



Research of the effect of the monopoly of China natural gas industry in shale gas development and the corresponding countermeasures

Wang Suling and Li Jiange

Beijing Jiaotong University Industrial Security Research Center, Beijing, China

ABSTRACT

Effective development of shale gas is the important measures to solve the natural gas resources in China and realize production to replace, the means and technology of the development of shale gas provide a new challenge to petroleum industry, This is because that the nature of the cause, storage and migration way different about shale gas and conventional gas. Technical problems are the core of restricting the development of shale gas, Draw lessons from the successful experience of development of American, China's petroleum industry system is the key to solve technology, This paper through the analysis of the concentration of the petroleum industry to determine the management structure of China's petroleum industry, come to the conclusion that China's petroleum industry market structure is oligopolistic market structure, and according to the condition of shale gas development in-depth analysis about the present situation of China's petroleum industry restricting the development of shale gas, put forward the countermeasures of creating a competitive market environment, It is the key to speed up the formation of shale gas industry development technology, in order to promote the development of shale gas.

Key words: monopoly; petroleum industry; shale gas; competitive market

INTRODUCTION

As the countries with the most abundant shale gas reserves, Preliminary evaluation of China shale gas resource of about 21.5 trillion to 45 trillion cubic meters, the value is 30 trillion cubic meters, experts revealed that shale gas production can be up to 25% of the total gas production in China by 2030 [1]. But shale gas development in China at an early stage, and development technology system has not yet been formed to adapt to shale gas reservoir characteristics in China, development of shale gas industry will become the future energy strategy for quite some time.

There are many factors influencing the development of shale gas, different national resource reserves and petroleum industry policy is different, the reasons influencing the development of shale gas is differ from one another, for shale gas development in China, the main factors influencing development of shale gas is system factors [2]. At present, China will shale gas development as a development project of petroleum enterprises rather than as a new mineral, the exploitation of unconventional petroleum and gas resources differ from the traditional petroleum exploitation, not make timely reasonable relevant industrial policy according to the development characteristics of unconventional shale gas in China, industrial policy is still based on the conventional petroleum and gas industry management, led to the development of shale gas stagnate on the premise of not lack of manpower and material resources.

2.The analysis of China's petroleum industry concentration ratio

Market concentration is a concept applied to depict Industrial market structure and market power of large company. Generally, the higher concentration is, the greater market power and the Lower the degree of competition are. There are two ways to measure the industry concentration:one is absolute concentration method,another is relative

concentration method. Absolute concentration method mainly reflects the degree of the concentration of the leading company, but the relative one reflects the difference in the enterprise scale degree [3]. This paper's analysis of petroleum industry concentration ratio of China mainly select the index of centralization (CRn), CRn is the proportion of the related number which the former large enterprises of the industry account for in the whole industries or markets.

Comparisons of E-waste Recycling System and Mechanism 505

$$CR_n = \frac{\sum_{i=1}^t X_i}{\sum_{i=1}^w X_i}$$

The X_i means sales amount, output value, the number of the staff, assets of the enterprises whose rank is i , the t means the number of the big enterprise need to be figured out, and the w means the whole number of the enterprise. Development of China's petroleum industry transition from a planned economy to a market economy has gone through four stages. The first stage is the Ministry of Petroleum Industry manages the domestic petroleum exploration and development and production of construction. The second stage is the country's adjustment of the affiliation on the Petroleum upstream and downstream, setting up four large National Company: China National Petroleum Corporation, China Petroleum & Chemical Corporation, China National Offshore Oil Corporation and China National Chemicals Import and Export Corporation [4]. Thus forming the upstream and downstream of the petroleum industry, marketing segmentation, sea land segmentation and the foreign trade division pattern. The third stage is the implementation of the various industries companies department segmentation divide monopoly. The fourth stage is that CNPC and SINOPEC listed, petroleum industry evolved to a broad oil and gas industry, pay more attention to natural gas development, gathering and utilization instead of focusing only on the development of the oil in the past. Although the petroleum industry experienced these changes, the petroleum industry is still operated by several major oil companies [5]. According to the website of the three groups company, NDRC, China Statistical Yearbook and China Statistical Yearbook, we can calculate the petroleum and petrochemical industry market concentration in Figure 1 and Figure 2.

