

The Russo-Korean Cooperation for Natural Resources: The Prospect of the Trans-Siberian Gas Pipeline Project

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Abstract

The main purpose of this article is 1) to analyze the current status of the Russo-Korean pipeline natural gas (PNG) project; 2) to discuss major issues involved in this project; 3) to demonstrate costs and benefits of the projects from the viewpoints of various participants; and, 4) to forecast the future of this project. Mainly through literature review, the authors show that the idea of the Russo-Korean PNG project began to be discussed among the related parties in the early 1990s, and several feasibility studies have been undertaken since then. Though there has been a complex interplay among Russia, China, North and South Korea, the pipeline from Vladivostok is ready to connect if North Korea can be viewed as a reliable partner.

Although there is a fundamental convergence of interests among major participants from economic as well as political points of view, political risks will be incalculable, once the required investments are made. This is because North Korea will have additional leverage over South Korea by having the pipeline within its own territory. In addition, Russia, North Korea, and South Korea are in a situation of trilateral monopoly negotiation. In this situation, North Korea and Russia can demand to increase prices until the marginal benefits of South Korea equal zero. In addition, Observers may argue that the separation of political and economic issues can reduce the risks involved in this project, but historical experiences strongly suggest that it will not be possible. Price volatility of the PNG and transit fees is another issue as shown in the Ukraine case, which increased the transit fees over 100% in less than two years. In short, the Russo-Korean PNG project may be seen as a very attractive business arrangement from an economic point of view, but the political costs will be insurmountable unless North Korea becomes a reliable partner, which may not be realized for a long time.

Keywords: Russo-Korea pipeline natural gas, trilateral monopoly negotiation, KOGAS, Gazprom, price volatility

I. Introduction

In recent years, there have been increased talks between Russia and South Korea about the pipeline natural gas (PNG) project via North Korea. The Trans-Korean PNG project has been viewed as mutually beneficial for all the related parties, although many problems remain to be resolved. The idea of building the gas pipeline from Vladivostok to Seoul via Pyongyang, however, is not a new one. In fact, the idea was first addressed and discussed in 1989 by former Chairman of the Hyundai Group, Chung Ju-Young and Lee Myung-Bak, then the CEO of Hyundai Construction Company. Lee is now the President of South Korea.² This idea could be discussed and an agreement reached at that time because of the Nordpolitik policy pursued by the Roh Tae-Woo government. The Trans-Korean PNG project, however, has been on hold for a long time without its many problems being resolved. After President Lee came into power in 2008, serious talks resumed between Russia and South Korea. The fact that the Trans-Korean PNG project has continued to be seriously discussed between Russia and South Korea even though a South Korean battleship, the *Cheonan*, was sunken and the Yeonpyong Island was shelled by North Korea, simply means that the project remains attractive to both Russia and South Korea.

The Trans-Korean PNG project is expected to provide huge economic and hopefully political benefits to all participants. Russia, for instance, can diversify and greatly expand its valuable energy markets for untapped natural gas reserves in the Eastern Siberia and Sakhalin areas. South Korea, which has to import virtually all of its energy demands from the outside, can have a new energy supplier, which can increase the stability of its long-term energy needs. In addition, the price of natural gas, if imported directly by South Korea via the planned Trans-Korean pipeline, is expected to be reduced on average of 30% compared to importing the liquefied natural gas (LNG) via ship. North Korea can also benefit greatly by agreeing to the project. The annual transit fee that it can levy is expected to be at least US \$100 million,³ which is huge, given its troublesome economy.⁴ An additional benefit can be collected through the wages of construction workers, who can be hired by Russian and/or South Korean construction companies. The political and strategic benefits should be endless if the project can contribute to reducing the level of belligerence between the two Koreas, and further increase the peace and stability of the Korean peninsula and East Asia by resolving, or at least relieving, the North Korean nuclear

and missile issues.

Despite the huge benefits expected from this project, however, many hurdles remain. The very existence of North Korea positioned between Vladivostok and Seoul, creates lots of problems which must be solved before such a project can be launched. Even after implementing the project, there is no guarantee that North Korea will abide by the contracts as negotiated. The cash that North Korea can make is certainly a good incentive, but no one can be sure that North Korea will behave properly during the whole period, estimated to be at least 30 years, beginning in 2017. The unilateral cancellation of the Geumgangsán project with the Hyundai-Asan by North Korea is a good example in this regard. As in the case of the Geumgangsán project, the Trans-Korean PNG project would provide additional leverage to the North. There are also complex strategic considerations, not only for both Russia and South Korea, but to China, Japan, and the US as well because it might alter strategic calculations as a whole in Northeast Asia and possibly the world energy market structure as well. The Trans-Korean PNG project also affects the related parties, perhaps including the EU, because Russia is the largest producer of natural gas, and Russia can exercise certain bargaining power over other consumer, including the EU, by diversifying its major energy markets from Europe to Northeast Asia.

The primary purpose of this article is to examine the future of the Trans-Korean PNG project. In order to do this, I will first review the historical development of the Trans-Korean PNG project, and explain the basic considerations of the project. Then, I will discuss the strategic interests of major participants in this project, followed by discussions of critical future issues and prospects.

II. Historical Development of the Project

As mentioned earlier, the idea of building a gas pipeline between Russia and South Korea was proposed by Hyundai in 1989. It included a possible overland pipeline from Vladivostok via North Korea to South Korea. The issue was discussed when Vice Prime Minister of North Korea, Kim Dal Hyun, visited Seoul on July 29, 1992. After that, Yeltsin and Roh Tae-Woo signed an agreement on the joint development of Chayanda gas field of Sakha in November 1992. Former President Kim Young Sam further explored the project when he visited Moscow in 1994. From November 1994 to December 1995, a preliminary feasibility study was carried out jointly by the Korean consortium (Korea National

Oil Corporation, Korea Gas Corporation, etc.), the Russian consortium (Gazprom, Russian Union of Industrialists and Entrepreneurs etc.), and the Sakha consortium.

