



Building a new system of natural gas international cooperation for Northeast Asia

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Economy

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1 Northeast Asia natural gas supply and demand situation and development trend

1.1 Northeast Asia natural gas consumption is nearly half of that of the Asia-Pacific region

2000-2010 World natural gas consumption was growing faster than oil consumption growth, maintaining growth trends. According to CEDIGAZ (France information center of natural gas and hydrocarbons) 2011 statistics 2010 World natural gas consumption at reversing the negative growth in 2009 by the world financial crisis, and reached 3.2159 trillion cubic meters than 2009 growth cubic meters, an increase of 7.5%.

World's largest regional natural gas consumption is in Europe-Central Asia. In 2010, 1.197 trillion cubic meters of natural gas consumption in Europe-Central Asia, 37% per cent of total world consumption. 830.9 billion cubic meters of natural gas consumption in North America, 26% per cent of total world consumption. Fast-growing natural gas consumption in the Asia-Pacific region, 2010 569.6 billion cubic meters of natural gas consumption, 18% per cent of total world consumption, particularly China and India both fast-developing countries, is the power consumption growth in the main.

Since 2006, three countries of the North-East Asia (China, Japan, and Korea) overall natural gas consumption maintained an upward trend due to the 2008 financial crisis, particularly in 2009, Japan, and Korea gas natural gas consumption falling, China's natural gas consumption is not affected. In 2010, natural gas consumption in Northeast rebounded, the three countries totaled 257.1 billion cubic meters of natural gas consumption (table 1), 8% per cent of total world natural gas consumption, 44% per cent of total natural gas consumption in Asia Pacific, Japan natural gas consumption at 97.1 billion cubic meters, Korea reach 45 billion cubic meters, China is in the Northeast's largest natural gas consumer, consumption up to 108.9 billion cubic meters.



Table 1 natural gas consumption in Northeast Asia billion cubic meters

cuntries	1990	2006	2007	2008	2009	2010
Japan	58.11	97.24	106.13	103.84	103.36	105.28
Korea	3.04	32.20	34.85	35.83	34.41	42.89
China	15.33	55.58	70.10	80.69	89.21	108.93
totle	76.48	185.02	211.09	220.37	226.98	257.10
Sources : IEA. Natural Gas Information,2011						

1.2 China is the only natural gas production county in Northeast Asia

From 1970 to 2010, the world's natural gas production is also affected by some but always maintained a growth momentum. According to the oil and gas journal according to the pull of a 2010 global economic recovery, after the collapse of the natural gas production in 2009, 6%, strong rebound in 2010, again exceeded 3 trillion cubic meters, to 3.18 trillion cubic meters, surpassing at 2008 levels, a record high. Compared with 2009 Rose close to 11%.

In 2010, Europe and the former Soviet Union's natural gas production reached 1.0431 trillion cubic meters per cent of world output of 32.6%, ranked in world natural gas producing area. Russia is the largest natural gas producer in the region, its output accounted for 56.5% of the region. North America is still the second-largest natural gas producing regions, natural gas production is 26% per cent global production. United States natural gas production account for world of 19.3%, after its production Super Russia in 2009, continue to maintain its status as the world's largest natural gas producer. Natural gas production growth accelerated in the Middle East, yield 14.4% of total global production of natural gas, of which Qatar its gas output continued to grow steadily rising over the past decade, is the main force of sustained output growth. Natural gas production growth in Asia Pacific, second only to the Middle East.

China is the only natural gas producing countries in Northeast Asia, 2010 production 96.78 billion cubic meters of natural gas, per cent from 2009. Since the beginning of 21st century, China's natural gas reserves and rapid growth of long distance gas transmission trunk line put into operation, provides a resource base for rapid on the middle class, 30.3 billion cubic meters of natural gas production from 2001 up to 2010 of the cubic metre, an average of 13.8% per cent, from natural gas yield power in the world for 18-bit, up from 7.

1.3 Northeast Asia became the world's second largest natural gas import region after Europe



According to CEDIGAZ statistics, in the aftermath of the 6% after the fall of the previous year, as the global economic recovery, international gas trade 2010 strong rebounding and a record high of annual trading volume growth 11.2%, break the trillion cubic meters mark, reaching 1.0152 trillion cubic meters, creates the biggest increase in 10 years. International trade of natural gas per cent share of global natural gas production has increased from 30.5% per cent to reach pre-recession levels. Pipeline gas 718.9 billion cubic meters, 296.3 billion cubic meters of LNG trade volumes, and 71%, respectively. The world's top five gas-importing countries followed by United States, and Japan, and Germany, and Italy and the United Kingdom; The top five exporting countries followed by Russia, and Norway, and Qatar, and Canada, and Algeria.

