

Northeast Asia and Russia's Energy Exports in the 21st Century

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Russian resources of natural gas are unique being the largest in the world. Only the Siberian Platform contains 3,640 billion cubic meters (Bcm) of recoverable resources of natural gas (categories A+B+C1+C2). Sakhalin offshore resources of oil and natural gas are estimated at 1,200 million tons (Mt) and 3,360 Bcm. This allows envisioning large-scale oil and gas development projects for both domestic needs and exports. The Siberian Platform, Yakutia, Irkutsk area and Evenkiyskiy Autonomous District form an energy corridor that could provide a formidable foundation of energy security for Eastern Russia and facilitate the revival of the inter-regional economic links through large oil and gas projects. Natural gas resources development will ensure stable supplies of inexpensive and clean energy throughout the region, reducing emissions by replacing low-grade coal.

On the other hand, energy consumption in East Asia is rapidly rising. By 2010 the economies of Northeast Asia are expected to import about 470 Mt of oil and up to 180 Bcm of natural gas a year. China, Japan, the Koreas, and Mongolia look at Eastern Russia with great interest as one of the new sources of their energy supplies. Obviously, for Russia, energy projects could form a solid foundation for economic links, making the Eastern Siberia and the Far Eastern region important for Russian energy strategy. Needless to say, energy policies of the Far Eastern neighbors and the long-term prospects for their energy needs and imports must be carefully evaluated to inform Russian energy planners and decision-makers.

New energy markets in Asia

In the 1990s the development of the Asian markets contributed to the global economic expansion and is expected to determine world economic trends in the 21st century. On the other hand, 1997-1998 saw how the Asian financial crisis led to the economic slowdown in other regions. Despite this downturn, however, Asian economies are recovering fast and in the long-term perspective are expected to generate a considerable demand for energy resources, contributing to the energy exporting countries' economic growth and the global trade and investment flows.

The Asia-Pacific energy markets are important for Russia, the eastern regions in particular. Eastern Siberia and the Far East contain large resources of oil and natural gas, although there is much to be done in terms of further exploration and prospecting. This wealth is geographically close to the energy importing economies and makes Russia interested in developing new energy links in this part of the world in addition its already well-established position in the European markets.

The energy markets in northwestern Europe and Mediterranean is relatively stable, competitive and already saturated. In the next 10 to 15 years these markets are unlikely to produce a considerable new demand for

Russian oil and the oil prices in this region will remain relatively low. According to the forecasts by Cambridge Energy Research Associates (CERA) and many other estimates in the next two decades the demand for oil in this part of the world will grow at only about 0.8-1.0% a year mainly due to the demographic trends and increasing energy efficiency. Besides, the use of natural gas in Europe is likely to continue to expand, substituting both coal and oil in power generation and limiting demand for oil products.

Russia's natural gas exporting strategy in Europe beyond the year 2000 is based on new large-scale projects, both offshore resources development in the north and the Yamal peninsula projects. These undertakings may require about US\$30-50 billion in investment, provided that the prices for natural gas are favorable and large markets are secured to allow mobilizing investment funds. In the mid-term perspective, however, rising competition and liberalization of European energy markets do not provide sufficient guarantees that these projects will be implemented. Moreover, it is likely that the European importers of natural gas will be interested in diversification of supplies to enhance energy security thus reducing dependence on Russian imports.

Unlike Europe, the Asia-Pacific energy consumption will expand fast, generating new demand for fossil fuels, including oil and gas, at favorable prices. For example, after 2010 the prices for natural gas in the region are expected to be significantly higher than in Europe. Also, energy security and environmental considerations will provide better opportunities for natural gas and renewable energy in the Asia-Pacific regional demand-supply equation. For Russia, these factors in the Asian energy markets may facilitate the development of the resources of the Siberian Platform and the Far Eastern region, assuring their closer economic and trade links with the economies of the region, China in particular. On the other hand, this cooperation in the energy sector will balance the growing demand in energy in the region, allowing the use of cleaner fuels for more efficient environmental preservation. Russia, however, needs an effective strategy in the region to realize this potential and expand energy exports.

