The Status and Perspective of Energy Cooperation in Northeast Asia

by

Kwonsung Kim

Department of Political Science
Duke University

Date:_____

Approved:

_____
Emerson Niou, Supervisor

_____
Michael D. Ward

_____
William R. Keech

Thesis submitted in partial fulfillment of
the requirements for the degree of Master of Arts in the Department of
Political Science in the Graduate School
of Duke University

2011

ABSTRACT

The Status and Perspective of Energy Cooperation in Northeast Asia

by

Kwonsung Kim

Department of Political Science
Duke University

Date:_____

Approved:

_____
Emerson Niou, Supervisor

_____
Michael D. Ward

_____
William R. Keech

An abstract of a thesis submitted in partial
fulfillment of the requirements for the degree
of Master of Arts in the Department of
Political Science in the Graduate School
of Duke University

2011

Abstract

The principal purpose of this study is to explore the significance of the concept of multilateral energy cooperation in the Northeast Asia region. The energy issue is becoming a major feature of the new political and economic world order. For example, ensuring the security of energy supply and, developing competitive markets play important roles in establishing the new world order. Northeast Asia is a region with increasing importance in terms of the world energy balance. The International Energy Agency reports repeatedly that the region could face great difficulties in energy supply due to the fast rising Chinese economy. Nonetheless, various political conflicts and embedded historical distrusts among these nations have hindered any form of institutional cooperation framework. The recent conflict between Japan and China over the oil pipeline route from east Siberia is an impending example. Nonetheless, there are very few studies dealing with alternative forms of international institutions for energy cooperation for Northeast Asia. European countries share common characteristics in their energy problems with Northeast Asia: Uneven distribution of energy resources among the countries and the great need for cooperative institutions to solve the energy problems. This paper examines various types of institutions for energy cooperation in the world. European case has been successful because Europe adopted supranational institutions for enhancing cooperation among members. This paper argues that the

nations in Northeast Asia must establish a new form of institutional vehicle with supranational characteristics in order to achieve effective and practical energy cooperation in this region. This new vehicle will not only play a complementary role for the pre-existing intergovernmental approaches initially, but also lead to the new politico-economic order in this region eventually. This analysis will also provide a better understanding of how the Northeast Asian countries can establish a new form of an energy cooperative organization in the region.

Contents

List of Tables

List of Figures

1. Introduction

Northeast Asia is the region which attracts the world's closest attention in terms of the energy security. The International Energy Agency' (IEA) 'World Energy Outlook 2008' indicates that the energy consumption in Northeast Asia is expected to amount to 3.5 billion tons of oil equivalent by year 2035, approximately rise of 1.5 billion tons over the next 25 years. This amount will exceed that of U.S. and Canada combined in 2035. China is mainly responsible for this projected increase in the energy consumption.

Northeast Asia is a region where the issue of energy and the preservation of security are closely connected to each other. The top three energy consumption and import countries, South Korea, China, and Japan in Asia are in the region, while Russia, one of the largest world energy suppliers, is located in this region too. Northeast Asia is one of the three major global energy markets together with the U.S. and Europe. As the economy is developed and the energy is lacked, the energy problem will become more and more critical.

Energy cooperation is a term identifying cooperation among countries in a region for joint energy supply, consumption, and facility construction. Recently, competitions have become quite fierce over securing energy, resulting in the continuous rise of oil price. Governments have paid great attention to secure energy and become alerted about the possible energy crisis in the future. As of result of this trend, movements of regional energy cooperation became apparent.

The Northeast Asian countries[1] are in mutually complementary positions. The energy market in the region consists of one monopoly supplier (Russia) and small number of buyer (China, South Korea, and Japan). On the one hand, China, Japan and South Korea are among the world top ten energy consumers. On the other hand, Russia is already the world's largest gas exporter and the second largest exporter of oil after Saudi Arabia. One of the most important current energy policy goals for China, South Korea, and Japan, which have been heavily dependent on the Middle East, is to diversify their energy supply routes in order to reinforce their energy resources. Also, the diversification of energy export routes and the development of the eastern region of the country are one of the main aims of the Russian energy policy.

Yet, competition, not cooperation, is more common among these energy consumers in Northeast Asia. They are competing with each other in order to secure energy resources including Russia's. Although they all agree on the need for the energy cooperation eventually, there are challenges to be overcome before such cooperation is established in Northeast Asia: history- based distrusts, territorial disputes, weak multilateral frameworks, and China-Japan economic rivalry relations.

---

1 Northeast Asia is not a formally defined region. In debates about energy cooperation, it is generally meant to include the energy producing, consuming and transit countries of the region which include Russia, Mongolia, China, Japan, and North Korea as well as South Korea. The focus of this paper will be limited to cooperation between Russia, China, Japan, and South Korea as they are the one big energy supplying country and the three major energy consuming countries in Northeast Asia.

In the international community, the foundation for successful multilateral cooperation is confidence and trust among countries in the region. Since the 1990s, various governmental and non-governmental attempts were made in the region. However, the ideal outcome has not been seen in the region due to the lack of mutual trust especially between China and Japan.

Finding a model that is suitable for Northeast Asia will provide an important stepping stone for a breakthrough to form an energy cooperative community in Northeast Asia. The European Union is the most well-known case in which the energy cooperation has been systematized. In terms of the energy cooperation, there are many similarities between the problems faced by Northeast Asia today and those experienced by Europe since the end of the World War Ⅱ. In the 1950s, Europe was a region of insecurity and political instability caused by excessive nationalism. The regional cooperation on the basis of energy cooperation, through the creation of the European Coal and Steel Community, was the first step towards creating a regional security. In the 1990s, Europe faced increasing energy dependency on Russia in the changing geopolitical context of post communism. The solution adopted was to develop a multilateral legal framework for economic cooperation with Russia. The analysis into the cases of energy cooperation schemes in other regions will contribute greatly to establish an effective and practical regime for the energy cooperation in Northeast Asia.

This paper proceeds in three parts. First, it begins with the energy situations in Northeast Asia, analyzing energy situation and strategies in each four country in order to understand why they are struggling against securing energy resources. Second, the paper explores some energy cooperation projects in Northeast Asia such as the East Siberia gas field development and oil pipeline construction in order to analyze each country's positions and attitudes. Then, it draws the needs and obstacles of energy cooperation among the Northeast Asian countries. Also, the paper addresses the Northeast Asian energy cooperative organizations initiated by Korean government as well as successful cooperative scheme in other region. Finally, implication and suggestion will be generated by discussions to form an energy cooperation scheme by pointing out the limit of the present schemes.

2. Energy Outlook in Northeast Asia

2.1 Northeast Asian Energy Security

The generally accepted outlook, Northeast Asia is expected to show the most dynamic economic growth of any region in the world for at least the next two decades. China's growth lies at the center of this expectation. At the same time, the economic growth of South Korea and the status of Japan as a global economic leader also account for the predominant views on Northeast Asia.

However, Northeast Asia faces the greatest energy imbalance in the world due to rapid increase in energy demand of China. Since the high economic growth inevitably results in a huge volume of energy usage in the region, energy security of Northeast Asia is vulnerable. Moreover, as energy imports are largely dependent on Middle East suppliers, any regional conflicts or marine transportation route crises could seriously impact the stability of energy supplies to Northeast Asia. Focusing on energy-related issues, the first and foremost challenge is to secure an adequate level of energy for supporting the economies (Doh 2003; Mikkal 2004; Lee and Brigid 2007; ect)

To put it simply, countries in Northeast Asia, especially heavy energy-consuming countries like China, Japan, and South Korea, are exposed to energy security threats in a broad sense, regarding energy security as a stable and cost-effective energy supplies.

2.1.1 Natural Resources Endowments

Northeast Asia is endowed with abundant energy resources, especially natural gas and coal. Roughly a third of the world's natural gas and coal deposits lie in this region. The geographical distribution of the resources endowment, however, exhibits extreme disparity across the countries. As shown in Table 1, most reserves are found in Russia and China, while South Korea and Japan are endowed with few resources.

Table 1: Energy Reserves of the Northeast Asian Countries.

	Coal	Oil	Natural Gas
	Proven Reserves (Mton)	Proven Reserves (Mton)	Proven Reserves (Bil.m^3)
S.Korea	82	-	6
Japan	785	7	32
China	95,900	5,272	1,171
Russia	200,580	6,654	47,700
(RFE&E.Siberia)[1]	(169,300)	(1,570)	(3,204)
NE Asia Total(a)	243,327	11,933	48,909
(Share a/b)	(30.9%)	(8.2%)	(33.2%)
World Total(b)	788,511	146,102	147,265

Source : Bang, Ki-Yual, *The Analysis of Potential Energy Supply and Overseas Development Strategies in East Siberia,* Korea Energy Economics Institute, 2003.

China is richly endowed with energy resources. Nevertheless, it became a net energy importer in the early 1993, due to the rise in energy demand driven by economic

[1] The Russian Far East and East Siberia. The probable reserves for oil and natural gas are estimated to be 12.4-14.4 billion tons and 32-36 trillion m^3. Hence only 10-12 percent of probable oil reserve and 9-10 percent of gas reserves are proven.

growth. Russia is the only net energy exporter in Northeast Asia. Russia is already the world's largest gas exporter and the second largest exporter of oil and oil products, after Saudi Arabia. The International Energy Agency projects that Russia will play an increasingly important role in world oil and gas markets for the next two decades.[2]

2.1.2 Energy Demand of Major Energy Consumers

Northeast Asia includes three of the top 10 energy consuming countries, namely, China, Japan, and South Korea. China ranks 2nd in primary energy consumption, accounting for 17.0 percent of the world's total. Japan is 4th and Korea is 9th, accounting for 4.5 percent, and 2.1 percent respectively. The three countries consume total around 23.2 percent of the world energy.

Table 2: Total Energy Consumption Projection. (Unit: Quadrillion Btu).

	2007	2015	2020	2025	2030	2035	Annual Growth
South Korea	9.7	10.6	11.7	12.7	13.8	14.9	1.5
Japan	22.8	21.1	21.9	22.1	22.1	22.2	-0.1
China	78.0	101.4	121.4	142.4	162.7	181.9	3.1
World	495.2	543.5	590.5	638.7	683.5	738.7	1.4

Source : Energy Information Administration (EIA), U.S. Department of Energy, *International Energy Outlook 2010*

[2] International Energy Agency, *World Energy Outlook 2008* (Paris: OECD/IEA, 2008), pp.269-284.

As shown in Table 2.1, In the next two or three decades, the energy demands of China and Korea are expected to grow much faster than the world average, while that of Japan is projected to show a modest growth.

The leading source of primary energy in Northeast Asia is oil. In 1999, oil overtook coal as the leading source of primary energy in the region, due to the continuous decline in the share of China's coal consumption since 1996. In terms of the oil consumption share of world total in 2009, China is the second largest oil consuming country in the world following the U.S., accounting for 10.4 percent of the world total. Japan follows China with a share of 5.1 percent making it the 3rd largest oil consuming country in the world, and Korea ranks the 8th largest with a share of 2.8 percent. Japan, China and Korea together accounted for 18.3 percent of world oil consumption.[3]

Northeast Asia is a major oil importer. These major energy consuming countries are greatly dependent on the Middle East as their supply source. Japan and Korea's oil import dependency on the Middle East was 77 percent and 74 percent in 2009. China's oil import dependency on the Middle East was 45 percent. This outlook clearly indicates that a future oil crisis, especially originating in the Middle East, could seriously disrupt the supply stability of Northeast Asia.

Although natural gas demand has grown fast in Northeast Asia, it still accounts for less than 10 percent of the region's total energy consumption and is still under-

[3] British Petroleum, *Statistical Review of World Energy 2010* (London: BP Communication Services, 2011)

utilized compared to other regions of the world. Natural gas usage in China has increased rapidly in recent years. However, Natural gas accounted for only 3 percent of China's total energy mix in 2008.The Chinese government anticipates boosting the share of natural gas as a part of total energy consumption to 10 percent by 2030 to alleviate high pollution from the country's heavy coal use.[4] Japan is the world's largest importer of natural gas and the Japanese government has encouraged natural gas consumption in the country due to environmental concerns. Natural gas accounted for 17 percent of Japan's total energy mix in 2008. In Korea, natural gas consumption has grown rapidly since its introduction to the country 15 years ago, at an average growth of about 18 percent per year. Its share in the country's total energy mix was 14 percent in 2008.