2006-2010 LNG trade volumes with an average annual growth rate over gas trade growth. In 2010, with traditional LNG importing countries (Japan, and Korea) and the emerging LNG importers (China) in the northeast of regasification capacity owned by 51% per cent of total global capacity, is the world's strongest received LNG regasification capacity.

Japan, and Korea gas almost entirely dependent on imported LNG, 2010 imports LNG137.92 billion cubic meters, import resources, mainly from Australia, Indonesia, Malaysia, and Qatar and Russia.

China pipeline natural gas imports from Turkmenistan, 2010 import 3.61 billion cubic meters. LNG imports come mainly from Australia, Indonesia, Malaysia and Qatar, 2010 imports LNG130 billion cubic meters.

In 2010, gas imports totaled 30.4 billion cubic meters of the three countries in Northeast Asia, became the 2nd largest after the European importer of natural gas.

1.4 Northeast Asia will become the world's major natural gas consumption and import region on 2030

Although at present the supply of natural gas depending on conventional natural gas resources, however, the development of unconventional natural gas has the potential to change the supply of natural gas environment. United States of deep basin gas, coalbed methane and shale gas development models that can be said to be the development of unconventional gas in the world. Unconventional natural gas resources will be a future gas supplies are important parameters in the environment.

Over time, North American natural gas is basically a self-contained, forecast natural gas demand in North America 2030 around 900 billion cubic meters. European imports will increase significantly, 2030 OECD Europe imports are expected to reach around 450 billion cubic meters, imports diversification of channels. Asia-Pacific natural gas imports will increase significantly in 2030, imports are expected to reach 490 billion cubic meters, or one of the



world's biggest natural gas imports, gas imports mainly from the Middle East, Africa and Central Asia-Russia. Natural gas market is in a phase of rapid development in the Middle East, mainly in the LNG exported to Asia-Pacific region and Europe, 210 billion cubic meters of natural gas is expected in 2030 net exports. Natural gas market is in a phase of rapid development in Africa, but smaller base, mainly in the LNG and gas export to Europe and the Asia-Pacific, in 2030 will export around 200 billion cubic meters of natural gas, mainly exported to Europe and the Asia-Pacific. Natural gas market is in a phase of rapid development in Central and South America, but smaller base, basic self-sufficiency.

Chinese authorities forecast in 2015, 230 billion cubic meters of natural gas consumption in 2020, demand for 350 billion cubic in 2030, demand for 500 billion cubic meters, by then or will surpass Europe as the us the world's second largest consumer of natural gas market abroad. By that time General domestic natural gas production can reach 250 billion cubic meters, imported 250 billion cubic meters of gas demand, 50% demand for imports. If 2030 China's 500 billion cubic meters of natural gas consumption, natural gas in China's energy consumption about 8%, still far below world levels.

CEDIGAS predicted in 2009 Japan 2020 LNG demand will reach 110 billion cubic meters, China's demand will reach 24 billion cubic meters. IEEJ (Japan Institute of energy economics) prediction of Korea 2020 LNG demand will reach 53 billion cubic meters. Projected to 2015 years ago in Northeast Asia market supply and demand will not be too tight. In addition, taking into account the due to the downturn in Europe and North America, now part of European and American market-oriented LNG will also flow into the market in Northeast Asia.

Northeast Asia LNG supply is mainly from the Pacific, the Middle East and Africa, piped gas supply mainly from Central Asia and Russia.

In order to achieve security of supply of natural gas, and Japan in addition to strengthening energy cooperation with the Asian natural gas resources, open up markets in Africa, also had to look to Russia and Central Asia, such as natural gas-rich region, energy cooperative relationship with countries in the region. In addition to strengthening energy cooperation with the resource State, Japan as well as working more closely with the Asian energy consumers (such as Korea and China) and energy cooperation.

Korea aims to achieve the State of import diversification and import forms. Due to excessive dependence on international markets on the resource, Korea's external energy policy is the core of the energy security of supply, Korea has been strengthened with Russia and Central Asian countries and cooperation.

2 The basic reasons of constructing Northeast Asian natural gas international cooperation system



2.1 Reducing off natural gas premium level in Northeast Asia

At present, most imported LNG contract price in Northeast Asia LNG are hooked by JCC, using the "S" curve price formula, "S" curve can effectively reduce the risk of both sides of supply and demand. Japan is the Asia-Pacific region's largest LNG imports country, its LNG CIF is often used as a measure of Asian area LNG transaction price level. Currently most LNG receives prices in Northeast Asia are in excess of US \$9 per million British thermal units. The United States of America is committed to abolish long-term natural gas trade contracts in the world, carry out spot transactions, to 2015, Japan has nearly 93% projects face cancellation "S" curve risk, need to be renegotiated, and currently some new contracts started with floating prices, no ceiling restriction.