Russian energy policy in the Far East

It is expected that at least until 2020 natural gas industry will remain a backbone of the Russian energy sector. The development of resources in eastern Russia will significantly contribute to this equation, allowing large-scale exports to the Northeast Asian markets. However, in addition to the existing project on Sakhalin and envisioned ventures in Irkutskaya Oblast and Yakutia, Russia must continue geological prospecting in the eastern regions.

As of today, several large projects under the

implementation and in planning stages, including Kovykta natural gas and gas condensate project near Irkutsk, export-oriented projects in Tumenskaya Oblast in Western Siberia, natural gas resources development in the southern Krasnoyarskiy Krai, and offshore resources of Sakhalin that by 2010 will allow to produce at least 20 Bcm of natural gas, including half of this amount for exports.

The transmission infrastructure, however, is the key prerequisite for all these projects, including natural gas exports. Only modern and powerful transportation system for natural gas can ensure competitive prices for export deliveries and domestic use. Ideally, a subregional interconnected network for natural gas transportation and use should be considered as a long-term goal. A transmission infrastructure for natural gas is going to be expensive requiring long-term capital investment, intergovernmental agreements, and support of the states involved, at least at the initial stage of its formation. This requires close cooperation with Japan, China, and the Koreas – the natural partners of Russia in the large-scale energy projects in the Far East.

The Irkutsk project

The Kovykta natural gas and gas condensate deposit in Irkutskaya Oblast is an important cross-border project to be linked by a pipeline with China and possibly Korea and Japan. Currently, resources of natural gas are estimated at 869.6 Bcm and the recent additional exploratory efforts promised a significant growth in reserves up to 1,500 Bcm. RUSIA Petroleum joint stock company holds a license for this site. The shares of the participants in the project financing and development will be determined after the feasibility study is complete.

In February 2000, Russia and China signed General Agreement regarding such a feasibility study for a pipeline and the entire project to be completed by December 2001 by RUSIA Petroleum and its key partner – the China National Petroleum Corporation (CNPC). The Korean Gas Corporation (KOGAS) has demonstrated its interest in joining the project to import natural gas to the southern areas in Korea. Also, Japan and Mongolia are among the potential participants in the project.

The project implementation will take about 4-5 years and the domestic consumers in Irkutskaya Oblast will be supplied with natural gas during the second year after the project begins. The project is very important for Russia because, in addition to exports, it will supply gas to local enterprises, including large chemical plants and power industry. Large resources will allow the domestic consumption of natural gas up to 15 Bcm a year and the replacement of oil and coal will allow improve the region's environmental conditions. The project will supply about 20-25 Bcm of natural gas for exports.

The Irkutsk natural gas project could become the key element in a subregional energy transmission infrastructure in Northeast Asia. Beyond 2010, it may be followed by the offshore projects in the northern seas (including Stockmanovskoe field), resources of the southern Krasnoyarskiy Krai, Sakhalin, and Yakutia. CNPC and Sakhaneftegas Company also entered an agreement to participate in development of natural gas

resources in Yakutia to produce about 35-43 Bcm of gas, including 23 Bcm for exports. In the future, these and other cross-border gas pipeline projects could constitute a network covering large territories from Irkutsk to Vladivostok in Eastern Russia and the regions in the neighboring countries in Northeast Asia with an export capacity of about 50 Bcm a year.

The ongoing Sakhalin projects

Oil and gas projects on the shelf of Sakhalin are the most advanced. The Sakhalin-2 project already produces oil, promoting Russia's new role as a source of fossil fuels in East Asia.

Development of the inland resources of oil on Sakhalin dates back to 1928. In total, 105 Mt of oil and more than 40 Bcm of natural gas was recovered. Inland resources, however, are limited and cannot support an increase in the output. Moreover, about two-thirds of these resources are already used and production shrinks from year to year. The alternative – the development of offshore fields – was under consideration since 1975, when negotiations with the Sakhalin Oil Development Company of Japan (SODECO) began. SODECO became the first foreign partner of Russia in the Sakhalin offshore projects.

