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IEA View on the Regional Energy Co-operation in Northeast Asia

Norio Ehara, Head, Non-Member Countries Division, Asia/Pacific and Latin
America

International Energy Agency (IEA)

1. Global Energy Demand and Northeast Asia

In the IEA programmes, Northeast Asia includes Northeast China (Heilongjiang, Liaoning and Jilin Provinces), East Siberia and the Far East of Russia (mainly Sakhalin Islands and Saha Republic), Mongolia, and Democratic People's Republic of Korea (DPRK), Republic of Korea (Korea) and Japan. This region is characterised as holding both the immense energy demand and the abundant energy resources. About one fifth of the world's energy is consumed in these countries grouped together. China, Japan, and Republic of Korea together are expected to account for one third of the increase in world energy demand over the next three decades, while the Eastern part of Russia holds significant amount of reserves of oil, gas, coal as well as significant hydropower potential. Russian government and industry has been placing a bigger emphasis on this region since Energy Strategy of Russian Federation in 2001 and 2003¹. The natural gas resources are particularly rich in East Siberia and Far East Russia and, according to Gasprom, 20% of the whole gas resources in Russia is located in this region.

Among these countries, China is another country to be monitored closely. The current robust increase of energy demand in China is quite striking. No doubt, the China factor will become more important in the coming decades for the regional and global energy security. Chinese oil demand has grown by 11 and 15 percent in 2003 and 2004 (1st&2nd quarters), respectively. In oil demand, in 2003, China became the second largest oil consumer in the world after the United States, exceeding Japan for the first time. With stagnant domestic oil production, China has been rapidly increasing oil import from outside. Crude imports are projected to rise to 2.2 mbd in 2004, while some product imports will also grow robustly. China is projected to account for about 40 percent of the incremental growth in global oil demand in 2004. The IEA projects that, between 2000 and 2030, about 20% of total incremental energy demand, and 50% of coal, 16% of oil and 6% of natural gas demand increase will come from China.

¹ In 2001, Russian Government issued "Energy Strategy of Russian Federation to 2020" and put an emphasis on the East Siberia and Far East Russia as the new frontier of oil and gas development. In the 2003 version of "Energy Strategy", the importance of eastern part of Russia was reiterated.

Most of developing countries in this region, including land-locked Northeast China and the eastern part of Russia, however, have been isolated from the global energy markets and left behind from the energy development without investment and infrastructure to connect them to the markets. But in recent years, we have seen some positive development of oil and gas development in the eastern part of Russia. The most critical issue of the three major energy importing countries- Japan, China, and Korea- is their high dependency on imported oil, especially from the Middle East. New supplies of Russian oil and gas would provide a major supply source other than the Middle East and help consumers in this region to achieve the policy target of energy diversification and thus strengthen the energy security structure of the consuming countries. Another common interest of the Northeast Asian energy consuming countries is the diversification of their energy sources from oil to other energies such as natural gas and electricity. Therefore, the common denominator for these large energy consuming countries is the diversification of the energy sources and the emerging Russian option will perfectly suit in their energy security objectives. In this pursuit, the energy reserves in the eastern region of Russia are critical. To date, most discussions on Russian energy have focused on the trade between West Siberia and Europe, but as described in the Russian Energy Strategy 2003, Russia recognises the importance of East Siberia and Far East Russia as new frontiers for the coming decades.

As mentioned above, there has been some positive development in the region. Sakhalin oil project has been on stream since late 1990s; Sakhalin2 LNG project is targeted to start in April 2007 and the feasibility study for the Kovykta gas project in East Siberia was completed in November 2003 and submitted to each government of China, Korea and Russia for their reviews; the oil and gas exploration and development in the East China Sea have been getting positive results; and the Pacific oil pipeline between Tyshet and Nakhodka are under negotiation.

Based on these developments, the strategic benefits obtained by the regional trade have gradually been recognised between suppliers and consumers of energy in the region. The concern on energy security and the need of co-ordination for the cross-border trades of gas, oil and electricity are also growing concerns in this region. Further demand increase in this region because of the activation of regional energy trade will certainly have significant implications on global energy markets. The region is therefore quite important for global energy security in coming decades.

