

Research on the Incentive policy of Shale Gas in China and America

Liaoyi Ning^{1, a}, Jinyuan Liu^{1, b} and Xuefeng Wu^{1, c}

¹State Grid Liaoning electric power co., LTD., technical and economic research institute, Shenyang, 110015, China.

^aningliaoyi @163.com, ^b54624579@qq.com, ^c13700007415@126.com

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Abstract. The shale gas is the important supplement for the conventional energy, and increases the supply of clean energy. Therefore, a lot of countries have begun to pay attention to the development and utilization of shale gas in recent years, especially America and China. The policy plays an important role in the early stage of the shale gas development, especially the incentive policies. Based on this, the paper summarized and analyzed the shale gas incentive policies of China and American, and then provided some policy recommendation for the development of China's shale gas.

Introduction

The success of shale gas revolution in America attracted the attention of many countries, especially China. The exploitation of shale gas is a strategic option for China to achieve the security and diversify of energy supply, and it is necessary to exploit shale gas in the "12th Five-Year" energy Planning. In order to realize the industrial development of shale gas, Chinese government promulgated a series of policies.

The development of shale gas also attracted the scholars' attention. Mehmet Melikoglu analyzed the role of shale gas in the global energy market, and held that shale gas development was a must for global energy market [1]. Hongcai Fei et al. pointed out that China's shale gas development should be in light of the development experience of America's shale gas [2]. Based on the situation of shale gas exploration, Shizhen Li and Qun Zhao provided correlative suggestions for the future development of shale gas [3, 4]. Shangbin Chen and Yunpeng Dong explored the trend and demands of China's shale gas development [5, 6]. About the policies, Nan Wang et al. analyzed the shale gas development in America and Canada, and suggested that China draw experience from them [7]. Jing Ma et al. researched the technology and relevant policies of shale gas on America etc. to provide reference for China's shale gas development [8]. Based on the development experience of America's shale gas and China's coalbed methane, Yongyuan Liao provided some policy suggestion for China's shale gas development [9]. Desheng Hu discussed the opportunity, challenges and policy choices of China on developing shale gas [10]. Based on the existing research, the paper mainly analyzed incentive policies of shale gas in China and America, and provided some recommendation.

Incentive policy

Fiscal policy. America began to encourage the unconventional resources development in 1970s, and issued a series of the policies for shale gas development (See Table 1). By now, the fiscal policy in America has been detailed, and the tax incentives of conventional gas have been applied to unconventional gas fields. Besides, America has also issued some corresponding tax breaks. In China, the subsidies framework of shale gas has been confirmed (See Table 2). China issued "The Notice about Introducing the Shale Gas Development and Utilization Subsidies" in 2012, increasing the financial supports for shale gas exploration and development and giving direct subsidies to the enterprises. On Oct. 2013, National Energy Administration issued "The Shale Gas Industrial Policy" and reiterated the terms of "the Subsidy Policy to Develop Shale Gas".

The fiscal policies in China and America are similar, especially the framework, but there are some difference. In America, the government is more inclined to give fiscal subsidies to shale gas

enterprises. Besides, the subsidies take the local characteristics into account to make up for the deficiency of the central government’s subsidies. While in China, the government tends to give tax breaks to shale gas enterprises, and the scope of tax breaks is more widely. Because the fiscal policies are made only for shale gas, the policies are more targeted and well combined with the characteristics of shale gas. In addition to the subsidies from central government, local governments can also give subsidies, but the local subsidy standards are not introduced.

Table 1 The major fiscal policies of America

Year	Policies or measures	Contents
1978	Natural Gas Policy Act of 1978	Ensure the unconventional gas subsidies by Legislating.
1980	Windfall Profits Tax Act, Section 29 tax credit for production of Non-conventional fuels	The unconventional gas drilled during 1980 and 1992 can enjoy a subsidy of \$ 3/barrel.
1992	Amendment of unconventional energy production tax cuts and subsidies policies, NO.29	Set up energy production tax allowance. Featuring tax breaks for the shale gas drilled between 1979 and 1999 and produced before 2003.
1992	Energy Policy Act of 1992	Extending the scope of subsidies.
1997	Taxpayer Relief Act of 1997	The tax subsidies are remained.
2005	Energy Policy Act of 2005,section 1345	Unconventional reservoir wells that put into operation in 2006 can obtain \$3/barrel of oil until 2010.

Table 2 The major fiscal policies of China

Acts and Policies	Contents
The Subsidy Policy to Develop Shale Gas	Subsidy standard of central government is 0.4 Yuan/m ³ in 2012-2015 and it is adjustable. Subsidies of local government are favoured.
The Shale Gas Industrial Policy, Chapter 7.NO.30	Shale gas development is put into national strategic emerging industries. Increase financial support.
The Shale Gas Industrial Policy, Chapter 7.NO.31	Direct subsidies are measured by the production. Enterprises should be audited. Government would withdraw the subsidies if there is any fraudulent behavior.
The Shale Gas Industrial Policy, Chapter 7.NO.32	Encourage local government to give subsidies to shale gas production enterprises according to the situation.
The Shale Gas Industrial Policy, Chapter 7.NO.33	Cut mineral resources compensation fees and mineral right fees. Plan to introduce tax incentives.
The Shale Gas Industrial Policy, Chapter 7.NO.34	Imported equipment or technologies of shale gas exploration and development are exempted from customs duties.

