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Study on the Policy of Orderly Releasing Plans on Generation and Consumption of Electricity in Northeast China

Xin Ma¹, Jicheng Liu¹, Qiong Liu¹, Linna Yu¹, Puchun Ren¹, Siyu Yu^{2*} and Jing Chen²

¹ Northeast branch of State Grid company, Shenyang Hunnan Camp No. 1 North Street, Shenyang 110180, China

² School of Electric and Electronic Engineering, North China Electric Power University, Beijing 102206, China

* wincey@163.com

Abstract. An important part of China's power system reform is the implementation of releasing plans on generation and consumption of electricity. This paper discusses the policy of orderly releasing plans on generation and consumption of electricity. By sorting out its relevant policies, interpret those policies from three perspectives. Study the releasing situation of generation and consumption of electricity in northeast China, integrate the implementation plan of the three provinces and one district and lay the foundation for studying the impact of policy and policy suggestions for orderly releasing plans on generation and consumption of electricity.

1. Introduction

With the conception and advancement of the energy revolution strategy, China has ushered in a new round of power system reform [1]. The new power reform is centred around green and low-carbon, energy saving and emission reduction and optimal allocation of resources, and will Promote the overall transformation of China's power production structure, consumption structure and technical structure [2]. With the deepening of electric power system reform, it is an inevitable trend for power generation and consumption to move from the plan to the market [3]. In 2017, China issued the "Notice on the Orderly Releasing Plans on Generation and Consumption of Electricity" (hereinafter referred to as the "Notice"), and put forward new requirements for grid operation and development. This paper first sorts out relevant policies of orderly releasing plans on generation and consumption of electricity, then interpret the policy from three perspectives in detail. Consolidate the specific implementation plans formulated in the three provinces and one district of northeast China, and lay the foundation for studying the impact of policy on the northeast Power Grid and policy suggestions for orderly releasing plans on generation and consumption of electricity.

2. Policy combing of orderly releasing plans on generation and consumption of electricity

Power system reform involves many aspects such as power resource allocation, electricity price, and power trading.

In 2015, the Central Committee of the Communist Party of China promulgated the "Several Opinions on Further Deepening the Reform of the Power System"[4] (hereinafter referred to as Document No. 9). Document No. 9 has clarified the key points and paths for the state to deepen the



reform of the power system and become a programmatic document in the process of China's power reform. In order to implement the requirements of Document No. 9, in 2015, six supporting documents for the reform of the electric power system including the "*Implementation Opinions on Orderly Releasing Plans on Generation and Consumption of Electricity*" [5] were published, and the blueprint for the reform of the electric power system was comprehensively and meticulously depicted. In 2017, based on the implementation opinions, the National Development and Reform Commission and the National Energy Administration jointly issued "*Notice on the Orderly Releasing Plans on Generation and Consumption of Electricity*" [6]. Notice made specific arrangements for matters related to the orderly releasing plans on generation and consumption of electricity, marking the substantial progress in the release of the power generation and consumption plan. In 2018, China's power system reform continued to advance in depth [7]. From the perspective of provinces and cities, three provinces and one region in northeast China have issued the implementation plan of orderly releasing plans on generation and consumption of electricity, and made relevant provisions on each link of the releasing.

3. Policy interpretation of orderly releasing plans on generation and consumption of electricity

The "Notice" is a key document for the new round of reform of China's power system, covering three main aspects: first, reduce the planned electricity by sub-category, with different and orderly, and expand the market-oriented transaction power; second, clear implementation of specific measures for the priority power generation system; third, guide power users, power purchase entities, and power sales companies to actively participate in market transactions. Combined with the power grid in northeast China, the following is a detailed interpretation of the ten policies in the notice from three perspectives:

3.1. Reduce the planned power generation of coal-fired units year by year, and promote coal-fired units to participate in market transactions

The first three policies of the "Notice" specify the planning and marketization rules for coal-fired units and coal-fired enterprises, and the combination of policies and market means, which encourages the development of coal-fired units while encouraging coal-fired units to participate in market transactions.

The first content of the "Notice" is to require all localities to organize power generation enterprises, especially coal-fired power generation enterprises, and power-selling enterprises, users and power grid enterprises to sign a tripartite power purchase agreement as soon as possible from the date of issuance of documents. At the same time, the first point limits the number of hours of coal-fired generating units. Whether it is an existing or newly approved coal-fired unit, the number of hours of power generation must not exceed the maximum number of hours of power generation in the local provincial coal-fired units. By setting a maximum limit, we can pay attention to the market efficiency while taking into account the survival rights of market participants. The maximum cap needs to be comprehensively considered for overall measurement of renewable energy consumption, grid security, fair competition, and healthy development of the industry. It is determined by the dispatching agency and relevant provincial government departments, and reported to the National Development and Reform Commission and the National Energy Administration for the record. In the northeast region, the highest utilization limit of Liaoning coal-fired generating units is the highest, while Heilongjiang is the lowest. The lower maximum utilization hour limit of coal-fired generating units limits the development of coal-fired generating units to a certain extent.