Construction of a natural gas pipeline connecting Asia had been discussed since mid-1990s, and CNPC (China National Petroleum Corporation) and RUSIA petroleum⁵ signed a memorandum of consensus on the construction of pipeline in 1994. Russia and China agreed to develop the Kovykta gas field in 1997. When President Kim Dae Jung visited Russia in 1999, he expressed South Korea's willingness to participate in the Kovykta project, and Russia agreed to Korea's participation in the development of the Kovykta gas field. Russia and North Korea signed an agreement on the Russia-DPRK cooperation treaty in February 2000, and both countries signed a joint statement during Putin's visit to Pyongyang in 2000. After that, KOGAS joined the project and the three parties began a feasibility study in January 2001, which was completed in November 2003.⁶ After the trilateral feasibility study, the three parties agreed to start exporting 20 BCM of natural gas annually via the trans-Manchurian route, from Zabaikalisk of Zabaikal Region going through Shenyang-Dairen-Yellow Sea, and reaching Pyeongtaek in South Korea.⁷ Another possible pipeline was also suggested from Zabaikalisk of Zabaikal Region going through Shenyang-Dandong-DPRK, and reaching Pyeongtaek. However, the Russian government did not endorse the trilateral proposal, and changed the main stakeholder of Russia's Eastern Gas Program⁸ to Gazprom in 2002.

In 2006, South Korea and Russia signed the agreement on Government Cooperation after President Roh Moo-Hyun visited Russia. On October 17, 2006, the Russian Federation and the Republic of Korea signed an Agreement of Cooperation in the Gas Industry identifying Gazprom and KOGAS as the companies authorized for overseeing natural gas deliveries from Russia to South Korea. In 2008, when the proposal deadline was approached, KOGAS withdrew the proposal. But TNK-BP, a main stakeholder of RUSIA petroleum, hoped to complete this project alone, but the Russian government did not allow this to happen.⁹ In 2008, both South Korea and Russia agreed to conduct a feasibility study of the Vladivostok-DPRK-ROK pipeline, and, if everything went well, South Korea would import natural gas through the Russian pipeline after 2015. As a part of this project, KOGAS and Gazprom through conducted feasibility studies of PNG and LNG from June 2009 to April 2010.

On June 23, 2009, in a working visit by Gazprom's delegation to South Korea, Alexey Miller, Chairman of Gazprom Management Committee and Choo Kang-Soo, CEO of KOGAS, signed a joint agreement to explore the gas supply project. The agreement was signed as an extension to the Intergovernmental Agreement of Cooperation in the Gas Industry and the Memorandum of Understanding on natural gas supplies from Russia to South Korea between KOGAS and Gazprom. The agreement stipulated studying options for natural gas supply from the terminal point of the Sakhalin – Khabarovsk – Vladivostok gas transmission system to South Korea. On August 24, 2011, Kim Jong Il and Medvedev agreed to North Korea's participation in the natural gas connection project during the Russia-DPRK summit meeting in Ulan-Ude. On September 15, Russia and DPRK signed an MOU of making a working committee for the Russia-DPRK-ROK gas pipeline connection. The next day, September 16, KOGAS and Gazprom signed a long-term road map for the Russia-DPRK-ROK gas pipeline project. On November 2, 2011, President Lee Myung Bak and Medvedev agreed to begin pipeline construction in September 2013, and finish in 2016. On November 5, 2011, the pipeline within the Russian area, the Sakhalin-Vladivostok pipeline, was completed.

III. Basic Facts of the Gas Project

1. Ready to Connect

Gazprom's development strategy envisages the expansion of transmission capacities and diversification of gas transmission routes.¹⁰ As mentioned earlier, the 1,188 km of Sakhalin – Khabarovsk – Vladivostok gas transmission pipeline has already been constructed. The Russian part had to be completed anyway because Russia already had a huge LNG system in Vladivostok to export its LNG to East Asian countries. After the completion of the Eastern Siberia–Pacific Ocean oil pipeline (ESPO pipeline), Russia focused on connecting pipelines to the Asian markets, and eventually Russia wants to be a dominant player in natural gas market of Northeast Asia. A key issue involved in this idea is the geo-political risks caused by the nuclear issues and the question of regime instability in North Korea.

The joint construction of the trans-Korea PNG will run from Russia's Far East through North Korea, and eventually reach South Korea. The planned Russia-trans Korean pipeline will have a capacity of

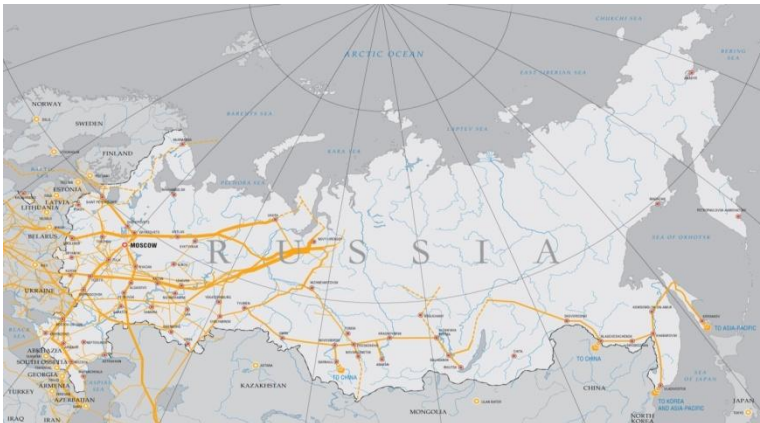
10 BCM annually and will run from Vladivostok.¹¹ Four major gas centers are being considered: Sakhalin oblast; the Sakha Republic; Irkutsk oblast; and Krasnoyarsk krai. Planned volumes of gas supplies to China and South Korea are more or less 25-50 BCM after 2020. However, no specific pipeline routes have yet been decided.

2. Natural Gas as a Strategic Russian Asset

Russia is a leading country with regard to the production of natural gas. Russia has 46,000 BCM of natural gas, which is a 23% of the world proven reserves, and produced 624.61 BCM, or 19.3%, of the world's total production in 2010.¹² Russia's reserves/production ratios of natural gas should last about 74 years.

Russia provides 25% of the world trade in natural gas. It is a dominant player in the European gas market and the gas market of the Commonwealth of Independent States (CIS) since Russian gas accounts for approximately 30% of the overall gas consumption among European countries, including Turkey.¹³ Russia provides the largest incremental volume to meet the increased demand for supplies from non-OECD Europe and Eurasia, with net exports growing by an average of 2.8% per year, from 6.6 trillion cubic feet in 2008 to a projected 14.0 trillion cubic feet in 2035.

Figure 1: Unified Gas Supply System of Russia



Source: www.gazprom.com, viewed on May 1, 2012.

Figure 2: The Sakhalin – Khabarovsk – Vladivostok gas transmission pipeline



Source: www.gazprom.com , viewed on May 1, 2012.

Table 1: Oil & Natural Gas Reserves and Production in the Russian Federation

		2010	Share of World Total	R/P ratio
Oil	Proved Reserves	77,400*	5.6%	20.6
	Production	3,748*	12.9%	
Natural Gas	Proved Reserves	44,800**	23.9%	76.0
	Production	589**	11.6%	

* Thousand million barrel; ** Billion cubic meters

Source: BP Statistical Review of World Energy 2011.