Russia is one of the largest exporters of oil and natural gas in the world while China has become a major energy importer. This may shape dynamics of world energy maps differently from what is now by changing the energy supply and demand structure. Firstly, in terms of the energy supply structure of the world, the position of OPEC seems to decline alongside the growth of Russia and central Asia. Secondly, in terms of the energy demand structure of the world, the position of USA and EU seems to decline alongside the growth of Asia, particularly China, Japan and Korea that have occupied the second, third, forth, or fifth positions among the global energy importers.

---

[4] EIA, U.S. Department of Energy, *The analysis China Country*. 2008

2.2 Russia

2.2.1 Energy Situation

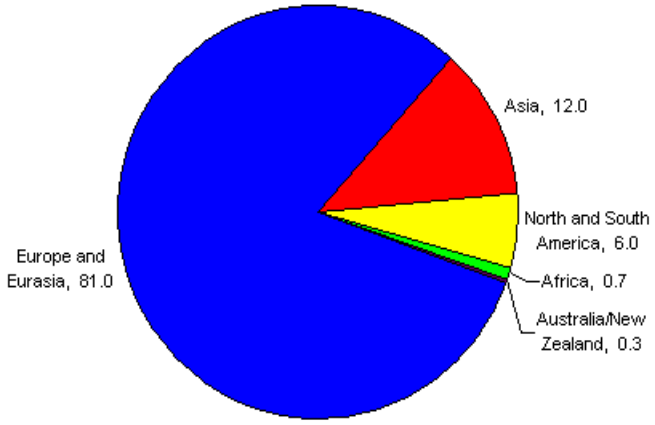
Russia is a major exporter of oil and natural gas and its economic growth over the past decade has been driven primarily by energy exports, given the increase in Russian oil production and relatively high world oil prices during the period. Most of Russia's oil production comes from Western Siberia, more specifically from Priobskoye, Prirazlomnoye, Mamontovskoye, Malobalykskoye, and Surgut regions. The Sakhalin region in the Far East is expected to contribute to most of Russia's oil production in the near future. In the longer-term, untapped oil reserves in Eastern Siberia, the Caspian Sea, and Sakhalin are expected to play a larger role.

Table 3: Russian Crude Oil Rroduction by Region, 2009.

Production by Region	2009 Production Volume (Thousand bbl/d)
Western Siberia	6570
Urals-Volga	2030
Northern Caucasus	800
Arkhangelsk	370
Sakhalin	310
Komi Republic	270
Krasnoyarsk	70
Yakutiya	60
Irkutsk	30
Kaliningrad	30

Source : EIA, U.S. Department of Energy, *International Energy Statistics*.

Russia exported 7 million bbl/d of oil in 2009. The 81 percent of Russia's oil exports are destined to European markets, especially Germany and Netherlands. About 12 percent of Russia's oil exports go to Asia, while 5 percent are exported to the U.S.



Source : EIA, U.S. Department of Energy, *International Energy Statistics.*

Figure 1: Russia's Oil Exports by Region, 2009.

According to EIA, Russia holds the world's largest natural gas reserves, with 1,680 trillion cubic feet, and Russia's reserves account for about a quarter of the world's total proven reserves. More than half of all reserves are located in Siberia and significant reserves are also located in northern Russia. Russia exports significant amounts of natural gas to customers in the Commonwealth of Independent States (CIS). In addition, Russia has shifted much of its natural gas exports to serve the rising demand in countries of the EU, as well as Turkey, Japan, and other Asian countries.

Table 4: Russian Crude Gas Export by Region, 2009.

Destination	2009 Export Volume (Billion cubic feet)
Western Europe	3267
CIS Countries	2239
Eastern Europe	1275

Source : EIA, U.S. Department of Energy, International Energy Statistics.

2.2.2 Energy Strategy

Since 2000, resource nationalism on energy policy has become intensified, and countries with energy reserves have attempted to utilize their resources to their best interest. Russia also leads such a trend. Russia's influence on the world energy market has increased as its oil and natural gas exports increased (Vasily 2006; Vladimir 2010).

The Russian government understands the geopolitical importance of its energy resources and tries to improve its position in the international community through an energy supply (Tian 2007). Energy exports revised Russia's slow economy and became the driving force to its high economic growth (Vyacheslav 2010).

In the emerging markets of Northeast Asia, Russia saw opportunities of double gain by achieving energy security and developing the Far Eastern Region and East Siberia. Putin's government continued to maintain its traditional energy relationship with the European markets, and it also had strongly developed its relationship with the Northeast Asia (Klashnikov and Guilidove 2008).

The Summary of Russian Energy Strategy 2020.[5]

Key assumptions:

- Annual economic growth rate: 5.5%
- Annual primary energy demand: 1.5% (electricity 2.5%)
- Radical reduction of GDP energy intensity : two fold by 2020

Federal Program : Economic Development of the Russian Far East and Transbaikal region up to 2020:

- Sufficient energy supply
- As much energy independence as possible
- Reliable and diversified energy supply

According to Russia's Energy Strategy 2020, the report recommended increasing export to Northeast Asia, a shift from the existing trade pattern- dominant trade with Europe. Russia will attempt to establish a comprehensive and mutually beneficial relationship with the Northeast Asian countries in the energy dynamics.

In this regard, 'Great Eastern Strategy' raised by the Carnegie Moscow Center in 2005, also emphasized the importance of Northeast Asia as Russia's energy partner. The Great Eastern Strategy is the following. (1) To launch the energy policy that will make Russia the major oil and natural gas supplier of the Northeast Asian countries (China, Japan, South Korea, and other countries) and will attract investment to develop the

---

[5] Source: *The Summary of the Energy Strategy of Russia for the Period of up to 2020*, Ministry of Energy of the Russian Federation, Moscow, 2003.

Russian Far East region. (2) To implement an active immigration policy in Russia's eastern region in order to meet the labor resource demands. (3) To formulate a security doctrine that creates a regional structure in Northeast Asia. (4) To establish a political strategy ensuring that Russia is not inferior, but equal to China and shares a friendly relationship with it (Kulagin 2006).

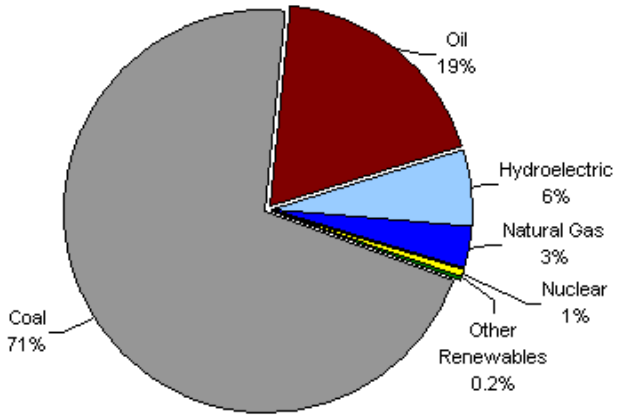
In short, Russia's energy policy is its main strategy to solve the crisis occurring in the Far East. Energy is the only means that Russia can play an influential role in Northeast Asia. Russia can exploit the construction projects of oil and natural gas facilities that will enhance economic development and alter current situations in the Far East and Siberia.

2.3 China

2.3.1 Energy Situation

China is the world's most populous country and has a rapidly growing economy. China's energy demand has changed dramatically due to its annual double-digit GDP growth. According to IEA, as of result of such speedy economic growth, China's energy consumption doubled between 2000 and 2007. Previously China had entirely depended on coal, but China has turned increasingly to oil to satisfy its energy demands. Although coal still provides nearly 71 percent of energy consumption, China became the world's second largest oil consuming country after the U.S in 2003.

Moreover, China has accounted for nearly 30 percent of world oil demand growth since 2000.



Source: EIA, U.S. Department of Energy, *International Energy Statistics.*

Figure 2: Total Energy Consumption of China, by Resources, 2008.

Even though China produces Oil, China became the world's third-largest net importer of oil in 2006. China's oil consumption growth accounted for about a third of the world's oil consumption growth in 2009. The Middle East remains the largest source of China's crude oil imports. According to IEA, China imported oil of which approximately 50 percent came from the Middle East, 30 percent from Africa, 5 percent from the Asia-Pacific region, and 17 percent came from other countries.

Natural gas consumption of China has increased rapidly in recent years, and China has looked to raise natural gas imports via pipeline and liquefied natural gas. Natural gas is not a major energy source in China, although its portion of its energy mix

is increasing. As mentioned earlier, the Chinese government anticipates boosting the share of natural gas as a part of total energy consumption to 10 percent by 2030 to alleviate high pollution from the country's heavy coal use. As China's indigenous gas resources are inadequate, imports from Eastern Russia will be the optimal solution for the future. If China is to achieve its stated goal of rapidly expanding the use of natural gas, it will need regional cooperation with neighboring countries to construct pipeline to Northeast Asia.

China is also the world's largest producer and consumer of coal and has accounted for 46 percent of world total coal consumption. According to EIA, China's coal imports started growing since 2002 because imported coal prices including transportation fee became competitive with domestic production prices, and the coal industry began suffering from frequent bottlenecks in transmission to consumer markets.

2.3.2 Energy Strategy

It was not until 1993 when China turned into a net oil importer that the Chinese government started to realize the seriousness of energy problem fearing that energy shortages and volatile world energy prices could become serious impediments to economic growth. (Mikkal 2004; Xu 2006)

The strategic view was reflected in the policies aimed to maximize domestic energy output, diversify oil import sources and increase investment in overseas oil and gas resources. The new foreign policy of 'going-out' focuses on building political and economic links with Central Asia, Middle East, Africa, and especially Russia. This policy is based on three major concerns. Firstly, China fears that sudden global oil supply disruptions could cause energy shortages and price spikes. Secondly, China faces a growing vulnerability for the majority of its oil needs from the unstable Middle East and other potentially problematic exporting regions such as Central Asia and Africa. Thirdly, China has felt increasingly threatened by U.S. strategic dominance in the Middle East and other important oil-exporting regions, as well as U.S. control of critical transportation routes that enable the U.S. to deny vital oil supplies to China in the event of a confrontation, particularly over Taiwan (Jiang 2006; Choo 2006).

In 2006, Premier Wen Jiabao and Vice premier Zeng Peiyan emphasized that Energy is an important strategic issue concerning China's economic growth, social stability and national security. In addition, the 2006 Working Report, delivered by Vice Premier Zeng Peiyan to the People's Congress emphasized China's potential and existing energy challenges. (Xu 2006)

The Summary of China's Energy Strategy.[6]

---

[6] Source: *China's National Energy Strategy and Reform*. Development Research Center of the State Council, November 2003.

- Develop multiple oil import sources and import locations by increasing imports from Russia and Central Asia
- Raise the proportion of crude oil imports from areas other than the Middle East so as to achieve diversification of energy suppliers
- Prepare against unexpected interruption of oil supplies by building strategic oil reserves

According to China's energy strategy, China has pursed its energy security on a various measures. Firstly, it has sought to strengthen its supply relationship with key areas, such as the Middle East, while diversifying the geographic distribution of its crude oil suppliers and transportation routes. Secondly, China is seeking to increase oil supplies from Russia's East Siberia through long-distance pipeline projects, which would have the advantage of reducing vulnerability to disruptions from the Middle East.

China's energy strategy involves Beijing's active oil and gas diplomacy, strengthening oil supply contracts, equity stakes, and cross-investment with deeper and broader diplomatic and trade ties. For example, President Jiang Zemin made a first-time state visit to Saudi Arabia in 1999 proclaiming `strategic energy partnership' between the two countries. In 2001 Jiang traveled to Moscow in order to broaden energy, trade, and military ties. China also has pursued a diplomatic tool to strengthen the relationship with Australia and Indonesia which are its major gas suppliers. China's leadership sees the development of broader diplomatic and trade ties and alliances as a key element in securing future oil and gas supplies (Xu 2006).

China's willingness to promote cooperative regional solutions to Asia's energy security concerns have been very limited (Chun 2005). However, Beijing has been involved in discussions with Russia and Korea on proposal to build a large regional natural gas pipeline from East Siberia, southeast through China, and across the Yellow Sea to South Korea to link Russian gas supplies to both markets.

2.4 Japan

2.4.1 Energy Situation

Japan has few domestic energy resources and is only 16 percent energy self-sufficient. Japan is the third largest oil consumer in the world following the United States and China, and the second-largest net importer of crude oil. It is the world's largest importer of both liquefied natural gas (LNG) and coal.

