market, and strives to become a leader in the field of ecological energy efficiency services. EDF mainly adopts three measures. Firstly, it attaches importance to the construction of information systems, supporting the management of intelligent operation and maintenance systems. Secondly, it improves the distribution network information system, focusing on top-level design and step-by-step implementation, to break professional barriers and realize the full sharing of data. It can make the different professional management modules connect effectively and improve the level of distribution network management, operation and maintenance. Thirdly, it establishes an independent service-oriented operation analysis center, which is responsible for analyzing distribution network operation data, asset data, enterprise management data, and customer data comprehensively and formulating integrated data model standards. It can realize comprehensive data sharing, and provide customer behavior analysis support to sales department, marketing department and others, to improve management efficiency and reduce service costs finally. The value-added services centered on big data have promoted the development of integrated energy service businesses strongly.

2.3 Strategic transformation practice of E.ON

E.ON is the largest energy company in Germany. Its business contains power generation, natural gas extraction, power distribution, gas distribution networks, and sales. In recent years, Germany has accelerated its energy transition, which brought huge challenge to traditional power companies. In order to meet the challenge, E.ON announced that it will divest part of power generation, energy trading and upstream businesses gradually. E.ON's renewable energy business has been developed around the world rapidly. It has become the world's top ten wind power operator and the world's top three offshore wind power operator. In the future, E.ON will continue to grow in this field, and seek investors and operational partners actively [4].

At the same time, E.ON develops a series of user solutions actively, promoting energy efficiency technologies and high-quality value-added services. It mainly provides customers with six types of services: a) Smart energy services. It can improve energy system operation performance and provide real-time information interaction, power transactions, energy use plans. b) Distributed power generation and storage services. It can obtain engineering income, option transfer fees and contract energy management fees. c) Energy demand aggregation management. It can obtain system operation management fees and electric energy transfer fees. d) Data analysis and services. It can obtain data analysis report sales income and application license fees. e) E-mobility electric vehicle solutions. It can get B2B platform usage fees and

value-added service fees. f) Smart energy system design. It can get design and construction fees, and smart energy system operation and management fees.

2.4 Strategic transformation practice of international petroleum corporation

In recent years, many international energy companies have announced investment plans and merger and acquisition measures, to prioritize the development of new energy businesses that have high synergy with their own advantages. Shell develops solar and wind power business and provides clean energy solutions. Total has expanded the installed capacity of solar, wind, and hydropower in recent years [5].

Some traditional energy companies use natural gas as an entry point, to carry out services such as combined cooling, heating and power generation, distributed power generation, energy trusteeship, energy finance, energy conservation and environmental protection. Some oil companies build gas stations and provides refueling and other energy services together, expanding the business chain and enhancing customer stickiness.

Some companies integrate new-generation information and communication technologies, using digital management to improve the overall efficiency of the energy system. Based on the Internet of Things technology, Shell builds a customer-oriented power purchase and sale platform, integrates excess power generation resources, and shares them with tens of thousands of households. At the same time, it provides auxiliary services for grid companies to solve problems, such as low equipment efficiency and lagging power channel construction. Total, BP and GE cooperate to place a large number of sensors in oil and gas pipelines, build an oil and gas pipeline monitoring system, and transmit data to the terminal in real time. Through big data analysis, it can provide early warning of pipeline safety and reduce operation costs greatly. The strategic transformation practice of world-class energy and power enterprises are as shown in Table 1.

TABLE I. THE STRATEGIC TRANSFORMATION PRACTICE OF WORLD-CLASS ENERGY AND POWER ENTERPRISES

Companies	Strategic transformation practice
TEPCO	1) Expand integrated energy service business through optimizing the organizational structure and building a supporting platform. 2) Innovate electricity sales models actively and participate in the competition on electricity sales market. 3) Develop business models of infrastructure operations actively, such as power towers and pipeline.
EDF	1) Attach importance to the construction of information systems, supporting the management of intelligent operation and maintenance systems. 2) Improve the distribution network information system, focusing on top-level design and step-by-step implementation. 3) Establish an independent service-oriented operation analysis center, which is responsible for analyzing various data for distribution network.

