

# Russian Natural Gas and Northeast Asia : Prospects for Russia-Japan-China Partnership<sup>1</sup>

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Northeast Asia is unique to the world of energy because it encompasses exceptionally large energy markets and vast regional resources of energy, which until very recently were largely, disconnected. Russia-the third world's largest producer of energy-possesses rich coal, oil, natural gas and hydropower resources in the Far Eastern and Siberian provinces. In the West, Russia's share in supplying natural gas to the economies of the European Union currently stands at 65% of their total natural gas imports. In 1997, Russia exported almost 143 billion cubic meters (Bcm) of natural gas, or 32 Bcm above the 1992 level, and it is expected that by 2010 the exports grows further, reaching 240 Bcm.

## Natural resources and development needs

In theory, Russia could contend for significant shares of energy markets in Japan, South Korea and China. It indeed aspires to become these economies' partner in meeting their energy needs. It is important to emphasize that attaining such a role is critical for Russia's own needs and future development path. Geographically, almost three-quarters of Russia is located east of the Ural Mountains and includes Western Siberia, Eastern Siberia, and the Far Eastern region. It accounts for 21% of the total population (Table 1), 74% of the national territory and 30% of the Gross Domestic Product.

In the second half of the 20<sup>th</sup> Century the population of the eastern provinces was growing relatively fast, doubling between 1939 and 1997. Considering negative population growth in Russia registered since the early 1990's and the forecasts of the population decrease by 2050 it is unlikely that the eastern provinces will demonstrate any significant increase in the number of residents. That will be certainly impossible without specific, well-focused measures and policies aimed at attracting investors, creating new industries, and inviting the skilled labor and professionals to this part of Russia. In this realm, the factor of rising

competition on the part of other more developed regions in Russia also must be carefully evaluated.

The rapidly changing economic, social and geopolitical circumstances require that the entire development scenario for Eastern Siberia and the Far Eastern region is driven by investment and policy measures that lead to qualitative changes in infrastructure development, industrial and social advancements in those areas. In this context, the development of energy resources in eastern provinces of Russia, including large-scale export-oriented energy projects, appear as the most important tool in attracting massive investment and a focal point in revitalizing the regional economy in the long run.

The possibility of natural gas exports to neighboring markets appears particularly attractive. It is based on a number of assumptions. The first one is the rising energy demand and expanding imports of oil and natural gas on the part of Northeast Asian economies. The second premise is that energy importers will give preference to natural gas as a fuel of choice for power generation, as compared with coal and nuclear power. The third assumption is that natural gas delivered to markets through pipelines will be cheaper and therefore more attractive for both the current and prospective users compared with liquefied natural gas (LNG).

## Assumptions questioned

It seems that there is no disagreement that, in principle, Russia can export large volumes of gas to Japan, the Koreans and particularly China. The question is about the time frame, the scale of the market expansion and Russia's own potential to compete with other producers and exporters of natural gas. What seems to be the problem is that some of the assumptions currently entertained by the Russian experts and politicians alike are not necessarily correctly reflect the existing picture and a potential for gas market development in East Asia.

Table 1. Eastern Russia: Population, 1939-1997  
(thousand)

	1939	1997
Western Siberia	8,927	15,098
Eastern Siberia	4,771	9,114
Far East	2,976	7,421
Total	16,674	31,633

Source: *Population of Russia: 1987-1997. Statistical Abstract* (Moscow: Goscomstat, 1998)

<sup>1</sup> This paper was first presented at the Far-Eastern International Investment Forum on "Investment Projects of the Far East and Trans-Baikal Regions - Priorities of the 21st Century," Khabarovsk, September 19-20, 2001. This revised version was prepared for the 2nd Annual Symposium on Overseas Hydrocarbon Development organized by the CNPC Economics and Information Research Center in Beijing, October 18-19, 2001.

Let us briefly review country by country, the current state of affairs with regard to gas pipeline projects. A case in point is Japan's policy in further promoting natural gas; it is crucial because its natural gas market is the largest in Northeast Asia, and the opening of this market for pipeline gas will constitute a major change. In this context Exxon/Mobil and Shell are backing competing gas transportation options as far as the Sakhalin gas projects are concerned. Exxon/Mobil proposes a pipeline to Honshu, while Shell decided to construct large LNG export terminal, which would have Japanese importers as its primary customers.