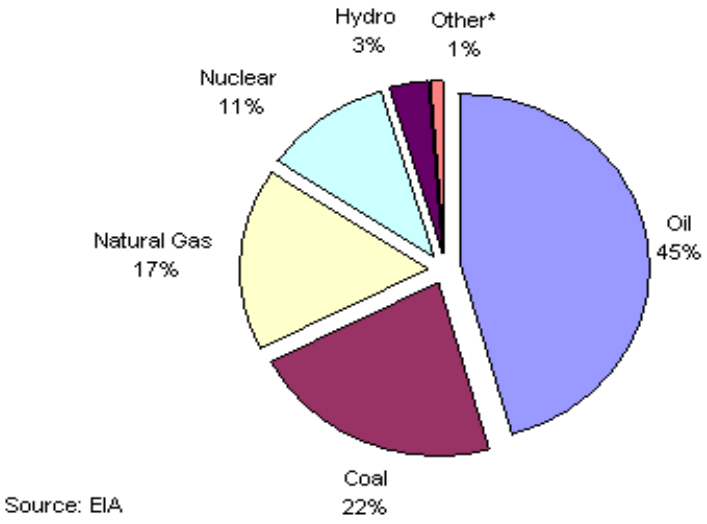
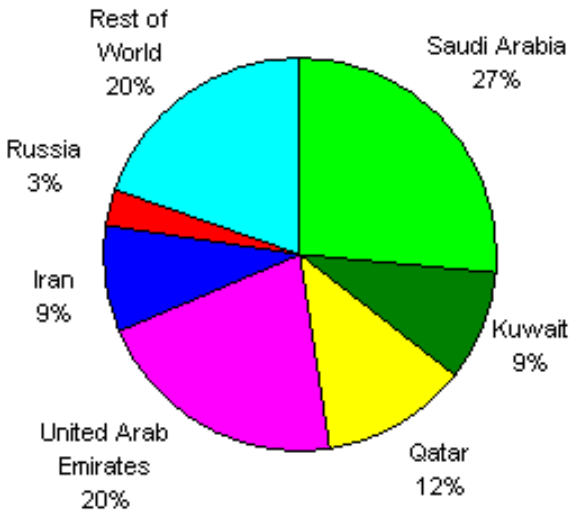


Figure 3: Total Energy Consumption of Japan, by Resources, 2008.

As presented in Figure 2.7, Oil is the most consumed energy resource in Japan, although its share of total energy consumption has declined from about 80 percent in the 1970s to 45 percent in 2008. Coal continues to account for a significant share of total energy consumption, although natural gas and nuclear power are increasingly important sources.

Japan has very limited domestic oil reserves. Consequently, Japan heavily relies on imports to meet its consumption needs. Japan was the second-largest net importer of oil in the world after the United States in 2008 and primarily depends on the Middle East for its oil imports, as roughly 80 percent of Japanese crude oil imports originate in the region. Japan is currently looking towards Russia, South East Asia, and Africa to geographically diversify its oil imports.



Source: EIA, U.S. Department of Energy, *International Energy Statistics*

Figure 4: Japan's Crude Oil Imports by Major Sources, 2009.

According to The Oil and Gas Journal (OGJ), Japan had 738 billion cubic feet (Bcf) of proven natural gas reserves as of 2010 and most natural gas fields are located along the western coastline. Because of its limited natural gas resources, Japan relies on imports to meet its natural gas needs. Japan began importing LNG (Liquid Natural Gas) from Alaska in 1969, making it a pioneer in the global LNG trade. Due to environmental concerns, the Japanese government has encouraged natural gas consumption in the country and Japan accounted for about 36 percent of global LNG imports in 2009.

2.4.2 Energy Strategy

Since the oil embargo of 1973, energy security has been a major concern for the Japanese government. Given Japan's extremely limited indigenous energy resources and its heavy dependence on imports from the Middle East, it remains deeply vulnerable to disruption of energy supplies. Japan has sharply reduced the rate of growth in oil demand over the past 30 years and succeeded in reducing oil's share of total energy use from an extraordinary high 75 percent in 1973 to 45 percent by 2008. This was achieved by pioneering fuel-efficient transportation and automobile technology and by taking oil largely out of the electricity generator sector. (Masaki 2006; Kumagai 2006)

Japan has taken a number of measures to diversify its sources of energy and to reduce the share of oil in its overall energy mix. It has steadily increased the use of nuclear power for generation of electricity, doubling nuclear power output between

1985 and 1996. Natural gas accounts for 13 percent of its energy mix with imports mainly from the South East Asian countries of Malaysia and Indonesia, in the form of liquefied natural gas (Koyama 1998).

A New National Energy Strategy launched in June 2006 sets forth five specific numerical targets for Japan to be achieved by 2030.

The Summary of Japan's Energy Strategy.[7]

- Energy consumption per unit of GDP should be improved by 30%
- Dependence on oil as a percentage of the total primary energy supply should be reduced to 40% or less from the present level of slightly less than 50%
- The percentage of oil in the total energy consumption of the transport sector should be reduced to about 80% from the present level of almost 100%
- The percentage of equity oil secured by Japanese companies in total crude oil imports should be increased to 40% from the present level of 15%
- The percentage of electricity generated by nuclear power in the total generated electricity should be increased to 30-40% or more from the present level of 30%

Japan's energy policy has been continually adapted to respond to changing global conditions. The traditional strategy emphasizing security of supply has gradually been broadened to a more comprehensive approach which aims to achieve the '3Es' of economic efficiency, environmental protection and energy security. Government has

[7] Source: *The Strategic Energy Plan of Japan*. Ministry of Economy, Trade and Industry, Japan. June 2010.

also increased risk money for Japanese companies conducting oil and gas exploration overseas. To support private company activities, it has reviewed the strategies use of Official Development Assistance (ODA) to make it a more effective foreign policy tool in the pursuit of strategic interests (Toichi 2006).

Japan has recently become more aggressive in seeking equity for oil supplies abroad, and has made progress on two large oil deals. In Iran, Japan recently completed four year of negotiations to get exclusive developments rights for a very large oil field, Azadegan. Japan achieved the deal despite of pressure and protests from the U.S. over Iran's suspected nuclear weapons development and the U.S. unilateral embargo on Iran. (Avery 2008).

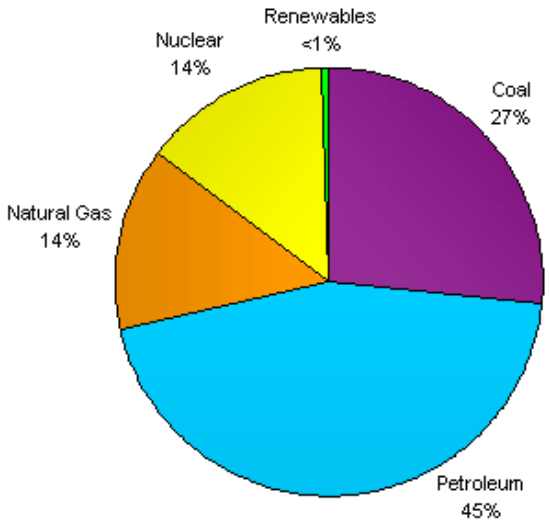
In Russia, Japan has also displayed aggressiveness in securing oil. China had been negotiating with Russia, for several years to build a large oil export pipeline to bring oil from the East Siberian region of Angarsk to connect to northeastern China's oil infrastructure at Daqing. In late 2003, Japan stepped in the pipeline-building competition with $7 billion offer to finance construction of a larger and longer pipeline from Angarsk to the pacific coast at Nakhodka anticipating further finance for field development in the Angarsk region. The pipeline would allow oil exports to all of Asia, most importantly Japan. Russia has been ambivalent about a decision but appears to be leaning on the Japanese proposal. Eventually the competition between Japan and China ended up with a compromise that Russia would build a pipeline which would be

connected to the pacific Coast as Japan. But, China will be the primary builder of the pipeline for oil supply.

2.5 South Korea

2.5.1 Energy Situation

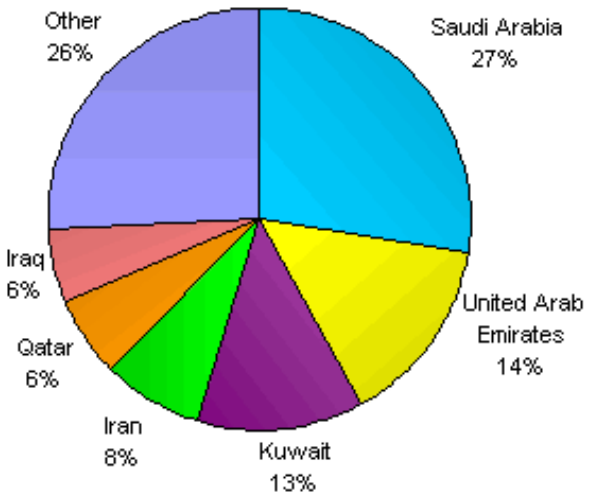
South Korea, with its lack of domestic reserves, was the world's tenth largest energy consumer in 2007 and it is now one of the top energy importers in the world. The country is the fifth largest importer of crude oil and the second largest importer of both coal and liquefied natural gas (LNG). South Korea does not possess international oil or natural gas pipelines, thus exclusively relying on tanker shipments of LNG and crude oil. Therefore, the government makes efforts to guard the nation's energy security. In this respect, state-owned oil, gas, and electricity companies are aggressively seeking overseas exploration and production opportunities.



Source: EIA, U.S. Department of Energy, International Energy Statistics.

Figure 5: Total Energy Consumption of Korea, by Resources, 2008.

Although oil accounted for the largest portion (45 percent) of South Korea's primary energy consumption in 2008, its share has been declining since the mid-1990's, reaching a peak of 66 percent. South Korea is highly dependent on the Middle East for its oil supply, with the Middle East accounting for nearly 75 percent of its 2009 total oil imports. Saudi Arabia was the leading supplier, and the source of more than a quarter of total oil imports.



Source: EIA, U.S. Department of Energy, International Energy Statistics.

Figure 6: Korea's Oil Imports by Major Sources, 2009.

South Korea relies on imports to satisfy nearly all of its natural gas consumption which has approximately doubled over the previous decade. South Korea does not have any international gas pipeline connections therefore; it imports all gas via liquefied natural gas (LNG) tankers. As a result, although South Korea is not among the group of

top gas-consuming nations, it is the second largest importer of LNG in the world after Japan.

Although the associated 2008 KOGAS-Gazprom memorandum of understanding indicated that the gas could be imported either as LNG or via pipeline from Vladivostok, Russian and Korean leaders recently acknowledged that the pipeline construction option will most likely not be deemed economically feasible without the cooperation of North Korea.

2.5.2 Energy Strategy

Energy profile of Korea is quite similar to that of Japan in terms of energy consumption structure, import dependency, and, large stockpiling of reserves. Korea's rapid industrialization has increased gross domestic product but with greater increases in energy consumption. Stuck by the financial crises of 1997, however, the government focused attention on energy efficiency. The devaluation of the country's currency, which led to a doubling of energy prices, high-lighted the need for improved energy efficiency and domestic energy sources such as nuclear plant and renewable energy sources.

The Summary of Korea's Energy Strategy.[8]

- Energy consumption per unit of GDP should be improved by 30%
- Energy consumption per unit of GDP should be improved by 40%
- Dependence on oil as a percentage of the total energy supply should be reduced to 33% or less from the present level of 43.5%
- The percentage of new and renewable in the total energy mix should be reached to 11% from the present level of 2.4%
- The percentage of electricity generated by nuclear power in the total generated electricity should be increased to 40% or more from the present level of 25%

Korea's future energy vision includes establishing an energy system for sustainable development, fostering a competitive, market-oriented energy industry, promoting energy technology exports; and becoming the hub of an open Asian energy system. Korea aims to link up to an energy network with other Asian countries, and to foster progress on Northeast Asian energy cooperation.

Korea has also pursed cooperative energy security strategies. Korea has recently joined the International Energy Agency (IEA) and has coordinated with other industrial countries in the event of a supply disruption. This more cooperative approach to energy security is also evident in Korea's leadership in forwarding proposals for a large regional gas pipeline to bring Russian gas to China and Korea and possibly even Japan.

[8] Source : The First National Energy Plan, Ministry of Knowledge Economy of Korea, 2008

Broadly speaking, Korean officials have been more deeply involved in discussions in APEC and elsewhere to broaden regional energy cooperation, and it frequently advocates regional energy cooperation. (Mikkal 2005; Gavin and Lee 2007)

The government continues to pursue a top agenda of acquiring overseas equity stakes in oil exploration and production. Korea has developed stakes in Yemen, Indonesia, Burma, Vietnam, Argentina, Peru, and the UK, and it has been involved in field development in Venezuela and Libya. It has also been involved in exploration in Angola, Algeria, Indonesia, Surinam, Ghana, and China. South Korea has developed relationships with the major Middle East oil producers at multi-levels; by diplomatically strong ties; through a number of large crude supply contracts and industrial and service contracts; and by involving in a number of construction projects from power plants, refineries, and chemical plants in the region. It is also beginning to broaden its industrial and diplomatic contracts in Central Asia and the Caspian region to support its long-term oil supply interests (Ministry of Knowledge Economy of Korea 2009).