As of today, there are five oil and gas projects, including Sakhalin-1 and Sakhalin-2 formed on the basis of production sharing agreements. Their combined cost is about US\$25 billion. The first commercial oil was recovered on June 1999 from Piltun-Astokhskiy field incorporated in the Sakhalin-2, which was operated by the Sakhalin Energy formed by Marathon (37.5%, later sold to Shell), Shell (25%), Mitsui (25%), Mitsubishi (12.5%). The Sakhalin-2 also covers Lunscoe gas field. In total, this project includes 140 Mt of oil and 408 Bcm of natural gas. It is expected that the Sakhalin-2 will develop an advanced offshore infrastructure for oil and gas resources recovery.

Unlike the Sakhalin-2, the Sakhalin-1 project incorporates two Russian companies – Sakhalinmorneftegas (23%) and Rosneft (17%). The recoverable resources allocated to this project are estimated at 325 Mt of oil and 425 Bcm of natural gas. Exxon and SODECO each hold the 30% shares in the project. Intensive prospecting and drilling revealed significant resources of natural gas in Chaivo field, which is the main target for development at this time. The Sakhalin-1 and the Sakhalin-2 projects combined will produce about 475 Mt of oil and more than 800 Bcm of natural gas. Several options for the transportation of these resources were considered, including the oil pipelines to Komsomolsk-na-Amure and Korsakov. This option was supported by the Sakhalin administration. Another option is an oil pipeline and a gas pipeline to Korsakov that will serve as an export outlet for both oil and liquefied natural gas (LNG) produced in a newly built LNG plant with 9 Mt annual capacity. Also, there were proposals to build an oil refinery with 4-5 Mt annual capacity to supply oil products for the local market (1.5-2 Mt a year), the mainland, and for exports, reducing at the same time the trans-shipments of fuels from the mainland.

Yet another alternative is a cross-border pipeline to

Japan, or a cross-border pipeline to Northeastern China. As a matter of fact, in 1999 federal government approved the program for domestic supplies of natural gas for Sakhalinskaya Oblast, Khabarovskiy and Primorskiy krajs. Rosneft and Sakhalinmorneftegas jointly developed this plan and its main goals are the improved stability and efficiency of energy supplies in these three Far Eastern provinces, using the resources of the first two Sakhalin projects. Also, with natural gas produced in sufficient volumes there is a possibility of establishing chemical industry on Sakhalin for plastics and methanol production.

Planned Sakhalin projects and prospects for exports

The Sakhalin-3 oil and gas project is very large and incorporates three smaller projects that are somewhat comparable to the Sakhalin-1 and the Sakhalin-2. Exxon won tenders for Ayashskiy and East-Odoptu blocks, containing 1,100 Mt of oil and 805 Bcm of natural gas, while Mobil and Texaco got the rights for Kirinskiy block with estimated 1,800 Mt of oil, 870 Bcm of natural gas, and 62 Mt of gas condensate. All these oil and gas resources were included in the PSA list and approved by the Russian parliament. Russia, however, insisted that both Rosneft and Sakhalinmorneftegas participate in the project. Also, the Sakhalin Oil Company established by the local administration also applied for participation.

The Sakhalin-4 and the Sakhalin-5 projects are also in preparatory stages. Obviously, the combined output of all these projects will significantly exceed projected local (Sakhalin) and regional (the Far Eastern region) needs in oil and oil products. Large volumes of oil will be exported to the neighboring countries and elsewhere. In quality terms, the Sakhalin oil is low in sulfur content, and light-to-medium in composition – the factors that make future exports quite competitive with those from the Persian Gulf.

As far as natural gas is concerned, the domestic consumption in the coastal Far Eastern region is likely to increase from current 3.3 Bcm a year to about 15 Bcm in 2020. This will leave significant production volumes for LNG exports and/or exports through pipelines. In this context, the Northeast Asian subregion appears as natural target area for cross-border connections. It is quite possible, that Japan will be interested in importing natural gas from Sakhalin, considering that the consumption of natural gas will grow, but the capacity of existing LNG terminals is nearing the upper limit. Imports of natural gas through a pipeline could be more efficient in terms of delivery distances, competitive costs, and complex and expensive equipment needed for LNG plants and terminals on both ends of the current LNG contracts. Also, China and the Republic of Korea demonstrated their interest in importing natural gas from Sakhalin through a pipeline. It must be noted, however, that the feasibility of a cross-border pipeline linking Sakhalin and Honshu entirely depends on how the domestic nation-wide and downstream infrastructures are designed to reduce costs and ensure maximum efficiency and competitiveness.