Japan currently imports about 52-53 Mtpa of LNG (about 65 Bcm<sup>2</sup>), and in 2010, under the new scenario with the nuclear power program scaled down and natural gas filling a shortfall, the total demand could rise to 60 Mtpa, reaching 70-80 Mtpa by 2020. However, because of its predominant reliance on LNG and domestic constrains for building such an infrastructure Japan is unlikely to be a customer for natural gas delivered through a pipeline before 2010. On the other hand, it must be also noted that since Japan is exclusively locked into the LNG option there is a possibility that a pipeline from Sakhalin will never be built.

China appears as the largest external market for pipeline gas from Siberian and Sakhalin, as well as from Central Asian sources. On the drawing board, by 2020 Beijing may need to import as much natural gas as the

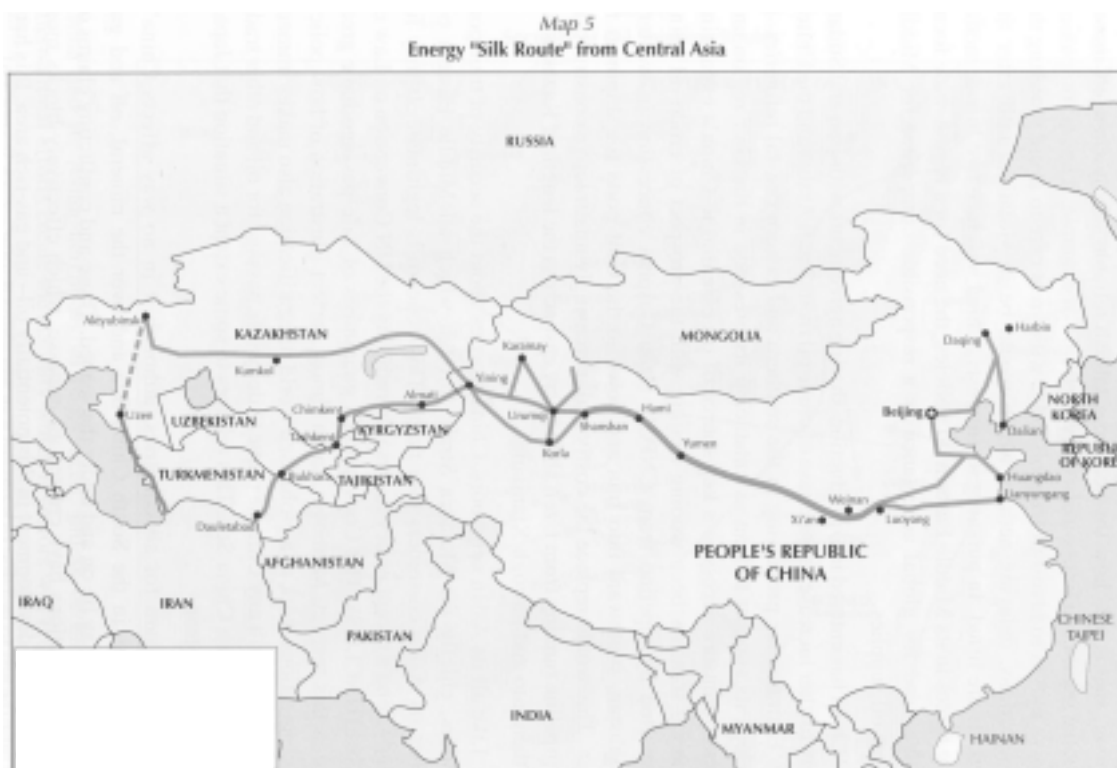
European Union does today, in addition to about 6-8 million barrels of oil per day. For Russian negotiators these projections appear extremely attractive and the top political leaders seem to support optimism regarding north-to-south cross-border gas pipelines.

However, China's first priority until at least 2010 is to develop its domestic resources of natural gas<sup>3</sup> Between 2002 and 2009, China plans to build a national long-distance West-East gas pipeline (Figure 1). This project is not entirely based on considerations of economic efficiency, being seen in the larger context of social and economic development plans for Western China. It is important to note that the trans-China gas pipeline system can be connected in the future to the Gazprom's pipeline grid in Western Siberia. An alternative is natural gas sources in Kazakhstan and/or Turkmenistan.

