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Review

Review on transaction status and relevant policies of southern route in China's West–East Power Transmission

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ABSTRACT

China's West–East Power Transmission is aimed at optimizing resources allocation, and promoting the common economy development of both east and west regions. However, some problems emerged in cross-province electricity trade in recent years. It is in great need of trading mechanism improvements for government and power grid enterprises to further improve parties' enthusiasm involved in West–East Power Transmission. This paper takes south route as the research object, and in-depth analysis of benefits distribution of current southern route is made as well as problems in tariff mechanism, and the impact of national policy and industry development on West–East Power Transmission is elaborated. Finally, all the factors related to the smooth progress of West–East Power Transmission are consolidated to offer some constructive ideas.

1. Introduction

West–East Power Transmission in China is one of three representative projects of western development strategy (West–East Power Transmission, West–east Gas Transmission and the Qinghai-Tibet railway), which is designed to optimize the distribution of China's resources and electric power structure, so as to ease electricity shortages in China's developed regions by exploiting resources in the west [1]. According to the arrangement and plan of State Council, West–East Power Transmission mainly consist of three parts: the northern route transmitting hydropower of the upper Yellow River reaches and the pithead power plant of Shanxi, Shanxi and western Inner Mongolia to North China and Shandong; the central route connecting Three Gorges Project and other hydropower plants on Yangtze River upstream with eastern China, and the southern route connecting hydroelectric and thermal power stations in southwest Yunnan, Guizhou and Guangxi with southeast Guangdong. Under the background of sustainable energy development and environment protection, West–East Power Transmission is of great significance to the low-carbon development of power industry and energy saving and emission reduction in China.

However, there are still bottlenecks that hinder the development of West–East Power Transmission [2,3]. Benefits allocation can't meet the demand of all economic parties involving in transaction process, especially for southern route. The economic and social development of four south provinces (Guizhou, Yunnan, Guangxi, Guangdong) is unbalanced, and the relationship is rather complex between central and local governments, east and west, seller and buyer as well as power grids and suppliers [4].

In view of the problems above, the southern route of West–East Power Transmission will be studied in this paper. Firstly, the construction history of West–East Power Transmission in China is briefly reviewed, and the future development trend and mode of southern route is illustrated. Secondly, the problems of investment, tax, tariff, power arrangements and other policies for this project are systematically analyzed. In addition, root causes of unbalanced development will be explored based on the analysis of benefits distribution mode. Finally, the effect of policy and industry development on West–East Power Transmission is analyzed so as to realize the target of energy saving and electricity market development.

2. The development of West–East Power Transmission in China

2.1. Historical review

In the late 1970s, Chinese government proposed strategic deployments, including developing large power plants, constructing large-scale hydropower and thermal power bases, transmitting large-scale hydropower and pithead plants power outward. In

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1982, according to the strategic deployment of accelerating the development of Red River approved by State Council, four hydropower development contracts of Qujing, Anshun, Panxian and Tianshengqiao were signed by national energy administration, state energy resources investment corporation and Guangdong province with Yunnan, Guangxi, Guizhou. And then, the prelude of West–East Power Transmission and power cooperation of southern provinces was uncovered. In August 1993, with the completion of Tianshengqian hydropower plant, 500 kV AC Tianshengqiao–Guangdong transmission line and 200 kV Lubuge–Tianshengqiao transmission line, the four southern provinces came into cooperation, i.e. the southern route of West–East Power Transmission was formed. Over the same period, ±500 kV HVDC Gezhouba–Shanghai transmission line was put into operation in 1990, and then the central route of West–East Power Transmission was accomplished. Meanwhile, in 1984, Datong and Shentou power plants went into completion. In 1989, Beijing came into cooperation with Inner Mongolia, the Fengzhen–Beijing–Tianjin–Tangshan power grid power transmission was on construction. Thus, the north route was accomplished (see Fig. 1).