3. The Necessities and Conflicts of Energy Cooperation in Northeast Asia

3.1 The Current Status of Energy Cooperation in Northeast Asia

The cases of East Siberia pipelines and Kovyctinsk gas field development project in East Siberia will be explored to study and understand the energy cooperation in Northeast Asia

3.1.1 Oil Cooperation: The Eastern Siberia Oil Pipeline Construction.

Recently, an international competition began over the construction of pipelines. China and Japan competed fiercely to win the route that will transport oil from the field in northwest of Taishet-Irkutsk in East Siberia.

China has negotiated with Russia over oil import since 1994 in order to meet the rapid increase in the demand of energy for its industrialization. With China's efforts, the route of transporting oil produced from the East Siberia field was almost decided to go through China's Daquing. The President Jiang Zemin visited Russia in July 2001 and met with Putin. In the summit, the two countries agreed to conduct a feasibility study for the Angarsk-Daquing pipeline construction.

Japan was highly dependent on the Middle East for the supply of petroleum, and it wanted to diversify its supply channel, paying attention to Russia. Checking China,

Japan began active negotiation with Russia from the late 2002. In January 2003, The Prime Minister, Koizumi, visited Moscow, and asked the Russian government to consider a new route to transport the East Siberia oil by going through the Pacific. If the Pacific line is agreed, Japan said that it would provide USD$5 billion for the construction and USD$2 billion for the oilfield development in form of loans with a low interest rate.

Meanwhile, Russia continued its negotiation with China on the oil export and the two countries' leaders agreed on the construction of pipeline to China at the summit in May 2003. Russia's major oil company, Yukos, agreed to provide China National Petroleum Corporation with seven hundred million tons of East Siberia oil over twenty five years.

Table 5: The Comparison of China and Japan Routes.

	China route (Destination: Daquing)	Japan route (Destination: Nahotka)
Length (km)	2,213	3,765
Amount of Shipment	1st step : 400,000 b/d 2nd step: 600,000 b/d	1million b/d
Estimated Investment	$ 1.7 billion	$5.2 billion

Source : Korean Energy Economy Institute, 2007. *The Study on the Eastern Siberia Pipeline Construction.*

Source: An American Chamber of Commerce in Beijing 2005. *China on the International Oil Market* (David Stanway).

Figure 7: Proposed Oil Pipeline Route

Amid the competition between China and Japan, Russia's Ministry of Industry and Energy postponed making its decision on the East Siberia Pipeline project. Russia's position on the East Siberia pipeline had been changed several times and Moscow came up with a compromise at the end because it made a calculation to earn the best interest between China and Japan. Russia needed to strengthen its bilateral economic cooperation with China, the largest buyer of Russian arms. Furthermore, Russia wanted to reinforce its strategic partnership with China to counter the U.S. That position might have played a vital role in deciding the East Siberia pipeline (Park 2006).

On the other hand, it was inevitable for Russian to continue its cooperation with Japan in order to develop the relatively underdeveloped Far East and Siberia, despite its territorial dispute with Japan. Therefore, Russian government decided to choose a compromising plan of pipeline construction rather than giving up the Pacific route completely and choosing the initial Angarsk-Daquing route. Eventually, China is the first in line for oil supply.[1]

3.1.2 Natural Gas Cooperation: The Eastern Siberia Gas Field Development

Over the past year, the project of developing gas field near Irkutsk and building pipelines through China to supply Russia's natural gas to South Korea was a chief issue in Northeast Asia. Russia estimated that the Kovyctinsk gas field, located 400 kilometers north of Irkutsk, East Siberia, contains 1.5 trillion cubic meters of natural gas.

To develop the enormous amount of natural gas reserve, Russia had proposed to China, Japan, the two Korea and Mongolia to form an international consortium to carry out a joint project. If the gas field is developed successfully, Russia will be able to export

[1] According to Xinhua news agency (2011.1.4), Oil began flowing through the pipeline that links Siberia with refineries in the northeastern Chinese city of Daqing at 11:50 am (0350 GMT) after two months of testing. Chinese President Hu Jintao and his Russian counterpart Dmitry Medvedev had symbolically opened the pipeline -- which stretches for 2,694 kilometers on the Russian side and 930 kilometers in China -- on September 27. It can carry 30 million tons of oil each year and will help China achieve its goal of diversifying energy imports, state media said. Under a 2009 deal China will receive oil for 20 years in exchange for loans worth 25 billion dollars.

twenty billion to thirty billion cubic meters of natural gas annually to the Northeast Asian nations.

Since 1996, a feasibility study, worth USD$120 million, has been ongoing. The ultimate goal of the project was building pipelines, four thousand eight hundred kilometers long to provide gas to East Siberia, China, and South Korea.

The preliminary feasibility showed that at least five hundred million tons of gas reserve exists in the field, and the total reserve was estimated at 1.15 billion tons. The outcome of the preliminary feasibility study showed that if additional two hundred sixty million tons are confirmed through the feasibility study, the project would be profitable and economical (Paik 2005).

Source: *Energy Tribune, November 9. 2006.*

Figure 8: Proposed Natural Gas Pipeline Route.

South Korea, China and Russia signed an agreement to conduct a feasibility study in November 2000 in Beijing. Since then till the summer of 2003, a feasibility study was conducted. Based on the outcome, the representatives of the trilateral consortium signed an agreement to develop a gas field in November 2003 in Moscow. Japan initially participated in the discussion, but it showed a different opinion from Russia over how much it would invest in the project and how much gas it would import in connection with the Sakhalin gas field project. Japan, without resolving the differences, eventually dropped out from the project. With the outcome of the main feasibility study, South Korea, China, and Russia agreed to build gas pipelines from Irkutsk, China, Yellow Sea and South Korea. Under the plan, Russia was scheduled to supply 10 billion cubic meters of gas to South Korea and 20 billion cubic meters to China annually over the thirty years.

The project's profitability was confirmed by the feasibility study, but Russia unilaterally changed its development and export plans. On the surface, the Russia government said that it would build a network with its West Siberia gas field and use the resources for its domestic consumption. According to the Russian Ministry of Industry and Energy, gas produced from the Kovykta gas field of Irkutsk will be solely

used for domestic consumption and natural gas from Sakhalin will be exported to the Asia-Pacific countries, including China and South Korea.[2]

Russia's changed position over the Kovykta project also indicated that it wanted to hold an advantageous position when negotiations with Northeast Asian countries resume over the gas pipeline construction cost and gas supply price.

3.1.3 The Joint Use of Petroleum Storage Facilities.

It can be one of milestones to create a joint reserve of petroleum and exchange oil reserves in order to expand energy cooperation among consumers in the Northeast Asia. In preparation for an unexpected disturbance in the international oil supply system, it is considered the foundation to secure enough amount of the strategic petroleum reserve. The reserve is also an important factor to maintain supply-demand balance and to decide the oil price. Japan and South Korea are members of the International Energy Agency (IEA) and they both maintain a certain amount of petroleum reserves (Tanabe 2003).

The IEA recommended that the minimum amount of the strategic petroleum reserve should be enough for a nation to survive for 90 days. As of 2005, Japan

---

[2] In March 2006, BP, under the Russian government's pressure, agreed to hand over a half of the shares over the Kovykta project to Gazprom, the largest Russian gas company. Gazprom plays the leading role for Russia's energy development and supply.

maintains the reserve enough for 170 days. South Korea's reserve is enough for 90 days. China reportedly has a reserve enough for twenty days and it planned to complete fifty two tankers by 2008 in order to increase the reserve amount to thirty days by 2012. In addition, Northeast Asian nations show consensus that their strategic petroleum reserves could be used jointly, but the issue has not been discussed formally yet (Kanekiyo 2005).

Recently, the initial step toward multilateral cooperation in the region has been shown. The joint use of petroleum storage facilities and swapping trades are examples. South Korea, China, India, and Russia agreed on multilateral cooperation of oil reserve and amount exchange, increasing the possibility of Northeast Asian region's energy cooperation. Starting in September 2006, the crude oil produced from Russia's Sakhalin I, invested by India's Oil and Natural Gas Corporation, has been stored in South Korea. In return, India shipped out crude oil from Nigeria which China stored in a South Korean Facility. The deal in a form of swapping trade in which Russia, the producer, India, the investor, China, the buyer and South Korea, the logistics center, cooperated (Ministry of Commerce, Industry and Energy in Korea, 2004). Sakhalin lacks ports capable of hosting large vessels and its sea freezes more than five month annually. Taking into account such condition, India, in need to transport 100,000 barrels of Sakhalin crude oil daily, needed an intermediate storage facility to save logistics costs.

China needed to stabilize its energy reserve in order to prepare for the rapid increase in consumption. South Korea emerged as the best candidate for the intermediate logistics center which can handle both Sakhalin crude oil for India and China's oil imports. According to the research of the Korean Energy Economics Institute (KEEI)[3], China actually began reserving petroleum in Seosan in South Korea, from October 2005 with an aim to reach 2.7 million barrels annually. In the future, China and South Korea will be able to trade China's oil reserve and India's oil purchased from Sakhalin in order to reduce their logistics cost and to stabilize oil supplies.

Russia will also be able to benefit from this multilateral cooperation by using the intermediate storage hub to enhance its export stability. South Korea will also earn profits from participating in this deal as a logistics hub. It can also purchase some of the oil reserve to safely import crude oil.

The multilateral cooperation demonstrated the potential of inclusive energy cooperation in the Northeast Asian region for the future. Furthermore, the energy cooperation in Northeast Asia will likely heighten the negotiation power of the region toward Middle East oil producers. The Northeast Asian nation's petroleum demands have gone up steadily, and the market's importance will grow over the decade, while the market share of the western countries will shrink.

---

[3] Hong, Chulsun. The Study on Energy Market in Northeast Asia: Petroleum. *Korea Energy Economics Institute, 2008.*

And yet, Asia has been importing oil at premium compared to western nations, indicating a need to form a new price structure in order to overcome the disadvantage. One proposal is opening up a regional futures market for petroleum. In Asia, no futures market exists, like West Tax Intermediate of Brent, in which prices are provided and trade take place. Energy economics experts urged that a regional crude oil futures market is a must in order to connect Northeast Asia with the world market and get rid of the Asian Premium[4]. That will enhance the transparency of the regional market, and Asian importers will be able to counter the Middle East oil produces more effectively. In the world oil market, crude oil futures market is extremely important. The amount of futures trade is seven or eight times of goods trade (Moon and Lee 2003).

3.2 The Necessities and Conflicts of the Energy Cooperation in Northeast Asia

3.2.1 The Needs of Energy Cooperation

The energy market in the Northeast Asia region consists of one monopoly supplier (Russia) and small number of buyers (China, Korea, and Japan). As discussed earlier, the Northeast Asia countries highly depend on the Middle East. Moreover, they

[4] Asian Premium is usually measured by the differential between Arabian Light formula price for Asia and that for Western market. KEEI reported that it is around $1.11 per barrel .

have been paying an 'Asian premium' for the Middle Eastern oil. As a result, one of the most important current energy policy goals for China, Korea, and Japan is to diversify their energy supply routes. On the other hands, Russia strives to utilize the abundant unexploited reserves in its eastern region to improve economic development in Eastern Siberia and the Far East. In addition, Russia is also seeking to diversify its energy export routes other than Europe. The Northeast Asia region is spread over a small territory. Russia borders on China, North Korea and Japan. Thus, the energy infrastructure such as oil and gas pipelines can be implemented within a radius of about 2000km (Fesharaki and Kim 2009). It is a huge geographical advantage.

Countries in the Northeast Asia will have to undertake intensive development of their energy sectors to build energy infrastructures. According to IEA projections, the Northeast Asia energy sector will account for about 26 percent (USD$4,303 billion) of the world's total energy investment (USD$16 trillion) during 2001-2030: Russia USD$1,050 billion; China USD$2,253 billion; and OECD Pacific, including Japan and Korea USD$1,000 billion (Toh 2003). Utilizing the economies of scale of the large energy cooperative projects is imperative because it could significantly reduce the proposed investment costs of the individual countries in the region.

The traditional formula of Northeast Asia cooperation stressed that the countries involved could benefit by using their own comparative advantages, namely, Russia-natural resources, China-labor, Japan and Korea-capital and technology. The state of

resource endowment indicates that the cooperative relationship is also attractive to countries (Paik 1995; Doh 2003; and Lee 2003).