The North American natural gas price is linked to oil prices, but basically by the market supply and demand, gas - gas competition is one of the main determining factors for natural gas pricing. At present, Henry Hub has become the United States of America natural gas market center, Henry Hub price is the North American datum price. In the LNG import prices, natural gas price of futures market in North American is LNG import price standard. The United States imports price of the existing LNG terminal station is hooked by Henry Hub natural gas trade price, and plus the proper base price difference. Because LNG in North America imported gas in smaller proportion, so basically is a price taker. Due to the United States of America unconventional gas shocks, the United States LNG import prices significantly lower than other parts of the world, at present basically maintained at \$3.5 per million British thermal units. Compared with America, Northeast Asia LNG receives price premium level in 6-8 per million British thermal units.

Europe mainly uses the "double-track" natural gas pricing mechanism, namely long-term agreement price and the market price of the coexistence of mechanism. At present, more than 70% of European natural gas using a long-term agreement contract pricing, prices are generally linked to the international oil prices. Use market pricing in Northwest Europe market, including the UK, Holland and Belgium and other countries. Natural gas of the area mainly comes from The North Sea. on the basis of NTS and BBL pipeline in Northwestern Europe, formed the British NBP, Belgium Zeebrugge, and Holland TTF such as trading centers. In the recent revision of the LNG agreement, the European LNG import prices have not linked to oil prices. Northeast Asia LNG import price remain US \$2-\$3 per million British thermal units premium level compared with Europe on long-term. In 2010, due to the recovery of the European economy, LNG demand growth, import price difference narrows somewhat, but still have US \$1-\$2 per million British thermal units premium level.

Main reasons of Northeast Asia natural gas premium, one is the LNG demand, and away from the LNG origin; two is emerging in recent years Chinese LNG import demand growth is rapider ; three is Europe and the United States in spot and futures market, and there is



pipeline natural gas as the spot transaction supplement, based on the market equilibrium market price formation, but the Northeast Asian area without spot or trading platform, no pipeline natural gas as a supplement, the spot market shortage, price based on negotiation; four is due to the lack of common interest protection mechanism, Northeast Asia natural gas consumption country in the international natural gas pricing system in a weak position, the lack of price words power.

Accordingly, building its own natural gas trading platform in Northeast Asia, construction of natural gas cooperation mechanism, participate in the natural gas price negotiations, reduce the premium level, are the fundamental interests of the countries in Northeast Asia.

2.2 Protecting natural gas supply safety in Northeast Asia

China, Japan, South Korea are all natural gas large-consumption counties, and Japan, South Korea 's consumption is Completely dependent on imported natural gas. Gas imports of the three countries are heavily dependent on continuing instability in the Middle East and the United States control of the Asia-Pacific region, threats to the security of gas supply. United States has been able to control the balance between supply and demand of international gas, only Exxon Mobil company would control the world one-fifth say's LNG production, in Qatar, Nigeria, Australia, and Indonesia, 4 most resource potential of the country has major LNG production line. Therefore, the international LNG supply support key control in the United States hands.

Russia is no longer able to dominate the world situation of natural gas. But if Russia adhere to the high gas price policies, North-East Asia region's natural gas supply will be tested.

At present, around in Northeast Russia between the fights on the oil and gas in China and Japan are particularly intense. As energy a major importer of living side by side, the two countries in the energy sector has a similar weakness, this is the main reason for the competition, should also be the basis for cooperation. At present, whether Japan or China or Korea are not out of the oil diplomacy, "all alone" model, is the lack of an effective platform for developing natural gas cooperation. Ensure regional energy security is an important factor in promoting economic development and, therefore, Northeast Asian countries urgently need to open up a new natural gas import channels, Russia is important and most promising to become a preferred partner.

2.3 Promote low carbon development in Northeast Asia region

Environmental problems in Northeast Asia region countries need to face big problems. Northeast Asia energy-related environmental problems is more prominent in other areas, if not, will not only affect the economic development of Northeast Asian countries themselves,



and environmental pressures facing the international community of States will gradually increase.

Speeding up development of low carbon technology important means to become a developed country seize the commanding point in the future. Many countries will develop a low carbon economy in the national strategic perspective and introduced the climate change Bill. Northeast Asian countries have also been put forward to 2020 adaptive numerical targets in the green economy. China 40-45% (compared with 2005), Japan 25% (compared to 1990), Russia 20-25% (compared with 2005), the Korea 4% (compared to 1990).