2. The Major Energy Integration Projects in Northeast Asia

In Northeast Asian region, there have been many private sector efforts to connect abundant Russian energy resources with the demanding countries. The following are the major ongoing projects in this region. Some of these initiatives are progressing more actively than others and bear close review.

Northeast Asian Gas Projects

Within Northeast Asian countries, there have been continuous attempts to link the natural gas resources in East Siberia and the Far East Russia with the growing demand in Northeast Asian countries. The first big project that is being proposed is a 4,100 km gas pipeline from the Kovykta field near Irkutsk to northeast China and Korea at a cost of around \$12 billion. British Petroleum – which owns a 30% stake in Russia Petroleum that has a production sharing license for the Kovykta field – completed feasibility study for this project jointly with CNPC (China National Petroleum Corporation) and KOGAS (Korea Gas Corporation) in November 2003. Immediately after the completion, the study was submitted to governments concerned for their review. Upon the completion of this project, it is expected to export 30 bcm a year of natural gas some time in late 2000s or early 2010s from its proven reserves of 1.4 trillion cubic meters.²

² Gas reserves of Kovykta field as of June 2003(State Reverses Committee of Russian Federation):

- C1 (Proven) = 1.407 trillion cubic meters
- C2 (Provable) = 0.572 trillion cubic meters

Thus, as the largest future demand center of gas, the gas demand of China in the coming years and thus China's gas policy have been the key for the development of the Kovykta project. China's decisions in 2002 to give priority to the establishment of the West-East Pipeline (WEP) and the introduction of LNG in Guangdong seem to have changed the course of the regional picture. Indeed, in the short term, the Chinese decisions may delay the initiation of the Northeast Asia Pipeline Project. However in the mid and long term, the WEP and LNG projects will provide a trunk line for this region and will develop gas markets as demand increases. This infrastructure and market developments should be regarded as positive factors for the future Northeast Asia Pipeline network systems.

Sakhalin island, which has a more accessible location than East Siberia, given its proximity to world sea routes and the Chinese, Korean and Japanese coasts, has also become increasingly central to Russia's energy strategy in Northeast Asia. Since 1996, there have been around eight projects to explore natural gas and oil in this region. Two major international projects – conventionally called Sakhalin 1 and Sakhalin 2 – are well on their way compared to others. In spite of some regulatory and business conflicts, new regulatory instruments and fixed tax rates that were announced by the Russian government in 2001 have helped to create a more stable and attractive environment for large scale foreign investment in the Russian energy sector including Sakhalin. It is encouraging progress that, since May 2003, Sakhalin Energy, the Shell-led operating company for the Sakhalin 2 project, has made a series of LNG supply agreements with Tokyo Gas (1.1 million tons/year), Tokyo Electric Power Corporation (1.2 million tons/year), Kyushu Electric Power Company (0.5 million tons/year) and Toho Gas (0.3 million tons/ year) to supply LNG from Sakhalin 2 gas field to Japan from 2007. No doubt, the initiation of Sakhalin LNG supply to the Japanese market gas will provide a good commercial model for other gas projects which may follow in East Siberia and Far East Russia in the coming years.

Cross-Border Oil Pipeline in Northeast Asia

As regards the cross-border oil trade in Northeast Asia, there are two major planned developments in Russian oil export capacity. The first one is Sakhalin export terminal and pipelines with the capacity of 240-300 kb/d which is expected to be completed in 2005. These pipelines would supply oil to Japan, Korea and Chinese Taipei across Sakhalin Islands. Second, there is a plan for building oil pipeline from Angarsk (the starting point of the pipeline has been changed from Angarsk to "Tyshet" (about 500 km northeast of Angarsk) since early 2004, because of the potential environmental damage against Baikal Lake) to Daqing in China and Nakhodka in Japan. This latter pipeline (the Pacific pipeline) has been in the news in the past several months as the key players begin to recognise it will take considerably longer than originally thought to realise this project, because of the insufficient oil reserves in Angarsk to supply both Japan and China with its current 5 billion barrels, and the longer than expected time to explore enough reserves to satisfy both markets, which is estimated about 14 billion barrels. Even after Chinese president Hu Jintao and Russian President Vladimir Putin endorsed the \$2.5 billion project for oil pipeline from Angarsk to Daqing in May 2003, the prospects of exporting oil to other countries via Nakhodka seem to provide an alternative rationale for Russia for its long-term consideration. Early 2004, instead of an expensive pipeline option, Chinese oil companies (CNPC and Sinopec) and Yukos agreed to progressively increase Russian oil supply through the already existing railway system from about 3 million tons/year (60 thousands b/d) in 2003 to the extent of 15 million tons/year by 2006 (300 thousands b/d).