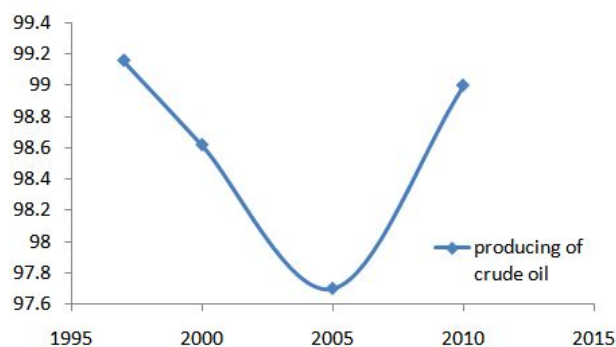


Figure 1 The concentrated changes of producing of crude oil in the petroleum industry

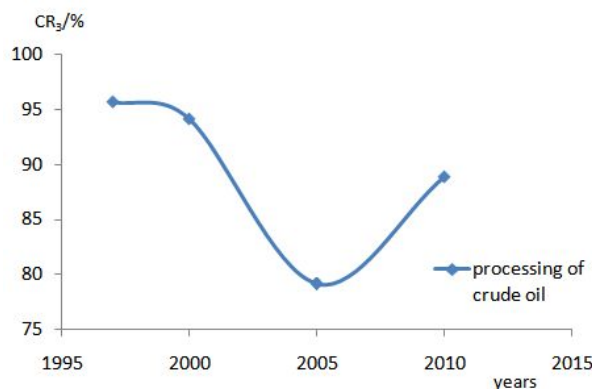


Figure 2 The concentrated changes of processing of crude oil in the petroleum industry

As we can see from the Figure 1 and the Figure 2, macro market concentration of China's petroleum industry has maintained a high state. According to Bain's Market Structure Classification, when the concentration is greater than

75% are heightening oligopoly market structure. Whether the oligopolistic market structure is adapted to the current situation of China's current shale gas development. This is the main issue of this paper. Monopoly has its own advantages. It can improve the productivity. However, excessive competition will cause a waste of resources. Now in order to accelerate and facilitate the development of unconventional shale gas, China's petroleum industry need to comprehensively analysis and judge whether to form an oligopoly market structure, monopolistic competitive market structure or close to perfectly competitive market institutions.

3. The U.S. petroleum industry organization structure analysis

In the world, the United States advocate economic liberalization, the land belongs to private ownership. Therefore, since the United States has dug the first oil Well in 1859, the petroleum industry of the United States is typical of private ownership, decentralized management and over-marketization, has experienced from free competition to monopoly market structure, and then to break the monopoly, thus in the international and domestic competition, gradually formed a network which have minority oil companies dominate and many small and medium-sized oil company's coexistence. But the government has always attached great importance to regulation of the petroleum industry [6]. Especially after the two oil crisis, the U.S. government continue to strengthen and improve macroeconomic regulation and control of the country's petroleum industry, its experience is worth referencing.

Because the land belongs to private property, The government is not directly involved in the petroleum enterprise's business activities in generally, oil supply and demand and the price of oil are regulated by the market, the U.S. government regulation of the petroleum industry mainly aimed at the field of natural monopoly that oil pipeline and gas placement system is in order to guide and control the business activities which not be bound by market factors, In terms of market access, provide non-discriminatory pipeline service access; In terms of price regulation, For examination and approval of oil and gas pipelines and price of the gas allotment system, But the oil and gas products price is not subject to regulation; In the same business to all shippers alike, without discrimination pricing and access. Open competition environment and sound market regulation provides a good system guarantee for the unconventional gas development in the United States. The unconventional gas development barriers to entry is low, Form a pattern of market competition which large, medium and small oil companies existence and development at the same time [7]. A large number of small and medium-sized enterprise investment unconventional resources and obtained the technology breakthrough, which greatly promoted the unconventional natural gas development in the United States. For example, Devon Energy Corporation is a small and medium-sized energy enterprise, take the lead in using the technology of horizontal well fracturing stimulation in the Barnett shale gas development, pushed the U.S. shale gas development to a new development direction.

In the last 30 years, the shale gas development most rapidly, and profound changes have happened in the US natural gas market structure, because of regulatory reform goal is to promotes the competition of natural gas industry and improve the efficiency, realize the highly competitive market in the United States, thousands of producers and independent traders, pipeline companies, local distribution companies and users for natural gas business competition activities in the center of the wellhead primary market, at present, the region has become the most fiercest competitive on the natural gas market in the world. America's natural gas market follows the change rule of market survival of the fittest, at present, The United States is a structural system what is highly fragmented, private and marketization. As the oil giant, Exxon annual sales of billions of dollars, and the wares business revenue up to tens of billions of dollars in multinational oil companies in Mobile, Texaco, Amoco, and dozens of medium-sized oil companies and thousands of small oil companies.