Japan proposed to build a new national policy for low-carbon society, by promoting itself has the advantage of low-carbon regional cooperation in the implementation of economic restructuring, has become the Japan participation in an initiative for regional cooperation in Northeast Asia.

Korea gets through "green growth strategy", through the development of green industry, green growth strategy for building a new engine of growth. Korea by achieving green growth strategy for Northeast Asia regional cooperation holds great expectations.

China Respond to new trends of development of low-carbon economy in. China Introduced the national program to combat climate change, such as policy documents, planning training characterized by low carbon new economic growth points, actively readjusting the industrial organization and interaction of revitalization in Northeast China and Northeast Asia regional cooperation to strengthen regional cooperation in the injection of low carbon content, leading low carbon development of regional cooperation.

Natural gas is important for low carbon development reality choice. Whether or not China, Japan also is Korea, national strategy of natural gas should be placed in the context of economic globalization to again and again, the only guarantee the sustained and stable natural gas supply, common implementation of environmental-friendly policy, economies are expected to have sustainable development. Established Northeast Asia regional natural gas cooperation mechanism and to Russia for supply country of natural gas network, in the, and day, and Han not only can obtained cheap, and stability and security of natural gas supply, elimination local resources shortage to States economic sustainable development by brings of threat, and also can integration entire Northeast Asia of resources, formed powerful of consultations force and purchasing power, greatly improve on natural gas price of influence, make up for the this a area natural gas market of vulnerable sexual, common ensure natural gas supply security, Through natural gas cooperation promoting the partnership between the three countries will be the future important task facing the region.

3. constructing the system of international cooperation in Northeast Asia natural gas infrastructure with obstacles

3.1 the basis for international cooperation has

3.1.1 common economic development needs

China, Korea, North Korea, and Japan is the world's top 15 economies, but also to the global political and economic four countries with important influence. Due to the rich resources of the region, abundant labor, abundant funds, advanced technologies, as well as in economic growth, complementary, cooperation in space, market potential, has a prominent role on the global economy, the Northeast Asian region is also unique in the world and North American free trade area and comparable to the EU economy. Remarkable potential for future development. The next 10-20 years, the region's total GDP is expected to reach \$ 20 trillion, which would exceed the United States and the European Union to become the world's largest economy. From the perspective of the growth potential, the region is expected to maintain economic growth for many years 5% more.

Economic development in Northeast Asia is inseparable from the consumption of energy, natural gas is the vital energy of low-carbon, green growth in the region, is the common foundation for development of Northeast Asian countries. By 2030, China, Korea, Japan's natural gas consumption needs of the three countries will reach more than 650 billion cubic meters, as the world's leading natural gas market area.

3.1.2 common resource security

In China, Japan and South Korea is the main importer of natural gas in Northeast. LNG's main source of imports is the Middle East, Qatar and the Asia-Pacific region of Australia, and Indonesia, and Malaysia, which is both an objective of Northeast Asian countries resource contention, can also be a common set of resource protection. Meanwhile, the three countries also actively seek pipeline natural gas cooperation in Central Asia, the most notable is Russia's natural gas, the three countries were eager to neighboring Russia strengthening energy cooperation, and are also in the Russian Far East's leading trade partners, three countries Russia energy common needs to establish broader energy cooperation relations in the region provides prerequisites. And Russia in "Russia's energy strategy before 2020", stressed that "in the Asia-Pacific region, Russia's main energy partners are China, Korea, and Japan, and India", and "to develop the far East and Siberia as a condition for Russia to strengthen its relations with these countries." Russia considered China, Japan, South Korea as the region's main energy partners , the three countries want Russia to be stability in the region's oil and gas supply source, forming a system of regional energy cooperation in Northeast Asia has laid a solid foundation for cooperation.

3.1.3 aspirations of common energy cooperation



Despite the multilateral energy cooperation mechanism in Northeast Asia have not yet established, but in different ways in China, Japan and South Korea for the establishment of such a cooperation mechanism for the initial attempt. For example, within the framework of APEC Energy Ministers meeting mechanism had been established, and on the Sixth Asia-Pacific Energy Ministers meeting held on June 10, 2004, Member States are called on APEC to take flexible measures, strengthen energy security cooperation, and strive to achieve long-term energy security objectives. Japan also regional multilateral energy cooperation was presented with the policy research initiative, and as a Northeast Asia countries first to advance this initiative, has made considerable efforts in terms of financial or technical support. China held on April 24, 2004 the theme "energy: challenges and cooperation" of the Boao Forum for Asia on the round table, enhancing regional energy cooperation was also emphasized on the importance of sustained and rapid economic development in Asia. On October 10, 2009, the second in China, Japan, and ROK Leaders Conference was held in Beijing and made the anniversary of the Japan-Korea cooperation Declaration and dealing with global problems, sought to establish "the East Asian community". From China, Russia, and Korea gas pipeline projects are being implemented initial progress has been made, has started the process of multilateral energy cooperation in Northeast Asian region, conditions for the establishment of a regional multilateral energy cooperation mechanisms are gradually mature.