Current estimates project that the proportion of the European energy markets in the total volume of Russian energy exports will steadily decline while its exports to East Asian markets will increase. It is expected that Russia's exports to Asia will grow from 6% currently to 22–25% for oil, and from 0 to 19–20% of natural gas, mainly due to the rapid rise in energy consumption and the high dependence of overseas energy in Northeast Asian countries. One of the main reasons for this change is Russia's profit maximization strategy as the production of current Western Russian gas field stagnates while new gas fields, especially in Eastern Siberia are actively developed. Indeed, the LNG plant in Sakhalin has already started its gas supplies to South Korea and Japan.¹⁴ However, its export volume depends on the capacity of LNG terminal and sea ports.

Table 2: Crude Oil Production in Russia (est.), (million tons)

	2005	2008	2013-15*	2020-22*	2030*
North/Northwestern regions	24.5	29.1	33.5	35.5	42.5
Volga region	52.7	54.1	49.5	44.5	35
Ural region	49.2	52.6	46	38.5	27
Caucasus/Caspian regions	4.9	4.8	9	19.5	21.5
Western Siberia	334.3	332.7	302	298.5	302
Eastern Siberia (incl. the Sakha Republic)	0.2	0.5	27	46.5	72
Far East	4.4	13.8	24	30.5	32.5
Total	470.2	487.6	490.5	515	532.5

* The mean value between the forecasted minimum and maximum volumes.

Source: Ministry of Energy of the Russian Federation (2010), *Energy Strategy of Russia for the Period up to 2030*, (Moscow: Institute of Energy Strategy, 2010), p.145.

Table 3: Natural Gas Production in Russia (est.), (billion cubic meters)

	2005	2008	2013-15*	2020-22*	2030*
Western Siberia	588	604	592.5	590.5	627
European region	46	46	72.5	117.5	134
Eastern Siberia	4	4	11	40.5	55
Far East	3	9	37	66	86
Total	641	664	715	820	912.5

* The mean value between the forecasted minimum and maximum volumes.

Source: Ministry of Energy of the Russian Federation, *Energy Strategy of Russia for the Period up to 2030* (Moscow: Institute of Energy Strategy, 2010), pp.146-147.

Table 4: Russia’s Major Inter-Regional Gas Pipeline Projects

Project	Delivery Port	Capacity (BCM)	Status	Start Date
Altai	China	30	Planned	2015
Russia-Asia Pacific	Korea	10	Planned	2015-2017
Nord Stream	Germany	27.5	Constructed	2011 end
Nord Stream 2	Germany	27.5	Planned	2012
South Stream	Italy	63	Planned	2015 end

Source: IEA(International Energy Agency), *World Energy Outlook 2011*, Special Report, 2011), p. 66.

Russia was the first natural gas exporting country and the second oil exporting country in the world. The Russian economy is heavily dependent upon the export of these two commodities. In 2007, for example, about 64% of Russian export revenues came from oil and natural gas.¹⁵ As the economic crisis in the Euro zone has worsened, Russian gas exports to Europe are expected to decrease. This is a major reason Russia has pressed so hard to construct gas pipelines in the Northeast Asian region.

3. Increasing Energy Demand in Northeast Asia

Russian interests in building gas pipelines connecting Northeast

Asian countries are also stimulated by skyrocketing energy demands in the region. In particular, Chinese energy consumption has increased tremendously over time, due to its rapid industrialization. The demand for natural gas in China is also increasing rapidly. Chinese demand for natural gas had already surpassed that of Japan in 2009. And China began to import natural gas in 2003. The IEEJ (Institute of Energy Economics in Japan) forecasts that China's dependence on natural gas imports will be more than 30 percent in 2020 and 50 percent in 2035.¹⁶ Over the next 20 years, China will consume nearly 70% more energy than the United States.¹⁷

After the March 11, 2011 earthquake, all nuclear power plants were stopped in Japan. Although Japan resumed operating some of their nuclear power plants recently, the energy forecasts in Japan have changed drastically. In the short run, Japan is likely to increase its use of natural gas to offset the loss of nuclear-generating capacity. In the long term, a slow growth rate in the GDP will limit the increase of demand for natural gas. Natural gas consumption in Japan is expected to increase by about 0.3 percent annually from 3.7 trillion cubic feet in 2008 to 4.0 trillion cubic feet by 2035.¹⁸

As Northeast Asian countries are highly dependent on a foreign energy supply, they have tried to reduce any risks involved in geopolitical, institutional, and market conditions. LNG is one of best alternatives in this regard. South Korea, China, and Japan are the largest LNG importers in the world; in particular, Korea and Japan are almost entirely dependent on LNG imports from natural gas supplies.

Table 5: Demand for Oil in Northeast Asian Countries, 2008-2035
Unit: million barrels per day

	2008	2015	2020	2025	2030	2035	AGR 2008-35
World	85.7	93.3	97.5	103.2	108.0	112.2	1.0
Korea	2.1	2.3	2.4	2.4	2.5	2.6	0.7
China	7.8	12.1	13.6	15.6	16.4	16.9	2.9
Japan	5.0	4.3	4.6	3.5	3.3	3.1	-0.4

Source: US EIA, *International Energy Outlook 2011*, p. 162.

Table 6: Demand for Natural Gas in Northeast Asian Countries, 2008-2035

Unit: billion cubic meters

	2008	2015	2020	2025	2030	2035	AGR 2008-35
World	3,136.0	3,487.3	3,779.0	4,090.7	4,441.9	4,779.0	1.6
Korea	36.8	42.5	45.3	51.0	53.8	53.8	1.5
China	76.5	150.1	192.6	243.6	289.0	325.8	5.5
China Prod.	76.5	82.2	87.8	133.1	170.0	206.8	3.8
Japan	104.8	104.8	104.8	110.5	113.3	113.3	0.3

Source: US EIA, International Energy Outlook 2011, p. 163.

Table 7: South Korea's LNG Import by Origin

	2008	2010
The Middle East	49.3%	44.5%
Southeast Asia	37.0%	31.3%
Russia	0.0%	8.8%
Others	13.7%	15.4%
Total (thousand ton)	27,940%	31,820%

Source: Nam Il Kim, "Issues in Gas Pipeline Connection and the possibility of Secured Energy Supply," Nov. 15, 2011 Min Hwa Hyup Forum, p. 61 (in Korean).