With regard to the on-going negotiation between Russia and Japan in terms of Tyshet-Nakhodka oil pipeline, the expert level discussion has reportedly been progressing. President Putin's possible visit to Japan early 2004 and the top level discussion between Russia and Japan may provide an opportunity to work out the future road map for this negotiation.

Northeast Asian Electricity Network

Recently there have been several studies of the technological potential of interconnections of national electricity grids across borders, in particular, between Russia, China, Korea and DPRK.³ According to the Siberian Branch of Russian Academy of Science, the combined potential generation capacity of hydroelectric, tidal power and natural gas power generation amount to 21.1 GW in 2020 in East Siberia and the Far East, and if nuclear and coal are added, the potential generation capacity would be 39.7 GW which far exceeds this area's own electricity demand of 14.9 GW. On the other hand, China has been facing the shortage of electricity in the past years and is expected to experience the world's most dramatic increase in power demand. In order to meet the rapid growth of electricity demand and to replace plants that are to be retired, China would have to build 800 GW of new capacity by 2030. Korea, which has around 54 GW of power generation capacity as of 2000, is expected to begin to import about 10% of its minimum expected power load by 2015. As a result, there have been a number of bilateral and multilateral talks and gatherings to discuss the plans for connecting these potential power demands and supply among the countries. This design includes the utilization of abundant hydropower, natural gas in Irkutsk, Amur, and Khabarovsk in the East Siberian region to supply electricity to China, Korea and DPRK. Although many projects are still in the conceptual stages, the electricity sector is getting more attention from the industry and policy makers in the region as an important area for the future energy cooperation in Northeast Asia. To promote the vision and share the information between policy makers, industry experts and researchers in and outside the region, the IEA, together with KERI (Korea Electrotechnology Research Institute), APERC and Russian Vostokenergo, jointly organised the "International Symposium on Northeast Asian Region Electrical System Ties (NEAREST)" in Seoul on 18 and 19 May 2004.

Stages of the Energy Projects in Northeast Asia

The development of energy projects would normally go through the following stages, successively clearing each hurdle. Naturally, the stage of each project above is different. To know some sense of maturity of the projects, the following table roughly summarises the current stages of major energy projects in the region:

Stages of Energy Projects	Current Stage of Each Project
<ol style="list-style-type: none">1. Concept building2. Political endorsement and political framework building3. Technical and financial feasibility studies4. Regulatory approvals from authorities: routing, health-safety- environmental (HSE) impacts, etc.5. Financing6. Physical construction7. Production and pipeline operation and management	<p>NE Asia Electricity Network Pacific Oil Pipeline NE Asia Gas Pipeline</p> <p>Sakhalin 2 LNG WE Gas Pipeline, Sakhalin 2 Oil</p>

3. Challenges in Energy Co-operation in Northeast Asia Region

It is noteworthy that there has been much progress in building energy networks in Northeast Asia since mid-1990s and, recently, private-sector initiatives, together with the efforts of regional and

³ At present, there are partial electricity connections between Russia-Mongolia, Russia-DPRK, and Russia-China for the sales of Russian surplus electricity to these neighboring countries. However, the interconnections between these countries have not been established yet.

international organizations, have induced more active involvements of the governments particularly from Korea, China, Russia, Japan and Mongolia. However, most of these ambitious plans are encountering several common economic or non-economic obstacles. Building a long-distance cross-border pipelines or power grid systems in a financially sound way is a big challenge in all parts of the world. It is especially so in Northeast Asia, where energy market and other necessary framework conditions for investment and regulation have not yet been developed. The following seems to be the major challenges in the region:

Need of Overall Plan and Review in the Northeast Asian Region

Feasibility studies or master plans, including above analysis on reserves and markets⁴ as well as other technical and cost assessment, are always significant tools for energy development projects. In the case of the Kovykta gas project, the feasibility study completed in November 2003 by the joint efforts of CNPC, KOGAS and Russia Petroleum took more than three years, but is providing indispensable information for policy makers and investors to judge the viability of the project. "Analysis on Natural Gas Market, Resources, and Pipeline in Northeast Asia" was completed in March 2004 after two years efforts by Northeast Asian Gas and Pipeline Forum. It would be also a valuable basis for the serious review for the policy makers, industry and investors. In the electricity sector, the study on Northeast Asian Region Electrical System Ties (NEAREST) by the Korean Electrotechnology Research Institute (KERI), which will be completed in the coming years, would contribute to set the basis for the future regional power grid systems.

Lack of Infrastructure and Investment

With a few exceptions,⁵ there is no infrastructure at present to bring eastern Russian oil and gas to the Pacific markets. It is encouraging to see some private sector proposals and business interests in this region to build natural gas pipelines, electric power links, and other types of cross-border energy trade. However, most of their preliminary findings have suggested two significant tasks to be solved in the future. One is a finance issue. Most of the recent findings on Northeast Asian energy co-operation suggested that significant infrastructure requirements on both sides of the supply and demand chain will have to be addressed to maximize the potential economic benefits to encourage regional and international investors. In order to realise the potential benefit of energy integration in the region, Northeast Asia would require a tremendous amount of investment. According to the IEA's World

⁴ **Reserves:** In Northeast Asia, the research and evaluation of energy reserves are really of vital importance because often projects require long term investment and thus are costly to develop. No one could, therefore, invest or finance without the confirmed reserve figures. Sakhalin 2 project needed the drilling and reserve evaluations for more than two decades before the project was finally able to initiate its commercial development. As for the Irkutsk gas project, more than 1.4 tcm reserves is confirmed by the Russian State Reserve Committee; this amount seems sufficient for more than 25 years' supply for the markets of Russia, China and Korea (Russia: 10 bcm, China: 20 bcm and Korea: 10 bcm, in total 40 bcm per year). Further drilling, however, is necessary to confirm the size of the reserves to attract investors. To secure longer-term supply beyond these years, the future linkage with the Yakutsk field of the Sakha Republic may have to be considered.

Markets: The evaluation of the energy markets to absorb the produced energy is the other end of the serious review before launching any energy projects. A slow market development can jeopardise the economics of a cross border or of large scale energy projects in Northeast Asian region. It is therefore essential that, right from the beginning, marketing efforts be conducted to ensure sufficient demand and an expedient build-up of demand for energy. Governments in Northeast Asia should facilitate downstream energy market development by encouraging downstream energy companies by providing tax incentives, reducing burdens in project approval procedures, backing the long-term energy purchase commitments of state-owned off-takers based on their realistic future demand evaluations and by reducing the burden in downstream energy project approval procedures and so on.

⁵ See foot note 3. Between East Siberia and Northeast China, China and DPRK, the railways are the main means to transport crude and petroleum products.

energy Investment Outlook 2003, the share of the 5 countries of Northeast Asia will account for 26% (US \$4.3 trillion) of global total energy investment in the coming three decades.

For example, China, the largest possible consumer of energy in this region, still lacks the infrastructure for major domestic gas usage. The country needs natural gas transportation and urban distribution networks. The electricity grid systems have to be expanded and modernized further to meet the rapidly growing demand. Japan also lacks a domestic natural gas pipeline network with its regionally segregated gas markets. Kovykta gas, without infrastructure to cross the sea, may not reach Japan in a foreseeable future, while the LNG supply from Sakhalin 2 field would be economically competitive and most probably will start in 2007.