4. The analysis of restriction of the monopoly petroleum industry to the development of unconventional shale gas

The characters of unconventional shale gas development is difficult, risky, high investment and more uncertain factors, oil enterprise develop shale gas only with the support of abundant capital and advanced technology, therefore, for the monopoly petroleum industry in China, the development of shale gas has incomparable advantage over the United States, such as funding support, policy support, etc., it is an advantage, but it will turn into a disadvantage in the development of shale gas without better use. It can be seen from the current forms of the development of the shale gas, China have enough enthusiasm for the development of shale gas, but to put it into action and efficiency is unsatisfactory, mainly exist the following problems:

4.1. The absence of moderate competition market environment

The central government monopoly of China's petroleum industry in the traditional government regulation system. China's three major oil company operate petroleum industry. In the field of upstream, the "Regional planning and governance" between the three national oil company and the franchise for foreign cooperation make the industry's access has certain obstacles; The management style of mining license has not yet been introduced more market competition system. The system of oil mining right in China's is as follows, first of all, by state-owned enterprises

apply to the ministry of land and resources for an exploration and mining licenses, and order to obtain a license by applying, unless the blocks are reserved for other uses. Then, State-owned enterprises decided whether to explore themselves, or cooperate with international oil companies with the product sharing contract. International oil companies involved in the exploration and development of oil and gas in China only with the way of product sharing contract. Currently, only 5% of onshore in the product sharing contract way, and most of the offshore blocks has been adopted into the product sharing contract, and licenses easy extension of companies, low cost of holding the exploration rights of large blocks. As a result, oil enterprises don't need to buy the mining right in shale gas development, the early stage of the development of low cost, low risk, it also easy to cause the phenomenon of "circle and not" in the oil enterprises, even if the development, the lack of urgency of development effect. And foreign oil companies have to buy land and obtain the rights to the examination and approval, therefore, foreign oil company cherish and attaches great importance to the qualification of mining, and they attached great importance to the development effect, and more cautious on technology, it play an important role in prompting the progress of the shale gas development.

4.2. The absence of government regulations to suitable the development of shale gas industry

China's government regulations on petroleum industry including resources protection, price and import and export control, industry access, investment examination and approval and environment, safety, etc. Government departments involved in petroleum industry including the State Planning Commission, state economic and trade commission, the ministry of land and resources, ministry of foreign trade, ministry of finance, state environmental protection administration, the state administration of taxation, state sea oceanic administration four, some countermeasures for constructing the mechanism of competition in the market research, etc., and China National Petroleum Corporation and Sinopec Group to undertake the responsibility which shouldn't be borne by the enterprises. More than ten of the central government departments to manage the petroleum industry, its function dispersed, repetition, cross, conflicting policies from different departments, It lacks a specialized regulatory authority whose function relatively concentrated; At the same time, use the practice of the planned economy period as the regulations, and regard the administrative examination and approval and the administrative regulations as the basic content and means.

China's petroleum regulation is are "mineral resources law" and form a complete set of regulations, related to the management system of oil and gas resources, oil and gas mining rights and transfer, international cooperation, the pipeline safety, taxes, land, environmental protection, quality, safety, and other fields, and give priority to with petroleum upstream regulations system has begun to take shape. But the lack of a specialized oil and natural gas law, It's hard to form a legal framework focus on oil and natural gas and cover the field of industry, government regulations in petroleum industry lack sufficient legal basis. At the beginning of the development of shale gas, caused by the lack of experience, so it easy for oil companies to spot the flaw of regulations, and over-developed, even damage the environmental, at present, the lack of the law of environment protection for shale gas in China, the legislative gaps become the hidden danger of environmental protection. Therefore, establishing and perfecting the legal system of the shale gas industry, oil companies for shale gas development activities in the legal framework, It has great significance for the healthy and sustained development of shale gas.

5. The research of building a competitive environment of market of unconventional shale gas development

To compare with abroad, China is different in petroleum industry structure and policy, but the regularity of experience of some countries in the process of reform is beneficial for the reform of the petroleum industry in China. We should base on the actual situation in China, absorb and draw lessons from foreign successful experience, and put forward countermeasures and suggestions of the reform of shale gas industry to adapt to the Chinese context.