South Korea is the tenth largest energy consumer in the world. Given the lack of natural resource reserves, South Korea has to import most of its energy. South Korea's oil demand is expected to increase steadily over time as shown in Table 5. The country possesses three of the ten largest crude oil refineries in the world. South Korea also imports virtually all of its natural gas for domestic consumption. Because South Korea does not have any gas pipeline connections, all of its imports are liquefied natural gas (LNG). Thus, it is now the second largest importer of LNG, after Japan. South Korean gas consumption has gradually increased over time as shown in Table 6.

South Korea imports LNG from eight different countries, including Qatar, Oman, Indonesia, Russia, and Australia. In 2008, the Middle East accounted for almost 50% of South Korean LNG imports, followed by Southeast Asia (37%). At that time Russia came into the South Korean market, and began to increase its market share from 0.0% in 2008 to 8.8% in 2010. Over time, South Korea seems to have benefitted from more diversified suppliers and better deals with Russia and Yemen as shown in Table 8.

Table 8: Details of LNG Contracts that South Korea Has with Its Suppliers

Country	Contract	Term of Period	Term of Delivery	Annual Contract Quantity	Linkage ratio of oil	Price (\$/mmbtu*)	Time Horizon
Indonesia	Arun III	1986-2007	Ex-Ship	2.3	91%	4.82	Long-term
	Korea II	1994-2014	FOB	2.0	91%	4.42	Long-term
	Badak V	1998-2017	FOB	1.0	88%	4.68	Long-term
Malaysia	MLNG II	1995-2015	FOB	2.0	87%	4.59	Long-term
	MLNG III	1993-2010	Ex-Ship	1.5+0.5(optional)	87%	4.32	Mid-term
Brunei	BLNG	1997-2013	Ex-Ship	0.7	87%	4.57	Long-term
Qatar	Ras Laffan	1999-2024	FOB	4.92	87%	4.46	Long-term
Oman	OLNG	2000-2024	FOB	4.06	87%	4.52	Long-term
Australia	NWS	2003-2010	Ex-Ship	0.5	64%	4.15	Mid-term
Qatar	Ras Gas	2004-2008	Ex-Ship	0.96	41%	4.20	Short-term
Malaysia	MLNG III	2004-2008	Ex-Ship	0.71	29%	4.07	Short-term
	MLNG II	2005-2008	Ex-Ship	0.4	87%	4.32	Short-term
	MLNG III	2008-2028	Ex-Ship	1.5+0.5	29%	4.08	Long-term
Russia	Sakhalin II	2008-2028	FOB	1.5	29%	3.54	Long-term
Yemen	YLNG	2008-2028	FOB	2.0	29%	3.02	Long-term

* 1 MM Btu =1000 ft³; Source: Hyun Hyo Ahn (2008), “Supply and Demand in Korea Gas Market and Policy Alternative,” Democratic Society and Policy Research, p. 106 (in Korean)

As for the distribution networks, South Korea has well-developed pipelines for domestic uses, especially for urban residential areas. About 64% of the revenues for natural gas come from city gas networks.

IV. Strategic Considerations of Potential Participants

1. Republic of Korea

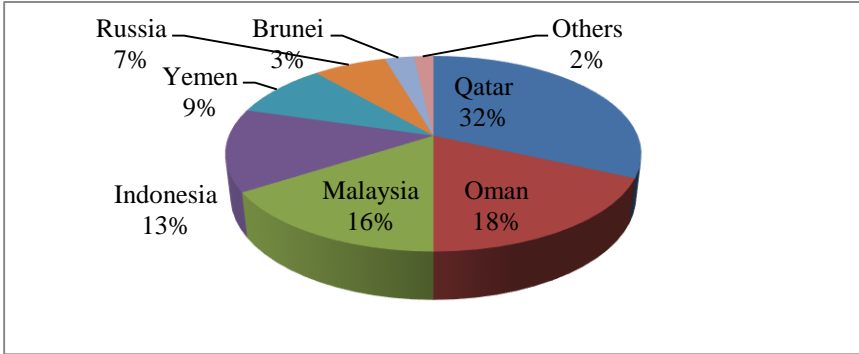
After the collapse of the Soviet Union, specialists expected that South Korea would focus on cooperation with Russia, despite its strong diplomatic relations with North Korea. They also speculated that economic cooperation and détente in South and North Korean relations would be the basis for the reunification of both Koreas in the long-run. Many projects for this purpose were proposed such as energy, electric grid, TKR-TSR & road connections,¹⁹ logistics of cross-border interactions, that is, Russia-DPRK-ROK in the 1990s. The possibility of realizing these projects increased when Putin visited North Korea in 2000. At that time, South Korea's main interest was a railroad connection.²⁰ At the same time, proposed energy and power grid projects were reevaluated in the context of the changing international and domestic environment. All of these projects are key issues for South Korea to overcome, given its "island" status after the division of two Koreas. Connecting railroad and road systems to Russia via North Korea would mean that South Korea could truly be a part of Eurasian continent.

The Trans-Korean PNG project is directly related to South Korea's economic, political, and strategic interests. First of all, South Korea has wanted to diversify its natural gas import origins and enjoy a significant reduction of transport costs, in particular, securing gas delivery in a more stable and long-term basis. South Korea is also expected to have first mover's advantages, compared to China and Japan.

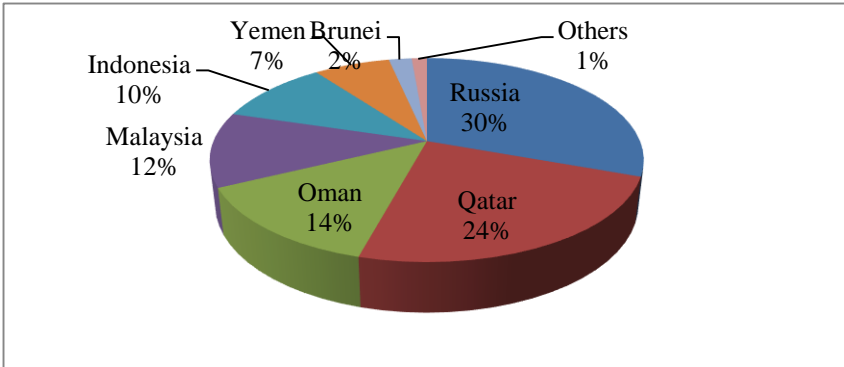
Another important reason for building the pipeline is that PNG is the most efficient alternative among three types of natural gases, PNG, LNG, and CNG as shown in Table 9. The cost of importing LNG or CNG is much higher than PNG, and additional costs in building the LNG terminal and/or CNG storages are needed. There is no spot market for natural gas, unlike the oil market. PNG is attractive because it does not require mass storage facilities. If South Korea imports Russian natural gas through the pipeline for thirty years, it is expected to save around US\$18.9-30.6 billion.²¹

Figure 3: South Korea’s Natural Gas Dependence Before and After Trans-Gas Pipeline

Before



After



Source: Kyunghyang Daily Newspaper, Sept. 15, 2011.