On the other hand, China's LNG imports in 2010 are estimated in the range of 5 Mtpa to 10 Mtpa, while Taiwan's LNG imports are likely to reach 10-12 Mtpa in 2010. The experts of the World Bank also project China to import LNG in the range from 20 Bcm to 60 Bcm by 2020, expressing skepticism about pipeline gas imports before 2015.

China's current domestic production of natural gas is only 25 billion cubic meters, or about 4% of the Russian output. China is yet to acquire a "gas culture"; when this does happen, it is likely to occur in the economically

Figure 1. A Trans-China "West-East" Pipeline and its Links with Central Asia



Source: *China's Worldwide Quest for Energy Security* (Paris: OECD/IEA, 2000), 63.

<sup>2</sup> 1 Bcm = 0.85 Mt, or 1 Mt = 1.2 Bcm.

<sup>3</sup> China's own total recoverable gas resources are estimated at 10 trillion cubic meters, while proven reserves are currently standing at one third of this amount. Until about 2010, Beijing justifiably wants to focus almost exclusively on exploring and developing these domestic reserves.

Table 2. **Projections for LNG Demand in Asia, 2000-2020**  
(Mtpa)

	2000	2010	2020
Japan	56	60	65
South Korea	16	21	35
Taiwan	5	12	16
China	—	10	40
India	—	23	35

Table 3. **Eastern Russia: Population of the Largest Cities, 1939-1997**  
(thousand)

	1939	1999	Growth
<i>Krasnoyarsk</i>	190	874	4.5
<i>Irkutsk</i>	250	591	2.4
<i>Ulan-Ude</i>	126	371	3
<i>Chita</i>	121	314	2.5
<i>Yakutsk</i>	53	196	4
<i>Blagovestchensk</i>	58	221	4
<i>Khabarovsk</i>	207	614	3
<i>Komsomolsk</i>	71	295	4
<i>Birobidjan</i>	—	80	—
<i>Vladivostok</i>	206	613	3
<i>Nakhodka</i>	—	160	—
<i>Ussuriysk</i>	72	158	2
<i>Youzhno-Sakhalinsk</i>	—	180	—
<i>Magadan</i>	27	122	4.5
<i>Petropavlovsk-Kamchatskiy</i>	35	197	5.5

Source: *Population of Russia: 1987-1997. Statistical Abstract* (Moscow: Goscomstat, 1998)

developed coastal regions first. When natural gas attracts attention in the developed coastal areas, their authorities and investors could opt for smaller-scale and easier-to-put-together LNG projects integrated with the combined-cycle power plants.

Also, in theory prospects for importing natural gas through a pipeline are improving as South Korea and North Korea talk about a railway opening between Seoul and Pyongyang. A conservative estimate for natural gas consumption in Korea is 21 Mtpa by 2010 and it is quite likely that it could reach 30-35 Mtpa by 2020, considering that South Korea is the only economy in the region that already put in place an infrastructure for a country-wide transportation of natural gas. There are now discussions taking place about building a gas pipeline through the territory of North Korea. There is little doubt that in addition to energy security of South Korea, if the inland gas pipeline is constructed it will contribute to inter-Korean cooperation and the economic recovery of North Korea.

On the other hand, uncertainties in Pyongyang's policy vis-a-vis Seoul and Washington's new stance toward North Korea are likely to complicate and delay discussions on cross-border gas pipelines and South Korea could remain for some years to come an "island" economy. Like Japan, South Korea is also in the middle of restructuring and deregulating its energy sector. This policy reform will promote competition, but a wider reliance on natural gas in power generation is not guaranteed. Moreover, currently South Korea, similar to Japan, is completely locked into the

LNG option.

In this context, Russia is yet to acquire a capacity to produce and export LNG, considering that the Asian LNG market will continue to expand (Table 2).