Table 6: Reource Endowment of Northeast Asian Countries.

	Oil&Gas	Coal&Minerals	Labor	Capital	Technology	Managerial Expertise
Russia	**A**	**A**	**D**	**D**	**C**	**C**
China	**B**	**A**	**A**	**D**	**C**	**C**
Japan	**D**	**C**	**C**	**A**	**A**	**A**
Korea	**O**	**C**	**C**	**B**	**B**	**B**

Note : A - very plentiful; B – Plentiful; C – short; D – very short; O – none

Source: UNESCAP 2004, *Energy Security and Sustainable Development in Asia and Pacific.*

This fact forces the countries toward the energy cooperation. As noted earlier, both Japan and Korea have few domestic energy resources. China is now a net consumer of imported oil and gas. These consumer countries would profit from a geographically closer energy supply. Also, Russia could benefit from the investments made by these consumer countries in East Siberia and the Russian Far East to facilitate Russia explore and produce its energy resources.

3.2.2 The Obstacles for Energy Cooperation

As discussed previous sector, the potential benefits of energy cooperation in Northeast Asia are apparent, however, there are many barriers such as history based-

distrust and territorial disputes, difference of energy mix, China-Japan rivalry relations, and weak multilateral framework.

Disputes over land and energy resources between the countries in Northeast Asia exist. Japan and Korea both claim the Dokdo or Takeshima Islands in the Sea of Korea, and China and Japan both claim the Senkaku or Diaoyu Islands in the South China Sea. Also a number of gas fields in the East China Sea are disputed by China and Japan. These are the Chunxiao or Shirakaba and Tianwaitian or Kashi gas fields, Where China has recently begun exploration. That makes Japan afraid that China is drilling for gas which is Japan's own gas. In addition, there is the territorial dispute of the four northern islands between Russia and Japan. (Valencia and Dorian 1996; Drifte 1999; Paik 2005; Choo 2006; Veenstra 2008; and etc).

South Korea and Japan have many similar characteristics of their energy mix and energy strategies. However, China has a very different energy mix and energy security strategy. When countries' energy mixes largely differ from each other, it can be difficult to find common objectives shared and reinforce their bargaining powers. As shown in the figure 3, Korea's and Japan's energy supply structures are dominated by oil and gas. Moreover, gas is supplied to both countries in the form of liquefied natural gas (LNG). However, China's energy mix is dominated by coal, which makes up 71 percent of the primary energy supply along with only a small of gas. Also, the self-sufficiency of South

Korea and Japan is around 18 percent, but huge Coal preserver, China's self-sufficiency is about 90 percent.

Another issue is China's strong economic development leading to a rapid increase of energy demands threatens Japan, because Japans' energy demand growth rate will be around zero which will make less attractive for suppliers than China (Toichi 2006; Veenstra 2008). The Eastern Siberia oil pipeline construction project is a typical example. Also, shown in the Kovykta gas field development project, Russia's lack of mutual respect is another instance.

Finally, establishing energy cooperation in the region is difficult because there is no strongly developed framework for establishing cooperation. Some regional partnerships, such as ASEAN+3, EAS and APEC, all of which consider energy issue as a part of their objectives for cooperation. Furthermore, there is no organization among the Northeast Asian countries even though they more rely on each other than any other countries (Valencia and Dorian 1996; Drifte 1999; Paik 2005; ect).

These barriers make it difficult to establish the right cooperation scheme for the energy cooperation in the region. However, the biggest and root obstacle is the history-based distrust in the region. Nevertheless, it was made during the long history, the Energy cooperation is the present problem. Therefore, despite of the long history of distrust among, it is inevitable for the countries to establish a new vehicle for the future cooperation for their survival.

4. The Multilateral Energy Cooperation

4.1 The Current Energy Cooperation scheme in Northeast Asia

Until now, energy cooperation in Northeast Asia has been bilateral forms, or a temporary multilateral consultation. However, efforts have shown recently to establish a systemic multilateral energy cooperative scheme for among South and North Korea, Russia, Japan, China, and Mongolia. The Senior Officials Meeting (SOM) on Energy Cooperation in Northeast Asia, a multilateral energy consultative scheme led by the United Nations Economics and Social Commission for Asia and Pacific (ESCAP) is an example. This meeting was first proposed in June 2001 at the Northeast Asia Energy Symposium in Seoul by Korea's Minister of Commerce, Industry and Energy (MOCIE) in order to improve energy supply and demand structure through energy development and improvement of market in Northeast Asia.

In October 2001, international experts' meeting took place in Khabarovsk, Russia. Participants adopted the Khabarovsk Communiqué[1] and agreed to hold SOM and establish working group. In April 2003, ESCAP hosted a provisionary meeting in Vladivostok to prepare for the SOM. The two Koreas, Russia, and Mongolia attended the

[1] Three Objectives: 1) increase the supply of energy from the Northeast Asian region, 2) optimize efficiency of supply and energy use, and 3) minimize environmental impact of energy projects through improved energy mix. Four basic principles: 1) recognition of sovereign rights over energy resources, 2) development of free and fair trade, 3) investment promotion and protection and environmental protection, and 4) free and not-discriminatory transit of energy products. (Source: UNESCAP 2003)

meeting along with international organizations for energy such as the Asia Development Bank (ADB), the International Energy Agency (IEA), the United Nations Economic Commission for the Europe and the Asia-Pacific Energy Research Center. The participants agreed on a joint statement to hold Inter-Governmental Steering Committee of SOM on regular basis. They also agreed to draft a Northeast Asia energy cooperation agreement.

In November 2005, ESCAP hosted the first SOM in Ulaanbaatar, the capital of Mongolia and participants agreed to form a consultative scheme among the governments. Senior officials from the two Koreas, Russia and Mongolia attended along with energy experts from Japan and China. IEA, ADB, ASEAN Center for Energy, other international organizations' representative and the U.S. attended as observers.

They agreed to organize a senior-level committee with director-general level officials and to form working groups and agreed on the activity plans for them. The Ulaanbaatar Declaration was adopted to announce the governmental consultative body for energy cooperation in Northeast Asia. The document reflects the principles on which this cooperation will be based in the 2010-2014 period and is entitled 'The collaborative mechanism of energy cooperation in Northeast Asian countries.' The main aims and principles of the Mechanism can be summarized as follows.

The Summary of Ulaanbaatar Declaration.[2]

1. Formulation and approval of policy recommendations and / or intergovernmental agreements among the participating countries of NEA through the conduct of joint studies and policy dialogues.

- Development of oil, gas, and coal resources.
- Development of policies and regulations for energy trade through oil and gas pipeline and grid interconnection.
- Investment promotion and project development for a regional energy market.
- Study on the use of renewable energy and improvement of energy efficiency.
- Evaluation of establishing a sub-regional strategic oil reserve.

2. Increase the importance and visibility of the Collaborative Mechanism by serving as a reliable source of information to energy industries and government organization.

- Collection and dissemination of information and data regarding the energy situation in NEA.

3. Strengthening the government-business dialogue in order to increase the involvement of industries in the activities of the collaborative mechanism.

4. Promotion of energy trade and investment through the organization of trade fairs, forums, and exhibition involving energy industries, government agencies, and the financial sector

The consultative body aimed at carrying out various energy cooperative projects such as information sharing, facility investment and trade expansion. The Senior Officials Committee was designed to be attended by one high-ranking official from each

[2] Source: UNESCAP. *Intergovernmental Collaborative Mechanism on Energy Cooperation in North-East Asia.* 2005.

country and non-members and international organizations were invited to attend as observers. The meeting is to take place annually, hosted by member countries in turn, and six working groups for different cooperative fields are to be established. Working groups will be formed by government officials and experts appointed by each participating government.

Japan and China did not sent government representative to the SOM, showing the limit of the attempt to form the energy cooperative scheme under the initiatives of the ESCAP. Japan is not willing to participate in this six-country framework because it entails great political risk that North Korea can create. Japan prefers a broader framework that encompasses ASEAN + 3 countries (the ten ASEAN countries plus China, Japan, and South Korea) (Tanabe 2005; Kanekiyo 2005). While Japan at least expressed its reasons publicly, China said nothing about its reason for not joining the meeting, creating concerns from the neighbors. It is likely that Japan's disinterest has contributed to China's such response (Fallon 2006).

The outcome and vision of the Ulaanbaatar statement were lessened due to the fact that China and Japan's disinterest. Without the participation of China and Japan, the six-country framework doesn't seem to be able to function as expected for energy cooperation in the region.

The South Korean government is the most enthusiastic about forming the cooperative body in order to realize its vision for the energy cooperation for energy

supply stability. South Korea's proposal for the energy cooperative scheme seeks a model of an open multilateral cooperative organization, which invites not only regional members but also outsiders such as the U.S. In this respect, South Korea aimed at establishing a Northeast Asia Energy Treaty, similar to Europe's Energy Charter Treaty.

4.2 Cases of Energy Cooperation Scheme in other regions

The ECSC: The European Union originates from the European Coal and Steel Community (ECSC), which was established in July, 1952. The six number of ECSC are France, West Germany, Italy, Belgium, Netherland, and Luxemburg. The ECSC had been established not simply to facilitate cooperation in energy resources but as a system to resolve troubles and confrontations in the post World WarⅡ. The Schuman Plan, which became the starting point of the foundation of the ECSC, contained extraordinary ideas to hold post-war Germany into Europe and prevent re-armament of Germany by keeping steel and coal under the control of Europe. These two resources could possibly be used as means of a war. One of the main reasons for the success of the ECSC over the past 50 years in providing the political and economic cooperative foundations among member countries is its transnational characteristics of organizational structure, mainly the so-called High Authority (HA). The HA, the highest decision making body of the ECSC, consists of committee members with 6 year terms. These committee members are

obliged not to work for their country's interests but for community as a whole (Spierenburg 1994).

The ECSC gave a lesson to Northeast Asia how history based distrust relationship could be transferred into cooperation relationship even in accessing such a crucial energy resources.

The ECT: After the collapse of the Soviet Union in the early 1990s, European countries seriously worried about their stable energy supply because of their heavy reliance on the Soviet Union for oil and gas. Instead of providing financial support to maintain the safety of oil and gas supply, European countries developed the establishment of a legal framework for energy trade, investment, transit, and dispute settlement. The Energy Charter emphasized the need for the establishment of an appropriate international legal framework for energy cooperation between participants. The negotiation on the Energy Charter Treaty (ECT) started in 1992. The negotiating partners consisted of more than 50 delegations with very different backgrounds and interests. Nevertheless, negotiations were successfully concluded after a relatively short period of three years. The ECT was signed in Lisbon on December 17, 1994, and entered into force on April 16, 1998. As of now, 52 countries (including the European Communities) have signed the ECT. The treaty has established the Energy Charter Conference as its main institutional body. The conference has the political responsibility

for the implementation of the Energy Charter, the ECT and related instruments. The conference has created several working groups and ad-hoc committees that operate under its supervision. In 1996, the Energy Charter Secretariat was established in Brussels, Belgium, to serve the conference and its member countries. Although originally conceived as a European initiative, having its roots in the European Energy Charter of 1991, the ECT has developed into a more global forum for energy cooperation (Dore 1995). Russia and the five countries of Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan), Australia and even Japan are all founding signatories to the ECT. Mongolia also joined the ECT in 1999 while China and South Korea have an observer status.

The ECT is based on the recognition of mutual interest and interdependence. In a world of globalizing capital and energy markets, this provided a better framework for the international cooperation than what could have been provided by bilateral agreement alone (Kemperer 2005a). The ECT could be a useful model for Northeast Asia as the big three consumers should establish a firm cooperative relationship with Russia in order to secure their energy security. It would provide a platform for the discussion between energy consumers and producers on key controversial issues such as the transit of oil and the construction of pipelines and the resolution of trade and investment disputes through legal mechanisms.

The AMEM: Some international organizations for energy cooperation are linked to regional trading arrangements. These types of organization can be considered Regional Energy Integration Organization (REIO). Established in 1967, the Association of Southeast Asian Nations (ASEAN) aims to promote regional peace and stability, economic growth, social progress and cultural development in the spirit of equality and partnership. The ASEAN countries also have actively pursued cooperation for the full utilization of their energy potentials. The Association of Southeast Asian Countries Ministers of Energy Meeting (AMEM), established in 1998, is the key mechanism for energy cooperation among the ten members of ASEAN. Under the control of AMEM, ASEAN Energy Center (ACE) plays a key role for energy policy integration among ASEAN countries. ACE is an intergovernmental organization established by Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. It is guided by the Governing Council composed of the Senior Officials on energy of the ASEAN countries and a representative from the ASEAN Secretariat. As the host country, Indonesia provides headquarter facilities and other amenities.