Table 9: Cost Comparison

	Investment and Operation Cost (Billion US\$)	Unit Transport Cost (US\$ per MM Btu)
PNG	4.80	0.31
LNG	22.64	0.94
CNG	10.55	0.60

Source: Lee Seong-kyu (2011), “Economic Effect of Russia-DPRK-ROK Gas pipeline and Type of Participation”, *North Korean Economy Review*, KDI (in Korean).

Besides, South Korea wants to participate in these ventures from the very beginning, thus the South Korean investors have considered the possibilities of acquiring Gazprom and expanding cooperation activities, including TKR-TSR connection. In addition, South Korea may consider this project as an alternative to improving its relationship with Pyongyang. If North Korea agrees, the pipeline project may enhance economic cooperation between the two Koreas, and may provide an institutional framework for bilateral cooperation that will reduce the possibilities of conflict between South and North Korea. Should this turn out to be true, political and economic benefits accrued by both countries would be countless.

Even the cost of building the pipeline is estimated to be US\$10.63 billion, for building a total of 3,200 km from Sakhalin to South Korea.²² Since the Sakhalin-Vladivostok section has already been built by Gazprom, the North Korean section, about 890 Km, should be constructed. This means that South Korean construction companies collaborating with Gazprom can participate in building the pipelines in the North Korean section. This kind of tripartite cooperation is helpful in accomplishing this project, not to mention its symbolic impact on the bilateral relationship between the two Koreas. Given the good records of South Korean construction companies in the Middle East and other parts of the world, it would be a valuable market opportunity for them as well. If South Korean firms undertake this project, they may be asked to hire North Korean workers, through which additional North-South cooperation might be possible. Later, this might serve as a model for connecting both Trans-Korean and Trans-Siberian railroad and road systems.

2. The Russian Federation

Russia's concern about this project is basically economic with a long-term strategic consideration on diversifying its energy markets. Russia has tried to expand its natural gas markets from traditional European markets to potential Asian ones, due to the slow growth of demand from EU countries. Russia's natural gas exports were less diversified in comparison to oil and other resources.²³ The recent economic crisis has added to the long-term uncertainties surrounding gas demand in the European market. Moreover, gas demand in Europe may not recover its 2007-08 level before 2012, and perhaps even later. Indeed, Russia's gas exports to Europe decreased in 2009-2010.

It is expected that the share of natural gas production in Eastern Siberia and East Asia will increase from 13 BCM in 2008 to 130-152 BCM by 2030. New additional volume of natural gas in Eastern Russia is projected to the Northeast Asian market. However, natural gas production has been realized only on Sakhalin; other major gas fields such as Kovykta (Irkutsk), Chayanda (Sakha), and Yurubchenko-Tokhomsk (Krasnoyarsk) are under construction.²⁴ As new gas fields are being developed in Eastern Siberia and East Asia, the main concern of Russia is how to connect its ESPO pipeline to the Asian market. The Sakhalin 3 project, owned by Gazprom is believed to be a good opportunity to develop Russia's economically backward Pacific regions and diversify the gas exporting markets. It should be noted that the Russian authority does not allow any gas exports without the involvement of Gazprom.²⁵ Russia also considers that South Korean companies have good knowledge and technology for energy plant construction and LNG utilities.

Above all, Russia can enjoy a monopolistic position vis-à-vis China if possibilities remain of connecting pipelines without Chinese participation. Even though Russia and China have agreed to supply natural gas, 68 BCM annually for thirty years from 2015, there are still unresolved problems remaining, especially the right gas price. In addition, Russia has closely studied the impact of Japan's nuclear power station²⁶ shutdown and the progress of shale gas development in North America. In addition, Russia can resume its political influence over North Korea through the gas pipeline connection. Although it basically depends on North Korea's location, Russia's diminishing influence compared to China, over North Korea may gradually change. It should be remembered that Russian officials once announced that Russia is not a Eurasian country but a Euro-Pacific one.

3. North Korea

If connected, North Korea is expected to write off the debt inherited from the USSR, US\$11.0 billion.²⁷ Moreover, it can expect additional economic assistance and humanitarian aid from Russia and South Korea. Strategically, it can reduce its over reliance on China significantly. Once gas supply begins, North Korea is expected to receive US\$100-150 million annually in transit fees. At the same time, if North Korea participates in the pipeline operating companies, its revenue will be increased based upon its share of stocks. In addition, North Korea will

gain salary for employees who work in constructing the pipelines. Moreover, North Korea can relieve the problems caused by energy shortages by having small gas power stations at home.

In sum, North Korea can relieve both its economic difficulties and energy shortages once the pipeline is connected. It is known that in a recent working group meeting with North Korea, Russia proposed a bundle of economic cooperation projects, in which the TKR-TSR, the gas pipeline, and the power grid connections were included as a package.²⁸ Politically, however, the future of North Korea is uncertain, mainly due to recent changes in its leadership. North Korea declared 2012 as the year of the one hundredth anniversary of Kim Il Song's birth, and the first year of the strong state. North Korea wants to maintain a subtle balance between China and Russia. Kim Jong Il's request for food aid in his final visit to Russia last year demonstrated North Korea's dismal economic conditions. However, North Korean attacks on the *Cheonan* and Yeonpyong Island simply added to the difficulties involved in any project with North Korea.

4. Others

China has been a net importer of natural gas since 2006, and its imports of both gas and oil have increased rapidly since that time.²⁹ China imported 45 BCM of natural gas in 2011. Half of those natural gas imports came from Central Asia through the Turkmenistan-China pipeline, completed in 2009. As a result, China has gained a stable source of imports. This is one of the main reasons China has not pressured Russia to hurry in the PNG negotiations. China is now seeking to attain a 60% level of Russia's European export prices. However, Chinese gas consumption is growing rapidly, and that could be a critical issue for Russia-DPRK-ROK gas connection soon.

An alternative pipeline proposal by CNPC starts from the Irkutsk gas field, and goes through Bruyat to Beijing. This pipeline will be connected to Pyeongtack, South Korea, via Weihai, and must be built as an under seabed pipeline. China would like to be connected to South Korea in this proposal because it would greatly increase its negotiating power with Russia. But the Trans-Korean PNG project is in direct competition to this proposal, which may strengthen Russia's negotiating power over China's.