In recent years, the West–East Power Transmission has been developing rapidly. By the end of 2008, China's Southern Power Grid has become a strong power transmission network with 8 AC lines and 4 DC lines, the 8 AC lines include four-circuit 500 kV AC Tianshengqiao-Guangdong transmission lines, two-circuit 500 kV AC Guizhou–Guangdong transmission lines, south Yunnan transmission line outward and Shibing–Xianlingshan transmission line; the 4 DC lines include ±500 kV Tianshengqian–Guangdong DC transmission line, 500 kV DC Guizhou–Guangdong transmission line, ±800 kV DC Yunnan–Guangdong transmission line etc. The capacity of sending side has scaled up to 25 GW. In 2010, both the transmission capacity and electricity amount are 10 times than that of 2000, in which, the maximum power capacity of western electricity to Guangdong was 18.55 GW, accounting for 27% of the maximum load in Guangdong, and for Guangxi were 3.77million kW and 30%. Therefore, it can be seen that western power has become an important part of the power supply in Guangdong and Guangxi.

2.2. The development status and future trend of southern route of West–East Power Transmission

2.2.1. The development status of southern route of West–East Power Transmission

The southern route of West–East Power Transmission refers to transmitting Guizhou's thermal power and Yunnan, Guizhou, Guangxi's hydropower to Pearl River Delta (Guangdong, Hong Kong, and Macau). In 2000, Hongjiadu (540 MW), Wujiang expansion project (500 MW), Yinzidu (360 MW) and third circuit 500 kV Tianshengqian–Guangdong transmission line were constructed, then was the Longtan hydropower plant in 2001, and both Suofengying hydropower plant (540 MW)and Xiaowan hydropower plant (4200 MW) in 2002. These projects above would guarantee the power supply of West–East Power Transmission. By the end of 2010, the southern route had formed a main-network of 8 AC lines and 4 DC lines. What's more, some special supporting projects bear the task of West–East Power Transmission and optimizing resources allocation between east and west, i.e. the ultra-high pressure (see Table 1), AC/DC transmission network.

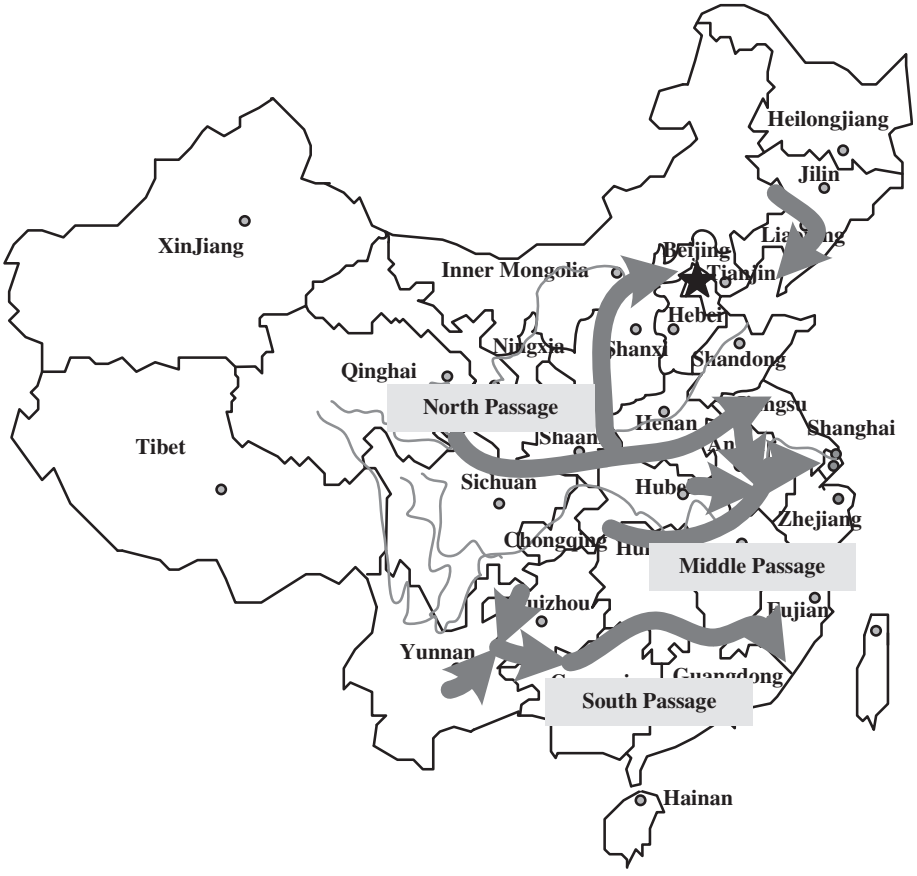

Fig. 1. The development status of West–East Power Transmission in China. Resource:http://www.csg.cn/.