3.2 Obstacles to international cooperation still exists

3.2.1 geopolitical influence

After the end of the cold war, significant changes in the international pattern, Sino-Japanese and Sino-Russian and Russian-Japanese relations of these three groups of this shift, a very complex situation of Northeast Asia. Sino-Japanese historical issues, fishing in ownership of the island and Japan on the Taiwan issue, the South China Sea oil issues such as, to a certain degree of interference on the relationship between China and Japan may affect bilateral cooperation in the field of energy, China and Japan in Russia on the issue of oil pipelines to the game is the best example. Sino-Russian energy cooperation also has beyond bilateral economic and trade cooperation of pure economic problem, counter-terrorism and Iraq war, and United States meddling Central Asia Affairs, and United States in Northeast Asia of strategy and on Korea nuclear problem of attitude, makes the relationships of Russia, US, China, and Japan, accelerated adjustment, Sino-Russian energy cooperation gradually evolution into one worthy of political, and security, and interests, and diplomatic of powers game. Between Russia and Japan have obvious complementarities on the resource and energy in recent years, Russia and Japan from folk.

3.2.2 cooperative mechanisms lack



Although some natural gas in Northeast cooperation ideas and practice, but truly effective mechanism for cooperation has not been established, no one can also be integrated energy security interests of the countries of the region, to promote and develop mutual understanding and communication between States of energy cooperation projects. Cooperation among States in the energy concept is largely followed by the traditional "zero-sum game" concept, that a State that is derived from one country to another loss, rather than under the trend of economic globalization and regional economic integration of the concept of interdependence. Based on such considerations, were being taken by the countries of Northeast Asia "siloeed" energy diplomacy, diplomatic efforts to get half of it not only States, but also easily lead and with other Asia-Pacific Nations occur between oil-importing countries to unhealthy competition. At present, the States to the multilateral energy cooperation in Northeast Asia is understood most of the way oil and gas trade this simple form, the establishment of a regional natural gas trading market, establishment of common strategic reserves of natural gas as well as the formation of international gas Consortium, and other forms of cooperation has not been officially started.

4 The strategic framework for international cooperation in the natural gas system in Northeast Asia

Carried out Northeast Asia natural gas international cooperation, as long as participation cooperation nations can in equal trust of principles, mutual coordination policy, determines natural gas cooperation of strategy target, and principles, and task and implementation way, makes States in development natural gas industry, and maintenance energy security aspects has common of multilateral cooperation target, and clear of interests determines and effective of cooperation way, Northeast Asia area of natural gas supply security and cooperation on must can made substantive effect.

Draw on the experience of international energy cooperation in North America, Europe, according to natural gas supply and demand patterns and development trend of Northeast Asia, as well as gas safety issues facing the country in Northeast Asia, the paper presents North Asia strategic framework of international cooperation in the natural gas system, as shown in Figure 1.

4.1 strategic objectives

According to Northeast Asian countries facing the problem of energy security, natural gas strategic objective of international cooperation in Northeast Asia is:

First, ensure regional sustainable and stable natural gas supply, maintenance of natural gas supply security in the region;

Second, forming a strong buying power and negotiation, to minimize gas premiums in this area;

Third, energy saving and environmental protection and technical cooperation, the formulation of effective patterns of natural gas consumption and achieve low carbon green growth in the region.

4.2 strategic principles

First, the principle of equality and mutual trust. International cooperation in natural gas, on the premise of safeguarding State sovereignty and territorial integrity, in line with the principles of sovereign equality, abandon the "zero-sum" concept, played down the negative impact of geopolitics, truly build mutual trust between countries, develop an open system of gas supply.

Second, the principle of mutual benefit and win-win. International cooperation in natural gas, to the overall concept, based on common interests, long-term interests, should not unilaterally seek parochialism, short-term interests, strategy, in implementing the strategy of natural gas in the region, in line with the principle of mutual benefit and win-win, consolidating resources, and common development.

Third, the honesty principle. International cooperation in natural gas, partners need to be honest, not because standard benefits beyond the overall strategic framework, or even make a beggar of the Act, all energy diplomacy in the overall strategic framework and under the terms of cooperation.