Figure 4: CNPC proposal



Japan relies almost entirely on imports to meet its gas demands. In its early transformation period from its Soviet era, Russia also focused on the Japanese energy market in the 1990s. However, there were few feasible projects in Sakhalin. Their potential has remained limited, mainly because of the unresolved Kurile Islands territorial dispute with Japan. Sakhalin 1 & 2 is ongoing. A consortium of public and private Japanese oil companies holds a 30% share of the Sakhalin Oil and Gas development Company (SODECO), that is, Sakhalin 1. Sakhalin 1's oil production reached 250,000 barrels in February 2009. Mitsui and Mitsubishi have a combined share of 22.5% in the Sakhalin 2 oil field, in which the estimated reserves are a billion barrels.³⁰ LNG exports from Sakhalin 2 to Japan will be secured as contracted. However, LNG exports from Sakhalin Island have a potential to grow, subject to the development of the other Sakhalin projects.

Japan and Russia have energy cooperation plans at the feasibility study stage, including a gas pipeline plan from Russia's South Sakhalin Island to Japan's Hokkaido, and a "Blue Fuel" plan of a gas pipeline from Sakhalin - Khabarovsk - seaside territory - North Korea - South Korea - Japan. But, Japan is not as optimistic as Russia about plans to build gas

pipelines from Russia to Japan in the near future.

Another important example of energy cooperation between Russia and Japan comes from the 2011 earthquake and tsunami, which devastated the first generation Japanese nuclear power at Fukushima and now in all of Japan. Japan's LNG imports surged by over a quarter following the Fukushima incident. While nuclear power is no longer a viable option for Japan, natural gas is available from nearby sources in Russia's Sakhalin gas fields. For energy security reasons, however, the Japanese government is cautious about becoming dependent on individual suppliers, especially Russia, which has shown itself ready to cut off gas supplies when mutual disputes occur.³¹

Recently, the US intensified its development of shale gas, which may serve as an alternative gas supply for EU and Northeast Asian countries.³² The potential reserves of shale gas in North America are enormous and could replace a significant portion of the natural gas markets. Even though the production volume of shale gas has not reached the level of the economies of volume, the global shale gas resource endowment, about 456tcm, is quite larger than 187tcm for conventional natural gas. It is assumed that nearly 40% of this endowment is economically recoverable. It is believed that "the proved reserves of shale gas in North America and the existing LNG infrastructure create the potential of LNG exports to Europe, which can help Europe to diversify its natural gas suppliers. This may provide marginal quantities of natural gas, and, if not, materially replace the demand for Middle Eastern or Russian gas."³³

More importantly, the Trans-Korean PNG project may change the relationship between Russia and South Korea. Both countries are expected to come much closer to each other than ever before, while the bilateral relationship between the two Koreas will also be affected. This may change the whole political environment in Northeast Asia, which necessarily will affect the traditional alliance between the US and South Korea. If the gas pipeline project is followed by bigger projects, such as TKR and TSR, US foreign policy toward Northeast Asia may have to be reshaped completely. In this case, the US would have to develop new policies against the new challenges that may be incurred by the Russia-DPRK-ROK pipeline.

V. Discussions on Critical Issues

1. Convergence of Interests, Incalculable Risks

As discussed so far, the convergence of interests among the major participants of the Trans-Korean PNG project is obvious. According to a feasibility study, construction costs are estimated to be over US\$10.63 billion, including material, and labor but it would not be so difficult to realize since the expected revenues are US\$1.6 billion a year. The estimated NPV (Net Present Value) of this project is calculated at about US\$13.22 billion.³⁴ However, the project involves incalculable risks as well.

Natural gas from Russia will become a vital resource for several decades to come in Northeast Asia. There are two serious political risks involved in the Trans-Korean PNG project. The first relates to the Russian supplier, Gazprom. Putin has tried to expand the role of the state in the economy, and Gazprom already enjoys an extreme leverage-producing monopoly position over gas exports to Europe.³⁵ Thus, Russia has held stronger bargaining power vis-à-vis the fragmented EU.³⁶ Once this new gas supply begins, Gazprom may enjoy a similar situation and/or bargaining power, which may create uncertainty about the price and stable supply of PNG to South Korea.

The second risk is related to the North Korean regime's instability and its unpredictable behavior. Regime stability is a critical precondition for reaching an agreement among Russia and the two Koreas in the first place. The unpredictability of North Korean behavior will mean huge uncertainty at every stage of the project. As in the case of Russia-Ukraine gas disputes in 2006 and 2009, the possibilities of a sudden shutdown by the supplier and/or transit countries exists at any time. Given the hyper-unpredictability of North Korea, especially in the bilateral relationship with South Korea, the leverage that the North will have once the gas pipeline is connected will be enormous. Therefore, without mutual trust among the supply-transit-demand countries, North Korea's leverage on gas pipelines has to be a main concern of participants in the project. In addition, South Korea also worries about the possibility of North Korea's using the transit fees in developing nuclear weapons and inter-continental missiles. It would be detrimental to South Korea because there would be no effective way of preventing North Korea's erratic behavior.³⁷ Although Russia may try to persuade and control North Korea at the beginning stage of the project, it may not be easy to exercise such influence after gas supply begins. Because of the possibility of North Korea's cutting-off the pipeline, the project

should have alternative means of transportation, LNG in this case. A key issue here is that LNG transportation is more expensive than PNG, and North Korea can enjoy a strong bargaining power equal to the price difference between LNG and PNG.

Another risk directly related to North Korea is price volatility. Natural gas fields are usually developed based on the pre-price setting for destination. Transit fees are also considered as one of key success factors. Russo-Chinese gas price negotiation is still ongoing, and China expects to pay as little as 80% of Russia's export price to Europe, which is a main obstacle for gas pipeline connection between the two. We have to consider how often North Korea may ask to raise the transit costs. The Ukraine case gives useful insight because Ukraine has increased the transit fee from US\$1.09 to US\$1.6 per 1000 cubic meters per 100km in 2009, to US\$2.70 in 2010, and US\$2.84 in the first quarter of 2011. This certainly illustrates the increased bargaining power of the transit country. When the Trans-Korean PNG is constructed and begins accommodating gas through this pipeline, North Korea may try to increase the transit fee substantially and frequently. And perhaps, South Korea may have to absorb much of the price hike.