A wider use of natural gas in Japan is currently problematic in view of lacking transmission infrastructure. In general, only half of all urban areas in Japan are

supplied with natural gas. The major natural gas consuming regions are Tokyo, Osaka, and Nagoya – all are spreading for about 50 km around the LNG-receiving terminals and the synthetic gas production plants. The prices for gas for end users are three-five times higher compared to the United States and United Kingdom. In France and Germany – traditional importers of gas – it is twice as cheap compared to Japan.

Some time ago, a special consortium to review the prospects for a nation-wide gas pipeline network was established with participation of Tokyo Gas, Osaka Gas, Nippon Steel, and others. There were several options considered, including a 2,500 km-long pipeline along the Pacific coast, linking major gas and power consuming areas and some inland areas through additional, short-distance pipelines. Initially, this plan was envisioning active participation of the government in pipeline construction. The economic difficulties and increased budget deficit, however, reduced the chances for public-private partnership. Japanese private investors alone are unlikely to absorb all the investment costs and the risks. According to the Oil & Gas Journal, American power companies and energy multinationals could be involved in the project, providing up to 1/3 of the required investment funds and in receipt of some control over the domestic distribution networks and an access to power generation.

As far as the cross-border pipeline between Sakhalin and Honshu is concerned, it could be unrealistic to expect the private sector to participate because of high costs involved and limited markets for natural gas in Eastern Japan. It seems that only government can promote such large-scale projects, providing a cleaner fuel for power generation to replace oil and coal, as well as an alternative for the new nuclear power plants.

It seems also that liberalization of energy markets in Japan, competition promotion in the energy sector, and environmental considerations make Japanese economic planners more interested in the cross-border pipeline project than ever before. Besides, the people in Kasumigaseki district, including experts from the Ministry of International Trade and Industry (MITI), have to review the long-term energy policy of Japan in order to reduce the cost of electricity and reassess plans for the nuclear power industry development. On the other hand, they should consider serious problems related to the expanded use of natural gas in Japan, including investment costs for infrastructure construction, market access, and reorganization of the power sector, which is currently under regional monopoly-type power generation companies.

Conclusions

More generally, all the economies of Northeast Asia are concerned with the long-term prospects of energy imports to ensure energy security and economic dynamism under the conditions of expanding international demand and competition. They also have to consider promotion of cleaner fuels in view of growing public discomfort with new nuclear power plants projects. New sources of energy in Eastern Russia and alternative fuels such as natural gas are on the agendas of energy analysts

and governments in Tokyo, Beijing, and Seoul.

In other words, many preconditions for cooperation in the energy sector in Northeast Asia are in place. If the cross-border oil and gas pipelines are constructed from Russia to its eastern neighbors, this will change both their energy balances and the import sources significantly. Subregional cooperation in the energy sector also promises a better environmental preservation, reduced prices for electricity for households, and increased competitiveness for industries and enterprises. Energy security of the entire subregion will be enhanced.

For Russia, Northeast Asia is emerging as large and

strategically important energy market. New projects, gas pipelines in particular, are likely to become the main pillars in Russia's economic and trade links with this area, generating resources needed for economic and social development of the Far Eastern and Siberian provinces. There are opportunities to promote a number of energy projects, but a longer-term vision and a larger picture of the future energy landscape in this subregion are needed to optimize the interests, development funds, and available energy resources.