5.1. Ease the access conditions of upstream, activation of market with competitive

Competition stimulate production efficiency (internal efficiencies) and allocation efficiency reflects its role in promoting economic efficiency. In a competitive environment, enterprise survival and development only with high efficiency, companies strive to find ways to reduce the production cost in the rule of survival of the fittest, and improve the production efficiency. At the same time, competition will produce a mechanism of information discovery and break the monopoly on information in the realities of incomplete information, and forcing the enterprise to price the product according to cost pricing, including normal profit, and promoting allocation efficiency of the society. Regulators of government can obtain more information of regulations from competition, relieve the problem on both sides of regulations of "information asymmetry", which is helpful to improve the efficiency of government regulation.

In the field of upstream of petroleum, first of all to form orderly competition within the industry, qualified Chinese companies should be allowed and encourage to compete in the upstream area without regional restriction, and break

the sea and land boundaries; To review and modify the relevant provisions of the issue and extended of exploration licensing, And block should be achieved by the way of bidding, in addition to introduce more and more orderly competition between company in China, it should implement oil mining permit policy, carry out exploration license terms strictly, and increase the cost of a permit, and then promote the reasonable transfer of blocks. Second, we should make full use of foreign capital, technology and expertise. Decades of international experience shows that use a wide range of exploration and engineering technology is the best way to find and develop oil and gas, the international oil company is one of the important media to spread these ideas and engineering technology. After the international oil companies into the field of the dominance of state-owned enterprises, they will change the speed and efficiency of oil and gas development by activities. At the same time, the international oil companies promote the existing companies greatly with competition and "demonstration effect". Third, increase the blocks in exploration and development in the form of the contract whenever possible, Accelerate the transfer of blocks who are under-utilized by the state-owned enterprises in the form of competition. Finally, in order to encourage the investment of the international oil companies, conditions of the fiscal and taxation with competitive should be formulated, and review and modify regularly, in order to make sure that all the participants remain competitive on the basis of conditions of the fiscal and taxation, and appropriate for all enterprises.

5.2. Establish perfect policy system for the development of shale gas

The success of the shale gas development in the United States, It has benefited greatly from different industrial policy support in different stages of the development of the shale gas. For the new minerals of the shale gas, makes the shale gas industry face such restrictions and development-hampering due to the lack of pertinence and the lack of policy support. The particularity of the shale gas, such as the development of shale gas is risky and costly and long cost recovery, resulted in the need for the moderate support and subsidies comes from the government regulations in the process of development of shale gas, and special regulations should be set to promote its development, adopted a policy of tax reduction or exemption include the shale gas resource tax, value-added tax, income tax, etc.; For the mining right person or the applicant who obtained exploration right and mining right of shale gas may apply to reduce the fee of exploration right and mining right according to the relevant provisions; The self-used equipment which cannot be produced in China and encourage exploration and development of shale gas shall be exempted from tariffs according to the relevant provisions, etc. To encourage enterprises to investment the equipment and lower the cost as the implementation of these policies.

With the implement of measures, such as breaking monopoly, expanding opening, encourage competition, it will greatly increase the economic efficiency of the petroleum industry.

Acknowledgments

Project supported jointly by the National Natural Science Foundation of China No.51374047, No.51004023 and the oil fund of the China No.2013D-5006-0210

REFERENCES

- [1] Lei Qun, Wan Yujin, and Li Xizhe, etc., 2010, *Natural Gas Industry*, 30(1), 45-48.
- [2] Liu Yan, 2008, "The development and characteristics of industrial technology policy in the United States." *Forum on Science and Technology in China*, 03, 126-129.
- [3] Wang Yajuan, Ma Xu, Zhang Kuangsheng, etc., *Natural Gas Industry*, 2013, 33(03): 113-118.
- [4] Zhao Hongtu, 2011, *Contemporary International Relations*, 12: 44-49.
- [5] Li Jizhen, and Wu Guisheng, 2001, *Science Research Management*, 04, 1-8.
- [6] Liu Cunzhong, 2013, *Oil Forum*, 03, 32-67.
- [7] Pan Jiping, Wang Nan, and Han Zhiqiang, etc., 2011, *International Petroleum Economics*, 06, 19-110.