The costs and benefits of this project remind us of a trilateral monopoly negotiation among three actors. Russia is a monopoly supplier of natural gas; North Korea is a monopoly transit provider, which holds essential facilities in its own territory; and South Korea is a monopoly purchaser of natural gas provided and delivered by Russia through North Korea. In this trilateral monopoly negotiation, levers may be shifted from one party to another, once major investments are made. That is, South Korea may exercise its negotiating power before investments are made, but once huge investments are made, North Korea and Russia can exercise a much larger bargaining power than South Korea. This may drive the price of PNG near to LNG or other substitutes. Since there is no international body to enforce a contract, the Trans Korea PNG project may not be viewed as a workable project.³⁸ The emergence of shale gas from North America is particularly important in this regard because it may serve as an alternative source of energy for South Korea in the future. Recently, South Korea has demonstrated a keen interest in developing shale gas, according to which the trilateral monopoly negotiating situation might be further changed over time.

2. Separation between Economic and Political Issues

One of the key issues related to the pipeline connection is its impact on political issues such as the Six-Party talks on North Korean nuclear and missile issues. Some argue that South Korea should separate its political concerns from economic decision-making in dealing with the gas pipeline project. The main reason for this argument is, of course, the bad experience of the Geumgangsan project, which began with a mixture of economic and political considerations, but basically became overwhelmingly political. However, are these factors really separable?

One can gain some idea about this from the differences between the Geumgangsan project and the Gaeseong Industrial Complex. While the Geumgangsan project was halted completely and has not yet been resumed after the shooting of a South Korean housewife several years ago, the Gaeseong Industrial Complex has continued, despite the North Korean attacks on the *Cheonan*, the shelling of the Yeonpyung Island, and North Korea's occasional threats to Seoul to close-down the complex. The Geumgangsan project had basically been pursued based on political consideration, while the Gaeseong Industrial Complex was implemented both for economic and political purposes. Political benefits, however, were not immediate but for long-term expectations. It is estimated that North Korea is currently earning about 5 billion per month from the Gaeseong Industrial Complex.

Another difference between Gaesung and Geumgangsan is found in the number of stakeholders. The Geumgangsan project is the business of one company, Hyundai-Asan, while there are numerous small and medium companies involved in Gaesung. But a more fundamental reason for the difference in the two cases is that killing an innocent South Korean housewife occurred in Geumgangsan and North Korean authority did not take appropriate actions thereafter. This indicates that as long as cash continues to flow into North Korea, cooperation with South Korea can be maintained. The same will be true for the separation of economic and political issues. This, however, cannot be an institutionalized separation. It is totally up to North Korea's decision, as shown in the Geumgangsan case, which is highly vulnerable in nature.

3. Building Interests for Peace and Prosperity

As discussed above, the primary risk involved in the Trans-Korean PNG project is the existence of North Korea, and its unpredictable behavior. Once gas supply begins, the threats to cut-off the supply

and/or raise the transit fee become inherent. A fundamental method of reducing this possibility may be the unification of the two Koreas. But as a second-best solution, one can think of building a complex web of interests for peace and prosperity among the related parties in the gas pipeline project in Northeast Asia.

The question of how to transport gas, either, by pipeline or by liquefaction, is linked to broader issues of the strategic and commercial interests of Northeast Asian countries.³⁹ If successful cooperative networks for maximizing benefits out of the Trans-Korean PNG project can be built among China, Japan, South and North Korea, and perhaps other related parties, it can contribute to the formation of interests for peace and prosperity. Unfortunately, however, Northeast Asian countries are more familiar with competition and hatred than cooperation.

Even though Japan can enjoy potential economic benefits, those benefits may be cancelled out by sporadic territorial and historical disputes with China. Bad colonial experiences, especially Japan's arrogant attitude toward women forced to work as prostitutes in the Japanese army during the World War II, incur tremendous anger and hatred against Japan. Maintaining the status quo on the Korean peninsula may be a bigger and more important strategic concern for China than the expected economic benefits from the gas pipeline cooperation with South Korea. Building a regional multilateral energy cooperation mechanism should be promoted from the start of cooperation between Northeast Asian energy consumer countries and their Russian supplier. However, economic benefits and fair distribution are uncertain, and there is a weak regional institutional basis for sustained and substantive cooperation.

Still, commercial interests are also related to building a broader cooperative mechanism in Northeast Asia. For example, the US has strong concerns about Northeast Asian energy security because ExxonMobil is the operator of Sakhalin 1 project. Likewise, the Trans-Korean PNG project and other cooperation in Northeast Asia such as TKR and TSR can create certain types of peace interests among the related parties, either major countries or banks, energy firms, and/or major investors.

VI. Conclusion: Prospects for the Future

If successfully started and maintained, the Trans-Korean PNG project has huge potential economic, political, and strategic benefits for

all participants. Yet many difficulties have to be overcome before it is realized. Even after the project begins, strategic alliance structures in Northeast Asia may need to be changed, and may provide new challenges to the six countries in and near the Korean peninsula. In a wider sense, the project may change the structure of the world energy market, which will affect business strategies of major energy firms.

As for South Korea, the project has tremendous potential impact for its national interests. Stable energy supplies and the diversification of energy sources are only the most immediate benefits. Resuming the North-South dialogue and maintaining cooperation and peace are additional changes that may flow from the project. By increasing opportunities for peace and prosperity, one may expect that North Korea's unreliable behavior be moderated.

Since its independence in 1948, South Korea has been an island country, and the Trans-Korean PNG project is a first project to connect South Korea to the Eurasian continent. This is a fundamental reason why South Korea has continued its efforts to build the Trans-Korean PNG project, along with TKR and TSR. Thus, from a long-term perspective, South Korea will continue to build the pipeline. As for Russia, extending gas pipelines to Northeast Asia means at least doubling their natural gas markets. Without these connections, the regional development opportunities for East Siberian areas will be greatly impaired.

As shown, there is a fundamental convergence of interests in connecting gas pipelines, especially between Russia and South Korea. The Trans-Korean PNG project, however, provides a critical leverage to North Korea because the pipelines pass through North Korean territory. A key issue for the future is how to counterbalance the leverage North Korea can gain from this project. There seems to be no fundamental way of solving this problem as of now, which makes the Trans-Korean PNG project more difficult to realize and may mean a much longer period of time to bring it into existence.

Notes:

¹ This article has been partially funded by the 2011 University Research Fund at Kookmin University.

² When one of the authors of this article, Professor Hong, met with President Lee in August 2011 at the Blue House, Lee explained some of the background

of the Trans-Korean PNG project. According to him, his company and the Russian counterpart, at that time the government of the Soviet Union basically agreed to provide natural gas to South Korea by constructing the Trans-Korean pipeline. He said that Russia agreed to take care of all the rights involved in passing through the North Korean territory by guaranteeing that total amount of natural gas supplied annually in any form, either through pipeline or ship. This might not be that easy anymore because the Russian influence upon North Korea has decreased tremendously since then.