The second content of the "Notice" clearly requires "reducing the planned electricity consumption of existing coal-fired power generation enterprises year by year". In 2017, the energy-saving and environmental protection units and the enterprises that signed the power purchase agreement (contract) more than 50% of the utilization hours of the previous year's thermal power plan, the planned electricity consumption is not higher than 85% of the previous year's thermal power plan hours. Other coal power units shall not be higher than 80% of the planned electricity quantity of the previous year's thermal power. In 2018, the proportion of planned power generation will be further reduced on this

basis. Since 2012, the average utilization hours of the coal-fired power units in northeast China have been at the national level. As the cost of coal prices has risen indefinitely, the planned reduction in electricity means that the profits of power generation companies in northeast China will further shrink. In order to reduce the risk of coal-fired power companies, the Notice requires the three parties to agree on the adjustment mechanism for the linkage of electricity prices and coal prices in the contract at the same time as the signing of the power purchase agreement. At present, the price adjustment mechanism in the northeast region's power purchase agreement is mostly to introduce the price linkage mechanism between upstream and downstream products of both parties, that is, the coal price linkage is also included.

In addition to clearly stipulating to reduce the planned power generation of existing coal-fired units, the "Notice" also indicates that coal-fired power units approved after the promulgation of Circular 9 will, in principle, no longer arrange for power generation plans and will not implement terminal pricing. After the unit is put into production, it is included in the market-oriented transaction and the price is formed by the market. This means that the newly commissioned coal-fired power units will be subject to more operational pressures. Compared with the current administrative orders that directly require suspension and postponement of construction, this regulation has inhibited the investment enthusiasm of coal-fired power plants in Northeast China through market-based means, and at the same time allowed all parties to form good expectations on the process of electricity marketization and the reform of power system.

3.2. Clean energy consumption is guaranteed in regional and cross-regional by priority power generation plans

The "Notice" stipulates that it is necessary to ensure the power generation of clean power, peak-regulating units and other guaranteed power sources. According to the policy regulations, the units within the planned acquisition period of wind power, solar power, and nuclear power in the Northeast region are determined to be the priority power generation plan. Implement "pre-quantity bargaining" to achieve "preservation" through priority power generation plans, and avoid difficulties in cross-provincial clean energy consumption in line with national strategies due to the orderly releasing plans on generation and consumption of electricity. In accordance with the national standard of guaranteed acquisition annual utilization hours: the standard for hours of indemnification purchase for wind power in northeast China is 1800-1900 hours, and those of solar power and nuclear power are 1300-1400 hours and 4720 hours respectively.

In addition, the "Notice" opened the door to cross-provincial and cross-regional electricity markets, and the cross-regional transaction was gradually transitioned from plans to a priority generation plan combined with direct transactions. The clean energy in the cross-region is protected by the priority power generation plan. The priority power generation plan is not lower than the actual level of the previous year or the multi-year average and the other participate in market-based pricing in the receiving areas. As of March 2018, the northeast power grid has only cross-regional power transactions with north China power grid. The contact lines that have been put into operation include the Gaoling back-to-back DC transmission line, the transformation of the Suizhong power plant, and the Zharute-Qingzhou DC transmission. Except the Suizhong power plant is thermal power, the other two lines are bundled and transported by conventional energy and clean energy. The Gaoling back-to-back line is a wind-fire bundled transmission. In 2017, the annual power transmission amount was 21.6 billion kWh, of which the wind power priority power generation plan was 6 billion kWh. At the request of the "Notice", in 2018, the wind power generation capacity of the line will increase on the basis of 6 billion kWh. It is worth noting that the Zharute-Qingzhou transmission project officially put into operation in 2018 can effectively promote cross-regional clean energy consumption in northeast China. However, the "Notice" does not mention how to develop a priority power generation plan for clean energy of the line, which brings certain difficulties to the formulation of the northeast cross-regional clean energy priority power generation plan.

3.3. Guide market participants to actively participate in electricity market transactions

Guide the purchase of electricity to accelerate participation in market transactions. On the one hand, all localities are required to speed up the release of power purchasers other than non-negotiating users to participate in market transactions. Areas with conditions can expand the scope of power users' release and are not subject to voltage levels. On the other hand, once you participate in direct transactions, you should participate in the transaction with full power, and the government will no longer issue a power plan. According to the rules of medium- and long-term power trading in the northeast provinces, power purchasers in the power market are still limited to users of voltage levels of 10 kV and above, and power purchasers below 10 kV are represented by sales companies.

Guide power users to actively participate in market transactions. First of all, the newly increased industrial users should guarantee the power supply by signing a direct power transaction agreement, and encourage other new users to participate in direct power transactions. Secondly, it is necessary to strengthen the awareness of cultivating power users to participate in the market, and strive to achieve real-time correspondence between power generation and consumption curve. Third, the power users participating in the market transaction will no longer perform the catalogue price. Finally, focus users to actively participate in the market through the guaranteed price mechanism, that is, users who have participated in the market transaction and quitted from the market will afford the guaranteed price and transmission and distribution price. According to the government, the guaranteed price is 1.2-2 times the residential electricity price.