For instance, Australia as the fifth largest LNG exporter in the world seems to have very clear and focused strategy. Its LNG exports reached A\$2 billion with 7.5 Mtpa exported to Japan alone. Six new major LNG projects are now under discussion and Australian government's goal is to export 25 Mtpa of LNG by 2010, tripling the current volume and expanding its share in LNG market in East Asia from 10% to 30% by 2015. One of the markets targeted outside Asia is the United States.<sup>4</sup>

#### Domestic market

In addition to the economic and political uncertainties, as well as the competition on the part of LNG, the major problem of the cross-border, long-distance pipeline projects is their price tag. Very high cost of these projects requires large and reliable reserves of natural gas, accessible markets, and multilateral financing along with concerted implementation efforts. Yet another problem is that large-scale pipeline gas exports could be economically feasible only if the prospective importing economies choose to promote pipeline gas for power generation. The governments will be required to undertake not only regulatory adjustments to allow pipeline gas to compete in their markets, but also cooperate in financing these projects and promoting construction of the distribution

<sup>4</sup> *Energy Policies of IEA Countries. Australia 2001 Review* (Paris: OECD/IEA, 2001), 101, 104 and 159.

infrastructure.

It seems that for the current decade, only Russia's own market could serve as a reliable device that could trigger both resource development and prepare a base for natural gas export promotion in Northeast Asia (Table 3).<sup>5</sup>

In this table, the cities highlighted (*italicized*) are the largest in Eastern Russia located along the Trans-Siberian Railway. The total population of these cities is above 4 million and minimum 4-5 million people live in smaller settlements located along the Trans-Siberian Railway to the East from the Lake Baikal. Also, the railway zone is the prime location area for major industrial enterprises and power plants, including those that consume coal.

### A Trans-Siberian trunk pipeline

It is important to acknowledge in this context that similar to China the implementation of pipeline projects in Eastern Russia will benefit local communities, economies and regional governments, particularly if the infrastructure is built in areas with a decent number of domestic consumers and industries.

What Russia needs is a long-term, comprehensive and consistent approach to developing, delivering and distributing Siberian and Far Eastern natural gas to domestic and external markets. This strategy must first of all be aimed at integrated approach to commercializing natural gas reserves. Second, the number of potential exporters must be maximized, so ideally a pipeline, like a railway, should be kept "neutral" and open to all major exporters. Third, key transmission pipelines should be designed to collect and transport sufficiently more than the

level of current and projected domestic demand to supply gas to Northeastern China and the Koreans. Finally, this integrated approach must include efforts in targeting LNG markets in Asia. This will allow a wider marketing of natural gas, involving LNG users in Japan, South Korea, China, Taiwan, India, and elsewhere.

It should be emphasized that the proposed west-east pipeline constructed along the Trans-Siberian Railway should be seen-and therefore designed-as a long-term concept for the development of natural gas reserves in Eastern Russia. Obviously, careful and impartial economic assessment of this option is needed. In this context, relevant experiences of other countries should be studied as well. At first sight, Canada could serve as a model for designing and developing a natural gas industry and the delivery systems in Eastern Russia (Figure 2).

Although there is a considerable consumption of natural gas in the Canadian producing provinces, its gas industry is characterized by "production in the west, consumption in the east" pattern. This is clearly reflected in the gas delivery infrastructure with all production fields, gathering pipelines and processing plants located in the west. The single West-East transmission pipeline system moves gas across the country and along the border with the United States. The export points for gas delivered to the United States are spread out along this border and there are currently 16 non-reversible pipeline interconnections with the total annual maximum capacity of 86 Bcm (in Canada, about 60 Bcm of gas is consumed domestically and 78-80 Bcm is exported).<sup>6</sup>

Why not to consider this as a possible model in

Figure 2. Canada's Gas Supply System and Cross-Border Pipelines



Source: *Natural Gas Pricing in Competitive Markets* (Paris: OECD/IEA, 1998), 66.

<sup>5</sup> In 1999, federal authorities endorsed a gas pipeline project linking Sakhalin and the two most populous and industrialized provinces in Far Eastern Russia. This program, however, is vulnerable because it lacks funding.

<sup>6</sup> *Natural Gas Pricing in Competitive Markets* (Paris: OECD/IEA, 1998), 64.