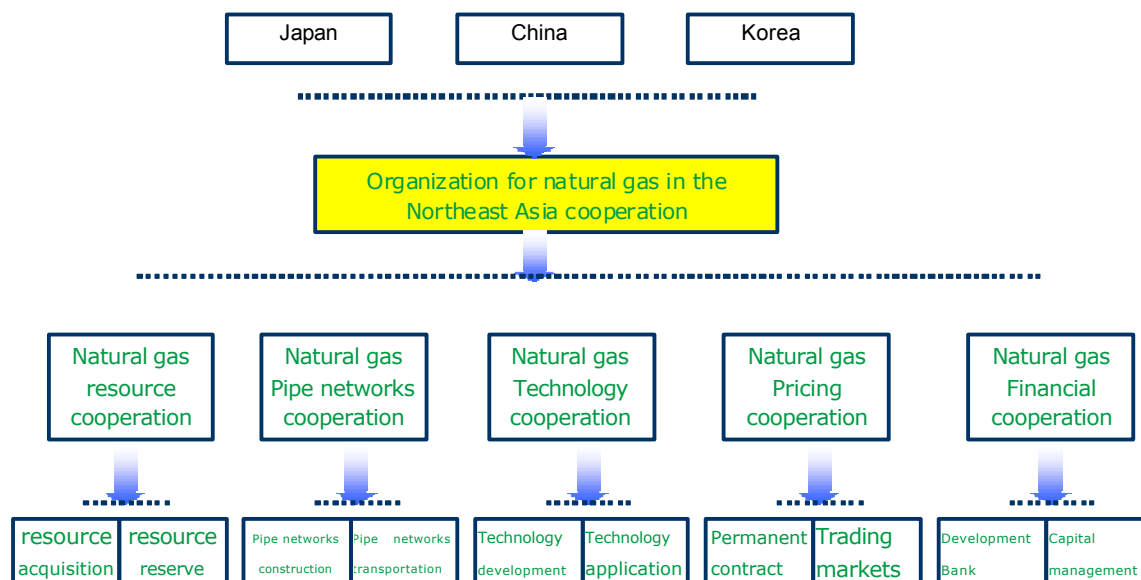


Figure 1 strategic framework for international cooperation in the natural gas system in Northeast Asia

4.3 strategic tasks and approaches

4.3.1 building natural gas cooperation organization system

To date, the Northeast Asian region still did not form a unified and effective cooperation organizations, which makes natural gas cooperation is not a very good platform. But at the



moment, establishing conditions of natural gas cooperation in Northeast Asia it is not so mature, in North-East Asia there are many unresolved issues between the countries. The good news is, has established a regional oil and gas Forum Northeast Asian region, carried out once every 4 years, "oil in the Northeast Asia Economic Forum", which laid a foundation of public opinion for regional cooperation. Take this forum, gradual transition to established organization for natural gas in the Northeast Asia area cooperation, establish rules of engagement similar to "Energy Charter" to promote the construction of natural gas pipelines in Northeast, Particularly established to Russia for the supply of natural gas networks, to the realization of special significant energy security of the entire Northeast Asian region.

Cooperation should consist primarily of natural gas in Northeast China, Japan, and Korea energy management make up, is mainly responsible for the overall development strategy of natural gas in Northeast design and management, the establishment of rules of engagement, coordination matters, organizing international cooperation negotiations.

4.3.2 cooperation mechanism of construction of natural gas resources

Cooperation mechanism of construction of natural gas resources, cooperation aims to form a powerful trading of natural gas, are working to ensure continuous and stable supply of natural gas resources in the region, Includes access to external resources and resources within the strategic reserve mechanisms.

In the Northeast Asia energy game, in China, Japan, South Korea and Russia form the mutual dependencies in this relationship, in China, Japan and South Korea is a net importer of Russian oil and gas resources, Russia is a net exporter of energy. Although Russia dominant position, but without a stable consumer market, Russia will be hard to secure a stable source of foreign exchange. Therefore, consultation in Northeast Asia energy consuming countries should work together with Russia energy cooperation in Russian Siberia and the far East's oil and gas development and transport in the region as a whole under the broad framework of energy security, scientific, rational, comprehensive and economic planning and development. Parties to cooperate only on the premise of resource sharing, common and best interests can be achieved between countries.

First, parties should According to "Russia federal natural gas industry development overall platform before 2030" (East Siberia and far East construction unified of natural gas mining, and transport and supply system and considered may on China and Asia-Pacific other national market export natural gas of planning under) of about content, develop Northeast Asia nations and Russia oil and gas cooperation of medium-and long-term program, on future oil and gas development, and oil and gas trade scale and oil and gas transport pipeline of to made specific provides.