Further Regulatory Reforms and Market Restructuring

Building a cross-border energy infrastructure of oil and gas pipelines is physically like simultaneously building two pipelines in different countries, although commercially and operationally, it is more complicated. A cross-border pipeline involves international energy trade, and if it passes a third country, there are also issues of transit to be resolved. Pipeline projects must be submitted to a regulatory review simultaneously in all countries involved. The regulatory risks coming from different market liberalisation stages are reduced if the technical and regulatory framework and procedures are predictable and reasonably efficient in all countries involved. A clear economic regulatory framework that is stable over time will also enable project sponsors to make their investment decisions based on a reasonable assessment of the commercial merits of a project.

Investment in long-distance pipelines is a decision to commit the investor's resources to the project over a very long term (30 years or more). In order to secure the necessary funding from investors, it needs an appropriate legal, regulatory and fiscal framework, which is stable, transparent and non-discriminatory in the project country to protect investors' interest with fair taxation and a fair rate of return on investment and mechanisms to resolve any resulting dispute in a neutral way. A number of organisations, such as the APEC Forum, have provided recommendations on the construction of the gas infrastructure. The Energy Charter Treaty provides rules for the appropriate investment framework which are accepted by its signatory states. It also provides a neutral conflict resolution mechanism between investors and the host country for an energy project, which provides comfort to investors.

In the developing Northeast Asian countries, there is a problem of energy sector restructuring, especially in the supplier's side. In May, 2003, Gazprom was given by the Russian government the status of a coordinator for building a gas network - production, transportation, and export- in East Siberia and the Far East. However, Gazprom itself has been short of capital for new investment partially because of very low prices paid for domestic gas production. Furthermore, Gazprom's opposition to Third Party Access (TPA) is also a major stumbling block to the ratification of the Energy Charter by Russia, which is another factor preventing development of large gas reserves in the country. In this regard, the overall reform of the Russian gas industry must continue in order to attract enough foreign investment to develop this region.

Political Issues in Northeast Asia

In the Northeast Asian region, there are also political issues that keep certain governments from their active participation in the regional energy cooperation. Among others, the most troublesome issue would be the swirling political situation in the Korean peninsula. At the moment, the serious energy shortages in DPRK are driving them into a corner interlocked with sensitive nuclear issues. The result of a series of Six-Party Talks in Beijing and other places needs to be closely monitored since the consequences of this negotiation will influence the future of the energy cooperation and development in this region.

4. Toward a Northeast Asian Energy Community

Need of Regional Energy Co-operation for Building Policy Framework and International Alignment in Northeast Asia

A cross-border energy project involves more players than a domestic project such as the country owning the energy resources, the company(ies) contracted for exploration and gas production, the transit country, the transit company, the consuming country, the purchasing company within the consuming country, the transport company and distribution companies in the consuming country and the final customers. There is a strong need for all involved states to share the risks and rents. Alignment of interest of all parties is the key for the initiation of international projects. This needs to be done in a way that ensures a well-balanced allocation of risks/returns for all players involved. To align the interests of all partners along one specific project and the mounting of an international consortium, the role of the governments is of utmost importance as a convenor to encourage the alignment of interests between upstream and downstream players, and between domestic and international participants of the project. Cross-border energy projects depend on the committed participation of multiple parties over a long period. In a cross-border pipeline project, some risks may be amplified by the fact that the interests of several sovereign states are at stake. In particular, there is a risk of the so-called “obsolescent bargaining”.

In addition, most of the cross-border energy trade and investment projects inevitably incur the problem of incompatibility between the laws and regulations among nations and different investment environments. Negotiation for cross-border energy trade will be long process of co-ordination between producers, transit countries, consumers, investors, central and local governments, etc. This part is often beyond the capacity of the private sector.

To supplement the bilateral energy co-operation framework and when the bilateral co-operation matured, the establishment of a regional co-operative framework would be of benefit to most of the countries in Northeast Asia since a regional issue needs a regional approach. In building regional energy framework, it would be useful for the Northeast Asian countries to learn from the experiences of other regions that have already developed regional energy co-operative networks. The examples could be found in the cases of ASEAN, EU, OLADE, APEC and NAFTA. The experience of the Energy Charter would be certainly useful and IEA/OECD could provide information and experiences about regional and global energy co-operation for Northeast Asia.