ASEAN is regarded as the front runners in the multilateral energy cooperation following the EU's footsteps. ACE promotes the integration of energy strategies by providing information, state technology, and expertise to ensure the long-term energy development policies and programs in harmony with the energy security, the economic growth and the environmental sustainability of the region. ASEAN initiated a series of

ASEAN Plan of Action for Energy Cooperation (APAEC) which intends to carry on the ASEAN power grid project, and the trans-ASEAN gas pipeline which includes total of 8 gas pipeline projects[3] (Karki and Salehfar, 2005).

The OLADE: The Latin American Energy Organization (OLADE), established in 1973, is an inter-governmental energy organization for Latin and Caribbean countries with 26 members[4]. OLADE's objective is to debate and put down the foundation of the energy integration processes in the Latin American and Caribbean Region. OLADE organized its first regional energy integration forum in September 2006 in Mexico. OLADE also holds the meetings of the Energy Ministries of the Region in order to promote the signature of the 'Energy Letter of Latin America and the Caribbean Countries,' as well as the creation of a 'Center for Arbitration and Conciliation specialized in Energy Subjects.' They are considered as the essential elements to consolidate the process of regional integration.

Most of the OLADE member countries form some kinds of economic blocs. Most notably, Argentina, Brazil, Paraguay, and Uruguay are members of Mercosur; Costa

---

[3] The eight projects are: 1) South Sumatera, Indonesia – P. Malaysia, 2) W. Natuna, Indonesia – Duyong, Malaysia, 3) E. Natuna, Indonesia – JDA – Erawan, Thailand, 4) 4a + 4b E. Natuna – W. Natuna, Indonesia – Singapore, 5) E. Natuna, Indonesia – Brunei Darrusalam – Sabah, Malaysia – Palawan – Luzon, Philippines, 6) Malaysia – Thailand JDA – Block B Vietnam, 7) Pauh, Malaysia – Arun, Sumatra, Indonesia, and 8) East Kalimantan – Sabah – Phillippines.

[4] Members of OLADE include Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay, and Venezuela

Rica, El Salvador, Guatemala, Honduras, and Nicaragua are members of the Central America Common Market (CACM). Dominican Republic, Grenada, Haiti, Jamaica, Suriname, and Trinidad and Tobago are members of the Caribbean Community and Common Market (CARICOM). And Bolivia, Columbia, Ecuador, Peru and Venezuela consist of the Andean Community of Nations (CAN). Although all members of OLADE do not make on huge economic bloc, these members of common markets maintain high level of economic cooperation. The experiences of OLADE member countries in economic cooperation facilitate OLADE's energy market integration. (OLADE 2009)

The NAEWG: Another type of REIO is the North American Energy Working Group (NAEWG), established in 2001 by the ministers of U.S., Canada, and Mexico. The goals of the NAEWG are to foster communication and cooperation among the governments and energy sectors of the three countries on energy related matters of common interests, and to enhance North American energy trade and interconnections consistent with the goal of sustainable development. To achieve these goals, the NAEWG exchanges views and shares information on factors affecting North American energy, including policies and programs, market developments and anticipated demand and sources of supply. Energy ministries of the three member countries take the responsibility in this process. (NAEWG 2002)

The NAFTA text specifies trilateral rules that can be applied to other activities of NAFTA countries. This implies that when the three countries want to cooperate in various areas, they do not need an additional agreement to legalize their action. The existing NAFTA text is sufficient to fulfill the legal requirements. NAEWG is an example of such broader trilateral initiatives specified in the NAFTA. In this respect, NAEWG does not require additional laws to make its actions effective (Paik 2006).

4.3 Implications for Energy Cooperation in Northeast Asia

Although the countries in Northeast Asia have on-going problems stemming from various issues, including the historical relations of distrust, they need an effective foundation for cooperation. The case of the energy cooperation of the EU presents important lessons to the formation of an energy cooperative system in Northeast Asia. The EU has enormous experience with the energy cooperation. From this cooperation process, many implications can be made for other regions that try to achieve energy cooperation.

The EU and Northeast Asia share important policy aim, but the differences between the two regions are remarkable. Unlike in Northeast Asia, in EU has a strongly developed cooperation framework. Although it is difficult to apply the European example and system of energy cooperation directly to the Northeast Asia, some fundamental ideas might be considered for Northeast Asia.

The main implication of the EU case is that establishing a top-down framework can be useful for creating a common foundation and for building a trust between the different countries in establishing cooperation. However, it takes time to install such a framework. Moreover, this implication is from a region where a cooperation framework was already present, which is not the case for Northeast Asia.

Therefore, it seems to be better to install a bottom-up approach by finding specific topics for energy cooperation first in Northeast Asia. If specific cooperation topics work, a further trust-building is likely to follow, and it may lead to a continuing cooperation process. Therefore, the bottom-up cooperation should be a starting point. Furthermore, such confidence building efforts can attract the attention and support of governments gradually. As of result of this, some issues can be considered as providing the Northeast Asian countries with a starting point for cooperation: technology transfer, joint stockpiling, transport safety, and a common bargaining position towards the energy supplying countries. These four topics can be prioritized in order to assess their potential for establishing the bottom-up cooperation in Northeast Asia.

However, the top-down framework such as the energy cooperative organization also should be attempted to create in order to assist the achievement of specific issues in Northeast Asia. In the process of creating energy cooperation organization in the region, it needs to first deliberate the scope, purpose and form of the energy cooperative organization and how it should be developed. To develop an effective energy

cooperative scheme for Northeast Asia, it is important to set a type of organization. The type of an organization can be classified by regional and functional aspects. The regional scope can be divided into either 'regional' or 'global.' And the functional scope can be divided into either 'specific' or 'comprehensive.' International energy cooperative organizations can be positioned in four different types (Paik 2004). For regional scope, NAEWG, OLADE, ECSC are 'regional' while the ECT is 'global.' In terms of functional scope, NAEWG, OLADE, ECSC are 'specific' while the ECT is 'comprehensive.' In a short term, an international energy cooperative scheme can be more effective when its regional scope is 'regional' rather than 'global' and its functional scope is 'specific' rather than 'comprehensive.'

As studied earlier, the SOM of the six Northeast Asian countries promoted under the initiative of the Korean government cannot be easily classified as regional and functional. Although, its regional scope looked like 'regional,' it seemed to aim at establishing open cooperative organization similar to the ECT because it invites not only regional members but also outsiders such as the U.S. In terms of functional scope, it can be positioned into 'comprehensive.' The problem with this scheme is that it takes a long time to modulate the interests of concerned countries. Even though the ECT is a 'global' and 'comprehensive' organization, it could operate effectively because a regional economic bloc has been already organized and therefore, it could set a mutual goal

without any difficulty. It is the same for the AMEM based on ASEAN and the NAEWG of NAFTA.

In the Northeast Asian region, a regional economic bloc has not been formed. This suggests that the Northeast Asia energy cooperative scheme should redesign both its regional and functional scopes strategically, considering there is an absence of cooperative framework and regional trading arrangement in the region.

The scope of organization should be considered carefully in order to develop an effective energy cooperative scheme for Northeast Asia. Considering the 'Six Northeast Asian Countries Plan' drafted by the Korean government, the Korean government seems to aim for an energy cooperative system among the governments of the six Northeast Asian countries. The SOM includes a relatively wide geographical scope of encompassing six nations in the region. The most notable energy consumers are South Korea, China and Japan, Russia being the only energy supplier. Mongolia and North Korea seem to have been included from political and geographical reasons.

Under such a structure, the functional scope is bound to be comprehensive. Therefore, it is hard to set a specific objective. The cooperative system should be promoted in a way that a specific goal can be set. For example, resolving the Asian premium for South Korea, China, and Japan, the joint stockpiling can be a desirable mutual goal. Therefore, in order to function the energy cooperative system in Northeast Asia effectively, the essential plan should actually involve mutual cooperation among

South Korea, China, and Japan. Considering the discussion so far, the Northeast Asian energy cooperative scheme promoted by the Korean government should be converted into a form of an energy cooperative scheme of South Korea, China, and Japan.

Also, the energy cooperation should not focus on too many issues at the same time. In order to make sure that the energy cooperation in Northeast Asia does not suffer from trying to achieve too many goals at the same time, the countries should focus only on some specific issues that are considered most important in obtaining a specific result. As mentioned before, joint stockpiling, technology transfer, transport safety, and a common bargaining position towards the energy supplying countries can be prioritized in order to assess their potential for establishing cooperation in Northeast Asia.

Oil stockpiles in Northeast Asia should be expanded with a view to establishing effective emergency response measures. The attitude of South Korea and Japan concerning the stockpiling is quite different from that of China. South Korea and Japan are both IEA members and thus have an emergency stockpiling system that stores the IEA standards of 90 days of net imports. Two countries should transfer their experience and know-how in building the oil stockpiles.

Such technology transfer purports to achieve a more sustainable energy mix while decreasing the level of CO2 emissions. The technology transfer will take place mainly from Japan to South Korea and China, as Japan is the more advanced in the

relevant technology. As all three countries are heavily import-dependent, the safe arrival of their energy supply is crucial.

One of the most pressing problems for the transport safety for Northeast Asia is the bottleneck of the Malacca Strait where a threat of piracy presents.

The three countries should together enhance a unified dialogue with the oil-producing countries. In the dialogue, they should make an organized single voice insofar as possible, based on consumers' interest to oil-producers. By taking such a collective position, they will be able to communicate effectively with the Middle East and Russia in particular.

Furthermore, currently, the Chinese and Japanese governments and petroleum industries are working hard to build a pricing system within Northeast Asia in order to solve the 'Asian Premium.' However, efforts of any one country are not enough to build a new and effective petroleum pricing system.

5. Conclusion

This paper studies the energy cooperation in Northeast Asia, focusing on current energy situation and cooperation based on formal experiences in Northeast Asian and other region. With the rapid and continued economic development in Northeast Asia recently, the region's demand for energy is growing fast. Russian's potential energy supply and the demand of Northeast Asian countries jointly form the strong drive of energy cooperation.

Despite of many obstacles, such as history based distrusts, territorial disputes, and rivalry relations, tremendous win-win opportunities among the countries in the Northeast Asia exist. First of all, the abundant energy reserves of East Siberia and the Russian Far East could become the key source of alternative energy supply source for the countries in Northeast Asia, and would lessen the region's heavy dependence on the Middle East. Second, it would also be a cost-effective alternative because of its proximity to consuming markets. Third, the energy cooperation between countries in the region would be mutually profitable due to their comparative advantages.

However, considering the practices of East Siberia pipeline and Kovyctinsk gas field development project, the energy cooperation has been limited to the bilateral level between Russia, the monopolistic supplier, and China, Japan, and South Korea separately as the major energy consumers. Russia seems to prefer to build a bilateral

cooperation with countries in need of Russia's energy resources rather than a multilateral relation because it can maximize its own interests by doing so. Moreover, China and Japan fiercely have competed against each other for securing the Russian oil. Such a competitive attitude results in undesirable outcome for both China and Japan. This kind of market structure will lead to unfavorable market conditions for the consuming countries.

In order to overcome these problems, the Korean government is strongly promoting an initiative to establish the energy cooperative system in the region. However, the initiative has not developed further due to the absence of effective strategy and the lukewarm attitude of China and Japan. Therefore, the Korean government needs to strictly evaluate whether the existing method can realize the energy cooperative system in the region and thoroughly study what is the most realistic and plausible plan.

The development of energy cooperation in other regions considered as a successful precedence of the energy cooperative scheme, presents many lessons to Northeast Asia. First, the bottom-up, topic-oriented cooperation is like to be a better approach for the initial energy cooperation in Northeast Asia because installing a top-down approach as an initiative vehicle seems to take too much time. Nevertheless, establishing the top-down cooperation framework as a supportive mean is also necessary for enhancing specific energy cooperative project. Second, a realistic option of

the energy cooperative type in the Northeast Asia is a 'specific' and 'regional' type rather than 'comprehensive' and 'global' type which is applied to the SOM driven by the Korean Government. In this respect, the scope of members and issues in the Northeast Asia energy cooperative scheme should be also reconsidered. Considering the scope of participation, it would be more effective if only South Korea, China, and Japan involves in the energy cooperative scheme as they share common interests. In determining the scope of issues, joint stockpiling, technology transfer, transport safety, and unified bargaining position toward the energy supplier should be focused.