Northeast Asia natural gas reserves in the three countries should also establish a common strengthening the feasibility study, strengthening cooperation in oil and gas resources of the world competition, Japan and South Korea's capital and China's oil and gas exploration technology joint participation in oil and gas development and utilization of

resources of Northeast Asia.

4.3.3 building a natural gas pipeline network cooperation mechanism

Strengthening the planning and construction of natural gas network. First according to “Russia federal natural gas industry development overall platform before 2030” (East Siberia and far East construction unified of natural gas mining, and transport and supply system and considered may on China and Asia-Pacific other national market export natural gas of planning under) of about content, taking a variety of ways to promote imports natural gas pipeline in Northeast Asia (Figure 2) construction. Secondly is well within the planning and construction of natural gas network.



Fig 2 Northeast Asia imports of Russian natural gas pipeline network planning diagram

Sources : Управление координации восточных проектов ОАО "Газпром" (2007.6)

Joint natural gas pipe network schedule. Should be under the unified arrangements of the Organization for natural gas in the Northeast Asia cooperation, different periods depending on the country situation of natural gas resources and gas overall provision and coordination of the utilization of natural gas resources.

4.3.4 mechanism for technical cooperation in the construction of natural gas



According to different technical advantages of the three nations, strengthening the natural gas transport, storage and utilization of technology development. Take advantage of the technical advantages of pipeline natural gas transport, storage, Japan, and Korea's manufacturing technology, joint pipeline natural gas storage and transportation technology. Take advantage of Japan, and Korea's technological advantages in LNG storage and transport, joint LNG storage and transportation technology development. Take advantage of Japan environmental protection, energy saving technology, joint development of natural gas use.

Through a joint technology development, building technology application mechanisms, occupation of North-East Asia region in the world natural gas transport, storage and use of technical high ground.

4.3.5 building natural gas pricing cooperation mechanism

For Russia and Central Asia and other countries, North-East Asia regional cooperation and political and economic cooperation in the field of natural gas should be combined, and dominated by long-term trade contracts, strengthen formula negotiation, fight for access to natural gas resources at lower prices, long-term stable supply channel, effectively avoiding manipulation of American and European natural gas prices. For the United States and the big Western oil companies, should strengthen its cooperation with its regional LNG trade, such as in the Middle East, moderate accept spot trading, and strive to get more LNG resources at lower prices.

Northeast Asia shall be set out to establish common gas market in Northeast Asia and North-East Asia spot and futures exchanges, and built it and the United States Henry Hub, the NBP side-by-side in London a world class oil and gas exchange. Through the establishment of gas exchange, formed in the Northeast natural gas reference price, and grasp the initiative in the international negotiations on trade in natural gas.

4.3.6 constructing natural gas financial cooperation mechanisms

To promote the Russia gas cooperation with Northeast Asian countries, Bank cooperation is also necessary. In China, Japan and South Korea, the Russian Federation should be joint energy development in Northeast Asia as a joint venture Bank, Russia Siberia and far East international financing of gas development and pipeline construction.

In order to improve the international competitiveness and petroleum enterprises in China, Japan and South Korea may also consider forming strategic alliances through equity participation in, Union, gas business capitalization, risks, benefit-sharing.



5. China's role in international cooperation in the natural gas system in Northeast Asia

5.1 China has a condition of participation in the game of world natural gas strategy

5.1.1 China is the world's natural gas production and consumption of power

General volume 56 trillion cubic meters of natural gas resources in China, now proven rate of only about 11%, unconventional natural gas resources in more than 150 trillion cubic meters, basically did not carry out a large-scale development, sufficient to build resource base of 250 to 300 billion cubic meters per year production capacity. It is estimated that by 2020 China will reach 350 billion cubic meters of natural gas consumption, when China will become the world's natural gas power, natural gas imports to more than 160 billion cubic meters, ranking second in the world; By 2030, natural gas consumption of more than 500 billion cubic meters, near United States consumption levels.

5.1.2 China natural gas industry with good strategic advantage

China's natural gas reserves and production are at the stage of rapid growth, enabling rapid capacity expansion of natural gas industrial base; Is taking shape with four channel imports natural gas as the basic framework of the national gas pipeline network, transmission capacity for speed and gas strategies; Natural gas consumption market potential is huge, with a large gas strategies; Distribution in China's Eastern, Western, Southwest gas field in late multiple development as a strategic reserve to provide space for Puguang, Longgang and other large monolithic to develop gas field to a resource reserve of the main goals, vision resource area such as the South China Sea as a major strategy to succeed. District level distribution in space of these resources, on the utilization degree of formation of gradient, using two types of natural gas resources in China and two gas markets provides strategic distribution of good natural condition.