Government Role in the Northeast Asia Regional Energy Co-operation

Governments have an essential role to play in international and cross border energy projects. They are crucial stakeholders in any successful energy cross-border projects. Their role and responsibilities need clear definition. Not all factors (risks) should be for governments to act on. However, some critical factors do require government involvement.

- Governments play an essential role in facilitating cross-border oil, gas and electricity projects, even in the context of the growing importance of the private sector. They can facilitate understanding between sellers, buyers and transit countries through regional co-operation framework or regional fora.
- Governments’ major responsibility is to establish a clear, transparent and predictable framework for private (domestic and foreign) investments within their country. This would allow market participants (project sponsors, investors) to confidently invest in and develop cross border natural gas projects. Governments can reduce the risks that are associated with large cross-border projects, in particular those of a political, legal and regulatory nature.
- They also have to establish a clear and transparent institutional and regulatory framework for technical and economic issues for gas production, trade and transport, and consumption. In countries where a fully operational legal framework is not yet developed, Governments need to consider including alternative mechanisms, in their policies, for example, giving individual

- assurances to investors to facilitate the construction of the cross-border projects. Given that pipelines are a fixed investment, viability becomes extremely vulnerable to interventions into its technical and economic performance by political authorities. This risk is multiplied when a long-distance pipeline traverses country borders, as more actors in the decision-making and regulatory process will be involved.
- Governments also need to ensure that investors are not taxed twice (e.g. via double taxation agreements) between countries, even though cross-border trade does not require harmonisation of regulation or similar degrees of market liberalisation on each side of the border.
 - At each stage when a pipeline crosses a country's border, it needs to comply with that country's regulatory requirements and is therefore exposed to intervention by the respective authorities that would not only jeopardise the technical or economic performance of the respective section but also that of the whole project.
 - A clearly defined energy policy is a key factor for the development of any gas project. Governments may have to take part of the risks, especially in the initial phase of a project.

Wholehearted government support through a clear energy and gas policy is a pre-condition for trans-border gas projects. Support should also include concrete measures such as the acceptance of international investment and transit protection rules.

Areas the IEA could contribute to Northeast Asia: Oil Security Co-operation

The consolidation of the energy security of this region would perfectly match the IEA mission; thus contributing to the global energy security. During the past several years, the IEA has been invited to a number of international conferences and meetings in Northeast Asia to provide our thoughts on regional and global energy future, and experiences on energy security. The IEA has also organised a series of international conferences and workshops on oil emergency stocks, natural gas and electricity security and cross-border energy trade. Most of these events certainly have provided a good opportunity for the policy makers and industry players to share opinions and develop mutually beneficial best practices for energy co-operation. All these things could help Northeast Asian countries to build a better foundation for regional energy security framework and future co-operation.

As for the energy demand in Northeast Asia, the most critical issue, in particular, for the three major energy consuming countries in the region – China, Japan and Korea is their high dependency on imported oil, especially from the Middle East. Oil market instability at present and during the War in Iraq in 2003 as well as oil disruptions in Venezuela in 2002/2003 reminded the Northeast Asian region of the need of preparedness for the energy security. The regional oil security systems are partly supported by the emergency stocks in Japan and Korea, but there is no collective regional oil security system yet and thus the rest of the region would still be vulnerable. China, now the largest oil consumer in the region, plans to establish strategic oil stocks within a few years. The oil security systems, particularly emergency response measures against oil disruptions, could not be secured by the efforts of one individual country alone. It seems that the time has matured to consider establishing regional oil security systems. The APEC Energy Security Initiative has been tackling this challenge though, and the IEA, with the membership of Japan and Korea in Northeast Asia region, has been maintaining steady emergency response measures including emergency strategic stocks since its establishment in 1974. The IEA invited China, together with India and ASEAN and with all other IEA Member countries, to participate in the 3rd Emergency Response Exercise to be held in Paris the week of 25th October, 2004.

What is important is that issues on Northeast Asia energy security are not just a regional issue but also will have a significant impact on world energy security. The IEA will remain at the disposal of their Northeast Asian colleagues for any further discussions on issues for building a sound and co-operative energy security framework that will also contribute to enhancing world energy security.