It is true that the EU is dependent on Russian energy. But it is equally true that Russia is dependent on EU markets. When Russia cut off supply to EU countries, it would suffer a huge loss of foreign exchange revenue from the fall in oil and gas exports upon which the economy is almost completely dependent……The lesson is clear. The more that individual member states engage bilaterally with Russia, the more power and control Russia has. The more they engage multilaterally, and speak with one voice, the more power the EU has. (Gavin and Lee 2007: 410)

Theoretically, a monopoly supplier with a competitive oligopsony will generate a lower amount of oil and gas production at higher prices. Thus, South Korea, China, and Japan need to cooperate to change the competitive oligopsony into a cooperative oligopsony. This will enhance the bargaining power of the consuming countries when they deal with the monopoly supplier, Russia. Therefore, the three countries in the Northeast Asia should make efforts to cooperate and put it at the top priority policy.

Appendix A

Table 7: Producers, Net Exporters and Net Importers of crude oil, 2008.

Producers	Mt	World total(%)
Russia	494	12.9
Saudi Arabia	453	11.8
U.S	320	8.3
Iran	206	5.4
China	194	5.0
Canada	152	4.0
Mexico	146	3.8
Venezuela	126	3.3
Kuwait	124	3.2
UAE	120	3.1
Rest of World	1509	39.2
World	3843	100.0

Net exporters	Mt
Saudi Arabia	355
Russia	241
Iran	120
UAE	108
Nigeria	102
Angola	92
Norway	90
Kuwait	89
Iraq	88
Venezuela	74
Others	593
Total	1952

Net importers	Mt
U.S	564
Japan	199
China	175
India	128
Korea	116
Germany	105
Italy	88
France	83
Spain	61
Netherland	57
Others	514
Total	2090

Source: EIA, U.S. Department of Energy, Key World Energy Statistics 2010.

Table 8: Producers, Net Exporters and Net Importers of Natural gas, 2009.

Producers	bcm	World total(%)
U.S	594	19.2
Russia	589	19.0
Canada	159	5.1
Iran	144	4.6
Norway	106	3.4
China	90	2.9
Qutar	89	2.9
Algeria	81	2.6
Netherland	79	2.5
Indonesia	76	2.5
Rest of World	1094	35.3
World	3101	

Net exporters	bcm
Russia	160
Norway	100
Canada	76
Qutar	67
Algeria	55
Indonesia	36
Netherland	30
Turkmenistan	27
Malaysia	24
Trinidad Tobago	21
Others	140
Total	736

Net importers	bcm
Japan	93
Germany	83
U.S	76
Italy	69
France	45
Ukraine	38
Turkey	35
Spain	34
Korea	33
U.K	29
Others	214
Total	749

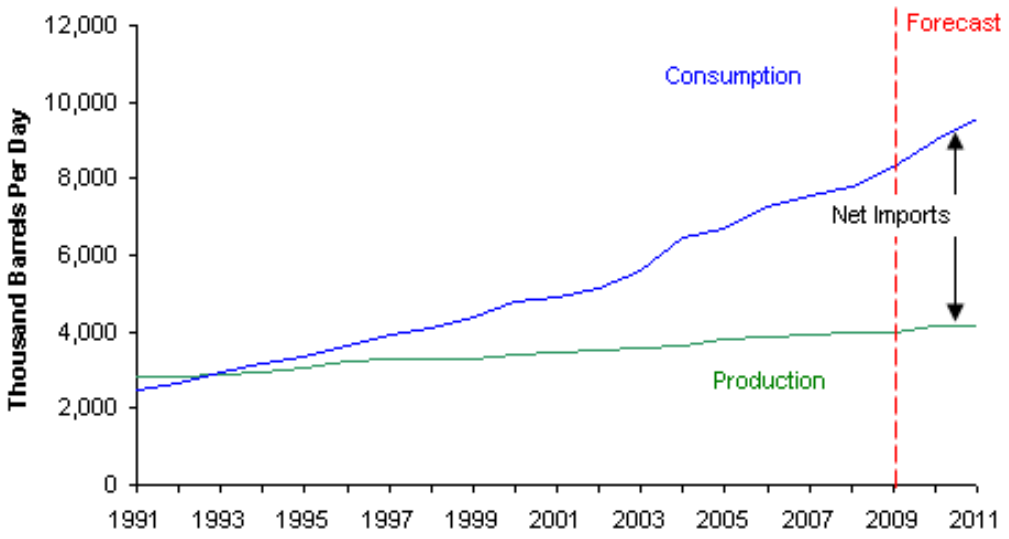
Source : EIA, U.S. Department of Energy, Key World Energy Statistics 2010.

Table 9: ASEAN's Energy Cooperation Scheme

Agreement	Key features
Agreement on the ASEAN Energy Cooperation (1986)	◦ Goals and objectives of ASEAN's energy cooperation ◦ Establishment of ministers meeting (AEMMEC)
Agreement on the Establishment of the ASEAN-EC Energy Management Training and Research Center (1988)	◦ ASEAN-EC Management Traning and Research Center ◦EC's transfer of knowledge
ASEAN Medium Term Programme of Action on Energy Cooperation (1994)	◦ Areas of common interest (electricity, coal, oil&gas, ect.)
Protocol Amending the Agreement on ASEAN Energy Cooperation (1995)	◦Ad-hoc working groups established ◦Investment opportunities ◦ASEAN Ministers on Energy Meeting (AMEM) ◦Senior Officials' Meeting on Energy (SOME)
Agreement on the Establishement of the ASEAN Center for Energy (ACE) (1998)	◦ Center for collective decision making
ASEAN Plan of Action for Energy Cooperation (APAEC) 1999-2004 (1998)	◦ Six programme areas: 1)ASEAN Power Grid, 2)Trans-ASEAN Gas Pipeline, 3)Energy Efficiency and Conservation, 4)New and Renewable Sources of Energy, 5)Coal and 6)Regional Energy Outlook, Energy Policy and Environment Anallysis.
The ASEAN Memorandum of Understanding (MoU) on the Trans-ASEAN Gas Pipiline (TAGP) (2002)	◦MoU signed (Programme Area No.2: Trans-ASEAN Gas Pipeline) ◦ The second stage of APAEC 1999-2004
ASEAN Plan of Action for Energy Cooperation (APAEC) (2003)	◦ Strategic Planning and Management (SPM) Framework for Sustainable Energy Development

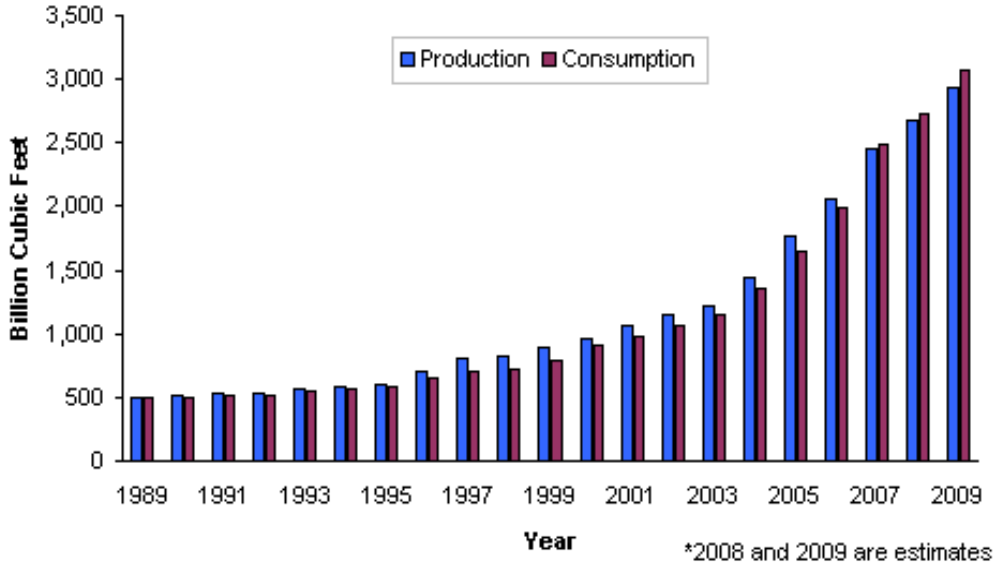
Source: ASEAN's Energy Cooperation Scheme. KEEI, 2003.

Appendix B



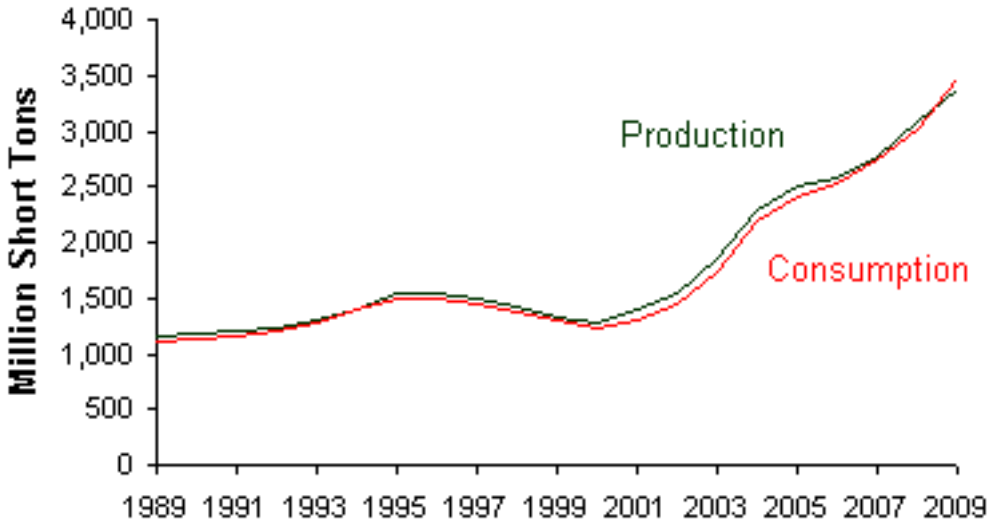
Source: EIA, U.S. Department of Energy, International Energy Statistics.

Figure 9: China's Oil Production and Consumption, 1991-2011.



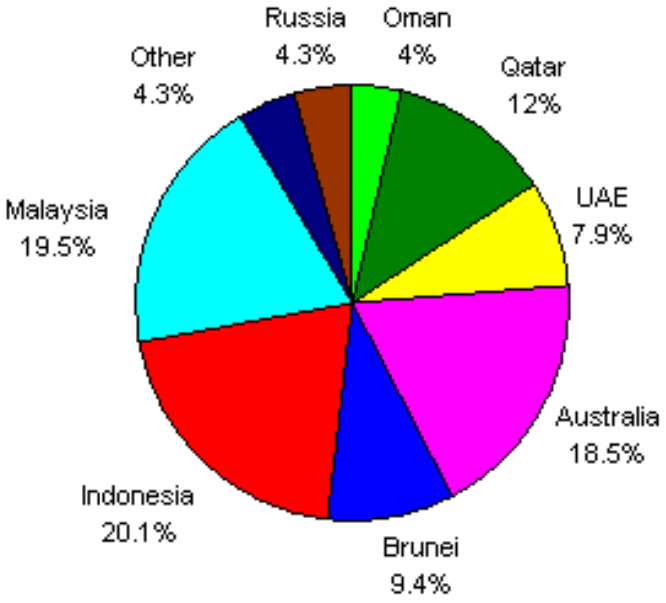
Source: EIA, U.S. Department of Energy, International Energy Statistics.

Figure 10: China's Natural Gas Production and Consumption, 1989-2009.



Source: EIA, U.S. Department of Energy, International Energy Statistics.

Figure 11: China's Coal Production and Consumption, 1989-2009.



Source: EIA, U.S. Department of Energy, International Energy Statistics

Figure 12: Japan's Natural Gas Imports by Major Sources, 2009.

Source: Korea Energy Economics Institute

Figure 13: Korea's Natural Gas Imports by Major Sources, 2009.

References

Abe, Sakamo (2007). "The Vision of Economic Development and Cooperation in Northeast Asia." *Working Paper,* Economic Research Institute for Northeast Asia (ERINA).

Alexander N, Gulkov (2010). "Basic Concepts of Cooperation in North-East Asia in the Oil and Gas Sector for the Period 2010-2030." *Northeast Asia Energy Focus, Summer 2010*, Korea Energy Economics Institute (KEEI).

Avery C. Emma (2008). "Rising Energy Competition and Energy Security in Northeast Asia: Issues for U.S. Policy." *CRS Report for Congress*, Washington D.C: Congressional Research Service.

Bang, Ki-Yual (2003). *The Analysis of Potential Energy Supply and Overseas Development Strategies in East Siberia,* Korea Energy Economics Institute (KEEI).

British Petroleum. *Statistical Review of World Energy 2010*. London: BP Communication Service.