China is trying to develop a long-term strategic plan, the formation of the super energy in order to solve the security problems of overseas oil and gas supplies, make reasonable pricing and tax policy, promote the development of new energy sources like nuclear energy and renewable energy and reduce pollution and greenhouse gas emissions.

5.1.3 China have broad international cooperation in the gas space

Implementing the strategy of natural gas has a favourable surrounding resources environment in China and early natural gas cooperation. Natural gas resource-rich Central Asia, northern China and Russia border, southwest of and adjacent to the emerging natural gas producing countries such as Burma, Bangladesh, Southern Pacific as a major gas-producing regions in the world. Four gas imports channel strategy has been to see the



results. At the same time because of the abundant natural gas resources around divided between States with different risks, for the strategy of vigorously developing gas and defense provide significant external resources support and risk spreading conditions.

China have natural gas exploration of international business experience and market infrastructure. Turkmenistan natural gas in 2010 have to pass through customs, Turkmen have signed the end of 2011 increasing for 25 billion cubic meters of strategic agreements; Sino-Russian pipeline 15 negotiations showing game strength of China as a great nation; Sino-Burmese pipeline cooperation has already started, China has accumulated rich experience in international gas trading. Cooperation agreement, CNOOC gas pipelines in Central Asia and Australia LNG project cooperation agreement negotiations for the future of the game provides a good precedent.

At the same time, ASEAN, Shanghai eco, APEC Member States in future facing a low carbon economy and the natural gas in the world strategic pattern in the common interest, and these organizations for implementing the strategy of natural gas in China also played good cooperation platform.

5.2 China will play the dominant force in the system of International natural gas cooperation in Northeast Asia

World natural gas pricing power struggle between China and Central Asia-Russia, Japan, South Korea and other countries have common strategic interests and the basis for cooperation, China has the Northeast Asian countries together, and long-term trade contract-oriented comprehensive strength in regional markets and geographical advantages of natural gas.

If Russia and effective cooperation of Northeast Asian countries led by China, the use of permanent contracts stable supply of natural gas market in Northeast Asia, in Europe in the future will be bounded by Eastern European portal area, formed two camps of natural gas. West to United States and Europe, oil oligarch and the Consortium as the core, you may spot trade-led; East-Russia-Japan and South Korea as the core, using long dominated trade contracts. Coefficient of long-term contracts will include the price formula, linked, as well as periodic review and adjustment of price mechanism. The strategic structure, Northeast Asia will be able to through the various stages of negotiation rights to reflect the discourse of natural gas and market presence. Russia is expected to effectively improve the export structure through such cooperation, give basic, West to East natural gas diversion to reach 1:1; Natural gas at the same time economically, Europe markets stock in trade, the Asian market with long-term contracts, this can also increase Russia's price safety and long-term security. But the partnership may also be because the Iran issue, China Iraq oil field, North Korea, and Russia in Europe and the Consortium asset equity issues are affected.



6. conclusions

Northeast Asia is the world's important natural gas consumption region, 2030 or will be the world's leading consumer of natural gas, will also be the world's leading importer of natural gas. Northeast Asia area within China, and Japan and Korea are faced with common of natural gas supply security problem, and natural gas premium problem and low carbon development pressure problem, established Northeast Asia natural gas cooperation system has become regional within States of common wishes, natural gas resources is promoting regional economic development of important resources, is established continued stability of natural gas supply system of needs, Northeast Asia States has for established Energy Community made has actively of preliminary attempts to.

Established Southeast Asia natural gas international cooperation system, needs regional within States in equal trust, and mutually beneficial total win, and Frank phase to of principles, desalination geo-political of negative effect, as soon as possible established natural gas cooperation organization, through strengthened regional outside natural gas business cooperation, and established strategy reserves construction natural gas resources cooperation mechanism, through strengthened Northeast Asia natural gas tube network planning and construction, and joint tube network scheduling construction natural gas tube network cooperation mechanism, through strengthened natural gas storage and transportation and using technology development and application construction natural gas technology cooperation mechanism, Through the establishment of long-term contracts, build trade market construction of natural gas and natural gas pricing mechanisms of cooperation, through the establishment of energy development Bank, the capitalization of constructing natural gas financial cooperation mechanisms, forming long-term, stable supply channel, minimize the premium level of natural gas in Northeast Asia, expanding international gas market voice and influence in Northeast Asia region.



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