³ “North Korea to Get \$100 Million Annually for Russian Gas Transit,” *RIA Novosti*, Nov. 17, 2011. It reports that “It [\$100 million] would be a huge sum for a country with annual gross product of \$10 billion. Moreover, the country would have to make no big effort to get it, the Presidential plenipotentiary envoy to the Russian Far East Victor Ishayev said.” See <http://en.ria.ru/russia/20111117/168770662.html>, viewed on May 27, 2012.

⁴ The real GDP of North Korea in PPP is estimated to be about US\$40 billion in 2011, and US\$28 billion in official exchange rate in 2009. Per capita GDP in PPP is US\$1,800 in 2011. See <http://www.cia.gov/library/publications/the-world-factbook/geos/kn.html>, viewed on May 27, 2012.

⁵ RUSIA Petroleum, the operator of the Kovykta gas field, was established in April 1992 to develop major hydro-carbon fields in the Irkutsk region. Proved reserves of natural gas in Kovykta are more than 2,000 billion cubic meters (BCMs). The pilot development of the field started in 2001. Estimate are that 62.9% of RUSIA Petroleum shares were owned by TNK-BP. Gazprom bought assets of RUSIA petroleum and received the exploration and production license for the major Kovykta gas field in East Siberia in 2011. <http://www.platts.com>, viewed on May 10, 2012.

⁶ Shoichi Itoh, “Russia Look East: Energy Markets and Geopolitics in Northeast Asia,” A Report of the CSIS, Russia and Eurasia Program, (2011), p. 27.

⁷ Itoh, *Op cit.*, p. 28.

⁸ “The Eastern Gas Program made no reference to the concept of constructing a pipeline from Kovyta deposit to China,” Itoh, *Op. cit.*, p. 33.

⁹ The RUSIA petroleum’s bankruptcy was declared by a Russian court in 2010.

¹⁰ See <http://www.gazprom.com>, viewed on May 1, 2012.

¹¹ See <http://en.ria.ru/russia/20111117/168770662.html>, viewed on May 27, 2012.

¹² ENI, *O&G: World Oil and Gas Review 2011*. 10th ed., (2011), pp. 44-96.

13 *Ibid.*

¹⁴ Sergey Paltsev, "Russia's Natural Gas Export Potential up to 2050," CEEPR WP 2011-012, (2011), p. 8.

¹⁵ John W. Bauer, "Unlocking Russian Interests on the Korean Peninsula," *Parameters*, (Summer, 2009), p. 55.

¹⁶ Itoh, *Op cit.*, p. 20.

¹⁷ IEA, *World Energy Outlook 2011*.

¹⁸ U.S. Energy Information Administration, *International Energy Outlook 2011*, p. 45

¹⁹ TKR means Trans-Korean railroad, and TSR means Trans-Siberia railroad.

²⁰ "Russia was most active in the TKR-TSR linking initiative, starting from early 2000. In the South Korea-Russia summit meeting held in Seoul in February 2001, cooperation for TKR-TSR connection was discussed, and both parties agreed to the establishment of a Transport Coordination Board and a Representative Office of Railways to pursue this initiative." Jong-chul Park, "Korea's Perspective on the Linkage of Economic and Security Cooperation in Northeast Asia," Korea Institute for National Unification, Online Series, 2006-14, 2006, p. 9.

²¹ Han Jong Man, "Russia-DPRK-ROK Natural Gas Pipeline Project," 2011, unpublished manuscript.

²² Garrett J. Harkins, "A Trans-Korean Natural Gas Pipeline: Feasibility Study," *Honors Capstone* (Spring, 2011), pp. 24-25.

²³ Sergey Paltsev, *Op. cit.*, pp. 1-2.

²⁴ Itoh, *Op. cit.*, p. 13.

²⁵ Itoh, *Op. cit.*, p. 34.

²⁶ Vassiliouk, S., *Japanese-Russian Energy Cooperation: Problem and Perspectives*, Oct. 9-13, 2008, Rhodes Greece, World Civilization Forum.

²⁷ Stephen Haggard, "More on the Pipeline," North Korea Witness to Transformation, Sept. 20, 2011. <http://www.piie.com/blogs/nk/?p=2887>, viewed on May 13, 2012.

²⁸ Lee Seong-kyu, *Op. cit.*, p. 40 (in Korean).

²⁹ China has imported oil since 1994, and the volume has been almost two times larger than its production. China imported 53% of its total oil consumption in 2009. Chinese Energy Research Institute.

³⁰ Japan Energy Data, *Statistics and Analysis: Oil, Gas, Electricity, and Coal*, updated on March 2011. <http://www.iea.doe.gov>, viewed on May 15, 2012.

³¹ Martin Adam, *Japan's Energy Future: The EIU View*, (2012), p. 6.

³² Allen & Overy LLP, *U.S. Shale Gas Developments: Investment opportunities from the wellhead to the burner tip*, 2011. http://clientlink.allenoverly.com/images/1106_US_Power-ShaleGas.pdf, viewed on May 4, 2012.

³³ World Energy Council, *Survey of Energy Resources: Focus on Shale Gas*, 2010, pp. 3-6.

³⁴ Garrett, J. Harkins, *Op.cit.*, pp. 24-27.

³⁵ Adnan Vatansever, *Russia's Oil Exports: Economic Rationale Versus Strategic Gains*, (Washington, D.C.: Carnegie Endowment for International Peace, 2010); Keith C. Smith, *Lack of Transparency in Russian Energy Trade The Risks to Europe*, (Washington, D.C.: Center for Strategic and International Studies, 2010).

³⁶ Kari Liuhto, "The EU needs a common energy policy - not separate solutions by its member states" in Kair Liuto, ed. *The EU-Russia gas connection: pipes, politics and problems*, pp. 109-140.

³⁷ President Lee argues that this would not be any problem because the Russia-South Korea gas contract would include a Russian guarantee to supply a certain amount of gas annually at the same price either through pipeline or ship. This means that Russia should be willing to risk North Korea's cutting-off the gas pipeline at any time. Either it may be difficult for Russia to do this, or gas prices will increase greatly, due to the uncertainty of North Korea's actions.

³⁸ The authors would like to express a sincere thanks to Dr. Richard Shin, a senior economist from the *Economists, Inc.*, who provided a valuable comment on this trilateral monopoly negotiation issue.

³⁹ Emma Chanlett-Avery, "Rising Energy Competition and Energy Security in Northeast Asia: Issues for U.S. Policy," CRS Report for Congress, 2005.