Blank Stephen (2008). "Asia and Russian Energy Under Dmitri Medvedov: What Can Be Expected." *Northeast Asia Energy Focus, Summer 2008*, Korea Energy Economics Institute (KEEI).

Calder, Kent E (2004). "The Geopolitics of Energy in Northeast Asia." *Seminar paper*, Korea Energy Economics Institute(KEEI).

Chidester, Robert and Kessler, Carol (2007). "Northeast Asian Energy Cooperation to Improve Regional Energy Security." *Northeast Asia Energy Focus, Autumn 2007*, Korea Energy Economics Institute (KEEI).

Choo, Jaewoo (2006). "Energy Cooperation Problems in Northeast Asia : Unfolding the Reality." *EAST ASIA, Vol 23.*

Chun-Sheng Tian (2007). "Russia's Energy Strategy in Northeast Asia." *Northeast Asia Energy Focus, Autumn 2007*, Korea Energy Economics Institute (KEEI).

Development Research Center of the State Council of China. *China's National Energy Strategy and Reform.* November 2003.

Doh, Hyun-Jae (2003). "Energy cooperation in Northeast Asia: Prospects and Challenges." *East Asian Review.*

Dore, Julia (1995). *The Energy Charter Treaty: origins, aims, and prospects*. London: Royal Institute of International Affairs.

Energy Tribune (2006.11.9). "Kovykta Hamstrung by Infrastructure."

Fallon, S. Karla (2006). "Promoting an Energy Partnership in Northeast Asia." *Pacific Focus, Spring 2006*

Fesharaki, Fereidun; Kim, Namil and Kim, YoonHyung (2009). *Energy Security in the Northeast Pacific*. Korea Energy Economics Institues (KEEI).

Gavin, Brigid (2006a). "Trade integration in East Asia: turning away from Multilateralism towards Regionalism." *Conference on Asian Regional Integration*, Osaka City University. October 2006.

Gavin, Brigid (2006b). "Towards establishing a Research Institute for Asian Integration: introducing European experiences." *Conference on Asian Regional Integration*, Osaka City University. October 2006.

Hong, Chulsun (2008). *The Study on Energy Market in Northeast Asia: Petroleum.* Korea Energy Economics Institute.

International Energy Agency (IEA). *World Energy Outlook 2008*. OECD/IEA

_____ . Energy Policies of IEA Countries: Japan, 2009 Review. OECD/IEA .

_____ . Energy Policies of IEA Countries: Korea, 2009 Review. OECD/IEA .

_____ . Energy Policies of IEA Countries: Russia, 2009 Review. OECD/IEA .

_____ . Energy Policies of Non IEA Countries: China, 2009 Review. OECD/IEA .

Ivanov, VladImir I and Oguma, Eleanor (2001). "Energy Security and Sustainable Development in Northeast Asia: Prospects for Cooperative Policies." *Working Paper,* Economic Research Institute for Northeast Asia (ERINA).

Ivanov, Vladimir I (2003). "Russian Energy Strategy 2020: Balancing Europe with the Asia-Pacific Region." *ERINA Report,* Economic Research Institute for Northeast Asia (ERINA).

_____ (2005). "Russia's Energy Policy: Focusing on New Markets." *Working Paper,* Economic Research Institute for Northeast Asia (ERINA).

Jiranuntarat, Simchai (2006). "ASEAN Plan of Action for Energy Cooperation." *International Conference on Energy Security in East Asia*, Seoul, November 2006.

Kanekiyo, Kensuke (2003). "Toward Energy Cooperation in Northeast Asia." *Working Paper*, Institute of Economic Energy Japan.

_____ (2005). "Energy Outlook of China and Northeast Asia and Japanese Perception toward Regional Energy Partnership." *Working Paper*, Institute of Economic Energy Japan.

Karki, S. and Salehfar. H. (2005). "Energy and Environment in the ASEAN: challenges and opportunities." *Energy Policy*.

Kemperer R (2005). "Investment and cross-border energy flows in Northeast Asia: a perspective from the Energy Charter." *Conference on Northeast Asia Natural Gas and Pipeline*, Seoul, September 2005.

Kim, Nam-Yll (2007). The Study on the Eastern Siberia Pipeline Construction. Korea Energy Economics Institute (KEEI).

Klashnikov, Victor and Gulidov, Ruslan (2008). "Russia's Energy Cooperation with NEA Countries: The Current Situation and Problems." *Northeast Asia Energy Focus, Summer 2008*, Korea Energy Economics Institute (KEEI).

Korea Energy Economics Institute (2003). *Institutional Basis for Multilateral Energy Cooperation in North-East Asia.* KEEI.

Koyana, Ken. And Koide, Takaaki (2004). *The Report for the Energy Cooperation among ASEAN+3 Countries for 2003-2004*. Institute of Economic Energy Japan.

Kulagin, Vyacheslav (2010). "The East as the New Priority of the Russian Energy Policy." *Northeast Asia Energy Focus, Spring 2010*, Korea Energy Economics Institute (KEEI).

Latin America Energy Organization (OLADE). *Handbook 2009.*

Lee, Sang-Gon (2002). "Energy Cooperation and Energy Security: Korean Perspective." *Research paper*, Korea Energy Economics Institute.

_____ (2003). "Regional Energy Cooperation for Sustainable Development: Northeast Asian Perspective." *Special Seminar*, Economic Research Institute for Northeast Asia (ERINA).

Ministry of Economy, Trade and Industry, Japan. *The Strategic Energy Plan of Japan*. Revised in June 2010.

Ministry of Energy of the Russian Federation. *The Summary of the Energy Strategy of Russia for the Period of up to 2020.* Moscow, 2003.

Ministry of Knowledge Economy of Korea. *The First National Energy Plan*. Seoul 2008.

_____ . *The Analysis of Development of Energy and Resources: Toward to Abroad*. Seoul 2009.

Moon, Young-Seok and Lee, Dal-Sok (2003). "On Asian Premium of Crude Oil: Causes, Patterns and Counter Measures." *Korean Energy Economics Review*, Korea Energy Economics Institute (KEEI).

Naitoh, Masahisa (2005). "Long-term Energy Perspective and Challenges for Japan and Asia." *WEC Asia Pacific Regional Forum*.

National Development and Reform Commission People's Republic of China. *The Outline of the Eleventh Five-year Plan for National Economics & Social Development of the People's Republic of China.*

NIEFES Consulting Group. *Intergration of Energy Markets in the European Union: History, Politics and Economics of Forming the Internal Market for Energy*. Report European Union, Executive Summary, December 1999.

North America Energy Working Group (NAEWA) (2002). *North America – Energy Picture.*

Oguma, Eleanor (2003). "Energy Security and Sustainable Development in Northeast Asia: Prospects for Cooperative Policies." *Research Paper*, Economic Research Institute for Northeast Asia (ERINA).

Paik, Keun-wook (1995). *Gas and Oil in Northeast Asia: Policies, Projects and Prospects*. London: The Royal Institute of International Affairs.

_____ (2005). "Russia's Oil and Gas Export to North East Asia." *Asia-Pacific Review*.

Paik, Hoon (2006). "The Regional Energy Cooperation Regimes and the Case of North East Asian Energy Cooperation." *Comparative Economy Research. Vol 21.*

Shankan S. Karki, Michael D. Mann, and Hossein Salehfa (2005). "Energy and Environment in the ASEAN: Challenges and Opportunities." *Energy Policy, Vol 33.*

Sokolov, Dmitry (2008). "The Perspectives on Russian-Korean Cooperation in the Sakhalin Gas Project." *Northeast Asia Energy Focus, Summer 2008*, Korea Energy Economics Institute (KEEI).

Spierenburg, D. Pieter (1994). *The History of the High Authority of the European Coal and Steel Community: Supra nationality in Operation*. London: Weindenfeld and Nicolson.

Stanway, David (2005). "China on the International Oil Market." *An American Chamber of Commerce in Beijing.*

Tanabe, Tsutomu (2003). "Asian Economic Integration and Energy Cooperation." *Northeast Asia Energy Focus, August 2003*, Korea Energy Economics Institute (KEEI).

Tanabe, Yasuo (2005). "Asian Economic Integration and Energy Cooperation." *Northeast Asia Energy Focus, August 2005*, Korea Energy Economics Institute (KEEI).

Toh, Kyung-Hwan (2003). "Northeast Asia Energy Cooperation and Future Directions." *The EU and NEA Parliamentarians and Experts Meeting*, Brussels.

Toichi, Tsutomu (2003). "Energy Security in Asia and Japanese Policy." *Asia Pacific Review.*

_____ (2006). "Japan's Strategy for NEA Energy Cooperation." *Research Paper,* Institute of Energy Economics Japan.

United Nations Economics and Social Commission for Asia and Pacific (UNESCAP) (2003). *Vladivostok Statement of Senior Officials on Energy Cooperation in Northeast Asia.*

_____ (2004). *Energy Security and Sustainable Development in Asia and Pacific.*

_____ (2005). *Intergovernmetal Collaborative Mechanism on Energy Cooperation in North-East Asia.*

U.S. Department of Energy, Energy Information Administration (EIA), *International Energy Outlook 2010.*

_____ . *Country Energy Brief* (Russia, China, Japan, South Korea) *2010.*

_____ . International Energy Statistics.

Valencia, J. Mark and Dorian, P. James (1996). "Multilateral Cooperation in Northeast Asia's Energy Sector: Possibilities and Problems." *An IGCC Study Commissioned for the Northeast Asia Cooperation Energy Workshop* (Korea).

Vasily V. Mikheev (2010). "New Russian Policy towards East Asia Under Medvedev's Presidency." *Annual international Seminar, July 2010,* The Korea Research Institute for Strategy (KRIS).

Veenstra, Van Anne (2008). "Establishing energy cooperation in Northeast Asia." *Working Paper,* Institute Energy Economy Japan.

Vladimir N. Kolotov (2010). 'Russia's Assessment of Regional Security System in East Asia: Historical Background and Recent Development." *Annual international Seminar, July 2010.* The Korea Research Institute for Strategy (KRIS).

Wang, Zhen and Wang, Tianran (2010). "A Study on the Northeast Asia Energy Cooperation Mechanism." *Northeast Asia Energy Focus, Summer 2010*, Korea Energy Economics Institute (KEEI).

Xinhua News Agency (2011.1.4). *"Russian Oil Began Flowing to China."*

Xu, Yi-chong (2006). "China's Energy Security." *Australian Journal of International Affairs 60*.

< Korean Literatures >

김정기 (2009). "중국과 일본의 에너지자원 정책과 에너지 자원외교: 석유자원을 중심으로." *정치정보연구 제 12 □ 제 1 □.*

김형국, 백훈 (2007). "다자주의 에너지협력의 동북아 적용 가능성." *한국동북아□□ 제 42 □.*

박홍영 (2006). "동북아 에너지문제의 현황과 전망: 협력의 필요성과 갈등요인." *한국동북아□□ 제 38 □.*

백훈 (2004). “동북아지역 에너지협력체 설립을 위한 제도적 접근.” *동북아경제연구 제 16 □ 제 2 □,* 한국동북아경제학회.

_____ (2005). “동북아 에너지협력과 시장통합: 유럽의 경험이 주는 시사점.” *비교경제연구 제 13 □ 제 1 □.*

심기은, 노기현, 이선미 (2007). *동북아에너지협력연구: 중국의 에너지자원 □보 외교전략과 우리의 □□□안 연구*. 산업자원부 정책연구보고서

안세현 (2008). “한국 러시아 중국 에너지동맹: 잠재력과 문제점.” *국제관□연구 제 15 □ 제 1 □.*

이두환 (2009). “유럽과 러시아의 에너지전략과 천연가스 파이프라인의 정치경제학적 고찰.” *한국사회과학□□ 제 19 □ 제 4 □.*

이복재 외 (2002). *동북아 에너지협력의 □□전략 연구*. 에너지경제연구원.

이유신 (2005). “러시아 동시베리아 송유관 정책결정 요인에 관한 비판적 고찰.” *국가전략 제 11 □ 제 4 □.*

이재승 (2008). “한국 에너지정책 패러다임의 재고찰: 해외자원개발과 녹색성장을 중심으로.” *국제관□연구 제 14 □ 제 1 □.*

이태환 (2008). “동북아 에너지 안보와 협력.” *세□정책연구.*

전가림 (2006). “에너지안보를 둘러싼 중국의 팽창주의 외교정책.” *국제지역연구 제 10 □ 제 1 □.*

주재우 (2004). “중국의 에너지정책과 동북아협력문제.” *국제정치□□ 제 44 □1 □*