E.ON	<ol style="list-style-type: none"> 1) Divest part of power generation, energy trading and upstream businesses gradually. 2) develop renewable energy business around the world 3) Develop a series of user solutions actively: smart energy services, distributed power generation and storage services, energy demand aggregation management, data analysis and services, e-mobility electric vehicle solutions, smart energy system design.
International Petroleum Corporation	<ol style="list-style-type: none"> 1) Prioritize the development of new energy businesses that have high synergy with their own advantages. 2) Use natural gas as an entry point, to carry out Integrated energy services. 3) Integrate new-generation information and communication technologies, using digital management to improve the overall efficiency of the energy system.

3. ENLIGHTENMENT FROM STRATEGIC TRANSFORMATION PRACTICE OF WORLD-CLASS ENERGY AND POWER ENTERPRISES

It can be seen from the above analysis that internationally world-class energy and power companies have accelerated their strategic transformation to adapt to the new trend of energy development, which has the enlightenment as follows:

- 1) Make the business transformation around the development and utilization of new energy. With clean and low-carbon as the core, many companies promote the development and utilization of clean energy on the production and consumption sides.
- 2) Apply internet thinking to promote the deep integration of energy systems and information technology. Through the in-depth integration of energy systems and information technology, as well as the construction of infrastructure internet, industrial internet, consumer internet and other networks, it can realize multi-regional and multi-level interconnection of energy, facilities, information, markets, and social relations.
- 3) Highlight comprehensive value creation and promote business model innovation. Energy Internet businesses are rich and diversified, involving energy production, transmission, storage, consumption, transactions, management and other links. As well as it involves basic layer, service layer, and application layer. The enterprises innovate business types and create comprehensive value constantly. Specifically, the businesses included in basic layer are mainly: traditional energy development, new energy development, energy transmission, basic equipment, and communication facilities. The businesses included in service layer are mainly: energy development and management, dispatching operation, asset services, trading services, financial services, data services, and technical service. The businesses included in Application layer are mainly: energy supply, comprehensive utilization of energy, comprehensive services, internet of vehicles, and internet of homes.
- 4) Conduct Energy Internet business around its own advantages. Different companies have different development foundations and advantages. Their focus on Energy Internet exploration is also different. Traditional energy companies attach importance to make full use of their

existing assets and brand, extending their business to related products and services. The Related business about Energy Internet are as shown in Table 2.

TABLE II. RELATED BUSINESS ABOUT ENERGY INTERNET

Layer	Main business
Base layer	<ul style="list-style-type: none"> • Traditional energy development: exploration of coal, oil and gas, etc. • New energy development: investment, construction and operation of wind energy, solar energy, distributed power sources, etc. • Energy transmission: investment, construction and operation of transmission grids, oil and gas pipeline networks, micro grids, etc. • Basic equipment: new energy, power equipment, control terminals, energy storage, charging piles, sensors, energy routers and other equipment supply • Communication facilities
Service layer	<ul style="list-style-type: none"> • Energy development and management • Dispatching operation • Asset services • Trading services • Financial services • Data services • Technical service
Application layer	<ul style="list-style-type: none"> • Energy supply: electricity, gas, water, cold, heat, etc. • Comprehensive utilization of energy: combined cooling, heating and power generation, multi-energy complementary • Comprehensive services: energy saving services, demand side management, contract energy management, energy efficiency services • Internet of Vehicles • Internet of Homes

4. CONCLUSION

The global energy transformation is accelerating. Many traditional energy and power companies have made a strategic transformation. This paper selects world-class energy companies such as TEPCO, EDF, E.ON and some oil companies as the research objects, analyzing their strategic transformation practices and the relevant enlightenments, to provide references for the strategic optimization of other energy and power enterprises.

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