R&D policy. Since 1980s, America formulated many policies to promote shale gas R&D, and invested more than 60 billion dollars to explore unconventional gas. Lots of advanced technologies were applied in practice, increasing the production and lessening the mining cost. The R&D policies in America have been successful, and it is continued to increase the support of R&D. In 2004, America issued “Energy Act 2004” deciding to invest \$45 million/year for unconventional gas next 10 years. The experience of America’s shale gas development provides reference for China. China should intensify policy support for the shale gas R&D. As shown in Table 4, many R&D policies have been issued in recent years.

Table 4 Main R&D policies of China

Policies	Contents
“China’s Energy Policy (2012)” Shale Gas Development Plan (2011-2015) The Shale Gas Industrial Policy, Chapter 4.	Strengthen basic and cutting-edge research and enhance the ability of technology innovation. Promote innovation of technology and equipment and bulled the talent team. R&D of shale gas key technology was listed as a key project in the large oil and gas fields. Encourage domestic enterprises to research the key technology jointly with foreign research institutions, and Learn advanced experience and core technology. Accelerate the self-independence of shale gas key technology and equipment. Intensify the construction of “National energy-shale gas research (experiment) centre” and other R&D platforms.

Both America and China made a series of policies to support the R&D of shale gas, but invested capital in R&D policies are different. China's policies tend to attract foreign advanced technology, and realize the nationalization and self-reliance of technology combined. America's policies are focused on independent R&D. In China, the funding profile of shale gas is not clear and specific, and the incentive effect is not obvious, but it is failed to attract various talents into the field. The planning of China's R&D policies may be reasonable, but the executive strength and implementation effect remains to be improved.

Market Policy. In America, the government has been trying to establish a free market for shale gas development. In addition to tax subsidies and technology research funds, the government enacted many legislations and policies to create a favorable competitive environment since 1978. Besides, the government also attached great importance to international cooperation in order to establish long-term energy and technology partnership (See Table 5). The market policies have good effects on the forming of the shale gas market, and many small and medium businesses have entered the field and played important roles.

Table 5 Major market policies of America

Year	Policies or measures	Contents
1978	Natural Gas Policy Act	Wellhead price deregulation of shale gas. Attract some small and medium-sized oil firms to join in the market
1985	Order No. 436 (by FERC)	Terminate bundled pricing and encourage gas transmission without discrimination, end pipeline companies' monopoly
1989	Natural Gas Wellhead Price Lifting Scheme	Thoroughly deregulation. Wellhead price of shale gas is determined by market
1992	Order No.636 (by FERC)	Pipeline companies are required to provide services based on the separation of transportation and sales
2000	Order No.637 (by FERC)	Improve the efficiency of oil and gas transportation market to protect the interests of markets players
2007	Energy Independence and Security Act	Establish international energy projects item to promote the cooperation with other countries
2009	Promoting international cooperation in clean energy	Establish long-term cooperation relations to help other countries develop shale gas.
2011	"Bureau of Energy Resources"	Strengthen international cooperation in the energy field.

The shale gas development needs huge initial investment, and China should increase financing channels to make the market more competitive. Meantime, the government should strengthen international exchanges and cooperation to quicken the forming of effective system for investment financing. As shown in Table 6, China has listed shale gas as independent mineral to let shale gas free from the oil and gas franchise, and adopted the shale gas exploration tender system to open the market. The market policies place more emphasis on attracting international businessmen and capitals into the development of shale gas.

Table 6 Major market policies of China

Year	Policies or measures	Contents
2012	Intention Survey for Shale Gas Exploration Right Bidding	Publish Bidding Qualifications. There are no other requirements except that the registered capital should be more than 300 million Yuan. Encourage other investors to enter the field.
2012	China's Energy Policy (2012)	Encourage private investment and cooperation with foreign firms. Establish joint research collaboration intentions with Chevron, BP etc. Companies can cooperate with foreign firms and introduce technology after getting the pre-review and approval of government. Introduce multiple investors. Standardize industry access and regulation. Encourage local enterprises to join in shale gas market by joint ventures, cooperation etc. Gradually form market structure in which shale gas mining companies, sales companies and urban gas businesses coexist.
2013	The Shale Gas Industrial Policy	Ex-work price is determined by the market. Formulate fair trade rules, encourage cooperation between the suppliers, transporters and demanders.

Both the market policies of China and America are inclined to deregulation and international cooperation, and break the monopoly and introduce competition. In order to break the monopoly of the mining license, Chinese government encourages various investors to bid for the right of exploration. However, China's shale gas market is dominated by just a few state-owned enterprises at present. Thus, there requires further implementation of the market policies in China.

Conclusions

America issued a series of incentive policies, including giving tax breaks and subsidies, setting up special funds, creating diversified investment environment and sound market, and strengthening international communication. The policies greatly reduced the cost, and promote the development of shale gas industry in America. As for China, the government has also issued many policies to accelerate the development of shale gas industry. The relevant policies have begun to take shape in China, mainly including tax breaks and direct financial subsidies, increasing research funding, opening the market and strengthening international exchanges and cooperation. However, the local subsidy standards in China have not been introduced, the executive strength and implementation effect of incentive policies remains to be improved. China needs to make more efforts on policy supports. Firstly, China should be adjusted to local conditions and cannot blindly copy America's policy experience. Secondly, the local subsidies standards should be introduced soon. Thirdly, the cooperation and communication among government, enterprises and institutes should be strengthened.

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