Guide sales companies to flexibly participate in market transactions. On the one hand, power sales companies can be regarded as large users and make direct electricity trading with power generation companies. On the other hand, power sales companies can represent small and medium-sized users to participate in direct transactions.

3.4. Policy analysis conclusion

To sum up, the policy mechanism design of the Notice focuses on the systematic thinking of using organic connections and overall design, and also reflects the policy formulation concepts of "orderly transition", "differential treatment" and "normative guidance". With the continuous reduction of power generation plans, the scale of market-oriented transactions is bound to expand further. The electricity market system that orderly opens, breaks market barriers, establishes full competition and develops healthily, is irreversible [8]. Reform dividends such as lowering corporate costs and optimizing resource allocation will be further released [9]. Marketization will eventually become the decisive force driving the revolution in power production and consumption.

4. Implementation progress of orderly releasing plans on generation and consumption of electricity in northeast China

The "Notice" was placed at a high level at the national level. In response to the call for national policies and the deepening of the reform of the power system, relevant provincial government departments have formulated corresponding policies in accordance with the "Notice". Among them, the three provinces and one district in northeast China have successively issued specific implementation plans for orderly releasing plans on generation and consumption of electricity, and made specific arrangements for relevant matters. The situation of releasing plans on generation and consumption of electricity in northeast China is shown in the table 1.

Table 1. The situation of releasing plans in northeast China.

Liaoning	1) Arrange the base electricity plan after eliminating the direct trading power space.
	2) The scale of power trading continues to expand, the transaction price is low, and users reduce production costs through direct transactions.
	3) Introduce incremental power transmission and distribution price.

Jilin	1) issued major power reform documents on the power market, the reform of the power selling side, the auxiliary service market and the electricity transmission and distribution price. 2) Transmission and distribution price is implemented by price difference linkage. 3) All the price reduction space on the power generation side is diverted to the user side.
Heilongjiang	1) Since the heating unit accounts for more than 70%, the heating period is long, and the proportion of industrial electricity is decreasing year by year, the priority power generation accounts for a high proportion. 2) Large user direct transaction contracts account for 8.9% of the total social electricity consumption. 3) Power generation companies and provincial power companies offer benefits.
Mengdong	1) Issued policies such as “Inner Mongolia Electric Power Reform Comprehensive Pilot Program”, “Mengdong Wind Power Trading Rules”. 2) The heating unit determines the base plan by ensuring heating. 3) The sales side is released to a large scale, and direct transaction of large users can effectively reduce power cost.

As can be seen from the above table, most regions in northeast China have issued policy documents related to power market transactions, which stipulate many links of direct transactions. At the same time, northeast China strives to reduce the cost of electricity, power generation enterprises and provincial power companies to reduce prices for the benefit of users, is conducive to the increase of electricity consumption in northeast China, revitalization of the northeast economy.

Table 2. Implementation plan conclusion of orderly releasing plans in northeast China.

Provinces and cities		Liaoning	Jilin	Heilongjiang	Mengdong
Priority generation calculation range	Spontaneous for private use	✓	✓	✓	Most of the units are dispatched by the Northeast Branch and cannot be measured.
	Guaranteed wind energy	✓	✓	✓	
	Guaranteed solar energy	✓	✓	✓	
	Guarantee other new energy sources	✓	✓	✓	
	Grid safety support	✓	✓	✓	
	Guaranteed heating	✓	✓	✓	
	Hydropower	✓	✓	✓	
	Nuclear power	✓			
	Residual heat	✓		✓	
	Outsourcing electricity	✓	✓		

Priority power consumption
calculation range

Guarantee electricity for residents, agriculture and utilities

It can be seen from the table 2, except for the uncertain calculation method of Mengdong in northeast China, the calculation scope of priority power generation in the other three provinces all considered to ensure the self-use, clean energy, grid security, heating and other aspects. And Liaoning is the province with the largest coverage. To promote the releasing of the overall electricity generation and consumption plan in the Northeast, efforts should be focused on Jilin and Heilongjiang provinces.

5. Conclusion

According to the time and importance, this paper sorted out the policy of orderly releasing plans on generation and consumption of electricity, made a detailed interpretation of “Notice” and summarized the content of reducing coal-fired plan power, ensuring clean energy and cross-regional priority power generation, and guiding participation in the power market. Studying the releasing situation, the northeast provinces has issued documents related to the electricity market transactions, and has gradually begun to release electricity plans. From the perspective of the implementation plan, to promote the overall electricity releasing of the northeast, and it is necessary to focus on promoting Jilin and Heilongjiang.

In view of the length, this paper only analyses the policy and implementation plan of orderly releasing plans on generation and consumption of electricity, but does not study its impact on the power industry in northeast China. In the future, we can start from the analysis of the impact of orderly releasing electricity, and further study the policy suggestions and other contents of orderly releasing plans in northeast China.

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