ロシアのエネルギー資源と北東アジア（抄訳）

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1990年代のアジア市場の発展は世界経済の拡大に貢献し、21世紀の世界経済のトレンドを決定付けることが予想される。一方で、1997～98年にはアジアの経済危機がこの地域の経済をいかに停滞させたかがわかった。しかし、経済がこのように停滞したにも関わらず、アジア経済は早急に回復しつつあり、長期展望ではかなりのエネルギー需要を創出し、エネルギー輸出国の経済成長や世界貿易、投資の流れを促進することが期待される。アジア・太平洋エネルギー市場はロシア、特に東部地域にとって重要である。東シベリアと極東は、今後の開発がさらに必要であるものの、巨大な石油及び天然ガス資源を有する。これらの天然資源は地理的にエネルギー輸入国に近接しているため、既に確立している欧州市場に加えて、新たなエネルギーリンクをこの地域に作ることにロシアは興味を持っている。

欧州とは異なり、アジア・太平洋地域のエネルギー消費は石油や天然ガスなどの石化燃料の新たな需要を産み出し、好ましい価格で急速に拡大するであろう。たとえば、2010年以降のこの地域の天然ガス価格は欧州に比べてかなり高くなると予想される。また、エネルギー安全保障と環境に対する配慮も、アジア・太平洋地域の地域的なエネルギー需給均衡のために、天然ガスや再生可能なエネルギーにとっては恵まれた機会となる。ロシアにとっては、アジアのエネルギー市場におけるこれらの要因は、極東地域のシベリア台地の開発を促進することになり、特に中国などの域内諸国との経済及び貿易関係をより密接なものとするであろう。一方では、エネルギー部門の協力は、より効率的な環境保全のためのクリーンな燃料の使用を促進し、域内のエネルギー需要の増大に対応する。しかし、この潜在力を実現し、エネルギー輸出を拡大するためには、ロシア域内における効果的な戦略が必要である。

現在、イルクーツク近郊のコヴィクタ天然ガス及びガスコンデンセート、西シベリア・チュメニ州の輸出志向プロジェクト、クラスノヤルスク地方南部の天然ガス資源開発、2010年までには少なくとも200億kの天然ガス（半分以上が輸出用）を産出する予定のサハリン沖資源開発などの実行段階および計画段階の大プロジェクトがいくつかある。しかし、これらすべてのプロジェクトにとって輸送インフラの整備が非常に重要な前提条件である。

イルクーツク州のコヴィクタ天然ガスおよびガスコンデンセート鉱床は、中国及びロシアと韓国や日本をパイプラインでつなぐ重要な越境プロジェクトである。現在、生産分与法に基づき、サハリン 1およびサハリン 2プロジェクトを含む5つの石油・天然ガスプロジェクトがある。この最初の2つのプロジェクトの総額は約250億米ドルとなっている。サハリン州からの資源を輸送するためのオプションは、コムソモルスク・ナ・アムールとコルサコフへの石油パイプラインを含めていくつか考えられる。石油と新規工場で生産される予定のLNGの両方を輸出する出口となるコルサコフへの石油およびガスパイプラインも1つのオプションである。また、その他の選択肢は、日本あるいは中国東北地方への越境パイプラインである。サハリン 3の石油・ガスプロジェクトは非常に大きく、サハリン 1、サハリン 2プロジェクトと同程度の規模の3つのプロジェクトから成り立っている。サハリン 4、サハリン 5プロジェクトは準備段階である。これらのプロジェクトを併せた生産量は、サハリンや極東地域の石油及び石油製品の必要量の見通しをはるかに上回るものと予測されており、さらに大量の石油が輸出されることになる。

天然ガスの消費が増すことを考えれば、日本がサハリンからの天然ガス輸入に関心を持つことにはかなりの可能性

があるが、現在のLNG取扱い量はターミナルのほとんど上限に近いところまで来ている。パイプラインを利用した天然ガス輸入は、輸送距離、価格競争力、またLNG工場やターミナルに必要な高価な設備と比較して、より効率的と考えられよう。中国や韓国もパイプラインを利用してサハリンから天然ガスを輸入することに興味を示している。しかしながら、サハリンと日本の本州を結ぶ越境パイプラインが実現できるかどうかは、日本国内の全国的な輸送インフラが、コストを低く抑え、また最大の効率と競争力を確保

するために、いかに設計されるかにすべてがかかっている。

サハリンと日本の本州間の越境パイプラインに関しては、大量のコストがかかり、また日本の東部では天然ガスの市場が非常に限られていることから、民間部門の参入を期待するのは非現実的である。石油や石炭に代わるクリーンな電力発電用の燃料を供給し、原子力発電所に代わるこのような大規模プロジェクトは、政府によってのみ促進できるであろう。

[ERINA抄訳]