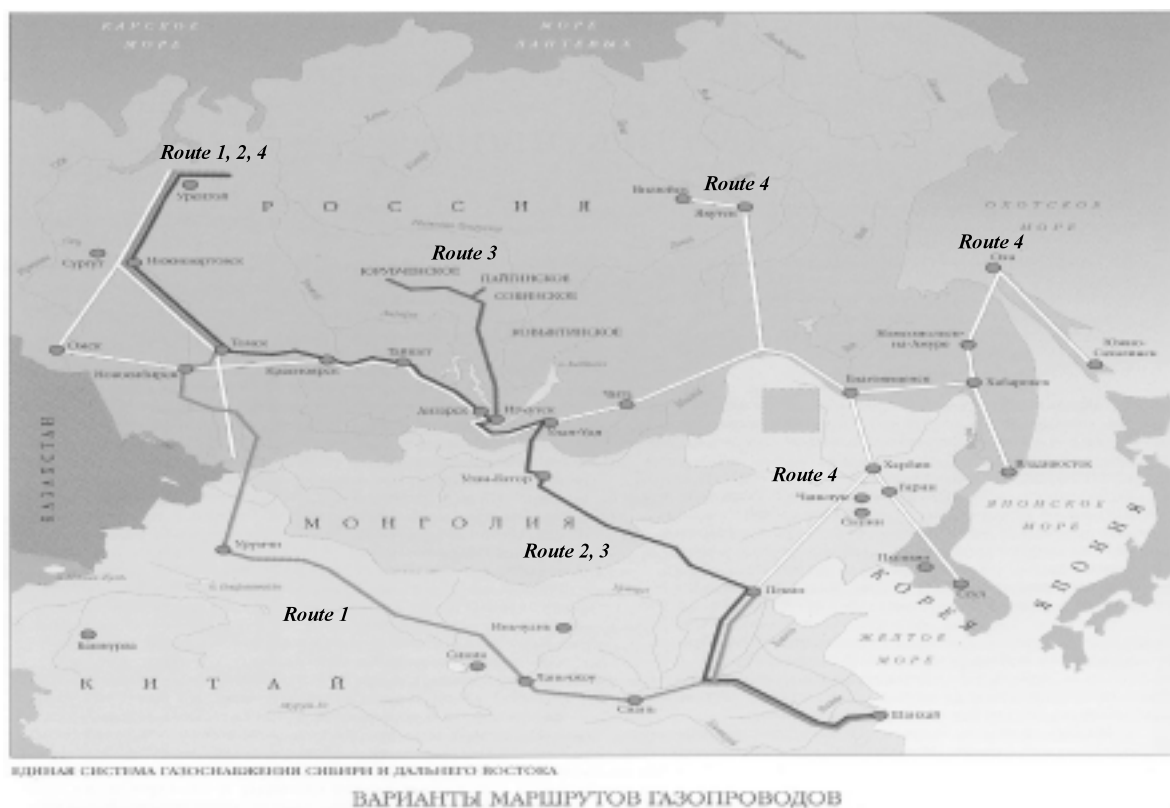
exporting Russian natural gas to the neighboring markets in Northeast Asia? Also, in Eastern Russia, like in Canada, a vulnerability to supply shortages and disruptions in a west-east trans-continental gas delivery system could be mitigated by substantial upstream reserves of natural gas in Western Siberia.

All these considerations combine may require a reconsideration of existing plans to construct "north-to-south" pipelines between Russia and China, or Russia and the Korea. Instead, a Trans-Siberian pipeline option must be considered as the preferable gas-delivering infrastructure, or at least the first option to proceed with a

feasibility study (Figure 3). It seems that such pipeline system combined with substantial LNG production facilities in the Pacific coastal area (or ensuring a complementary capacity in reserves for Sakhalin projects) could offer the following advantages:

- \* The Trans-Siberian Railway's corridor already has infrastructure in place, in a location that has known geological conditions, allowing a pipeline to be constructed faster and possibly at a cost competitive with other options.
- \* The Trans-Siberian gas pipeline project will create

Figure 3. Options for Gas Pipeline Projects in Eastern Russia



LEGEND	PROPOSED ROUTES	THE PIPELINE LENGTH, KILOMETERS		
		RUSSIA	CHINA	MONGOLIA
Route1	Pur-Tazovskie fields-Urengoy-Gorno Altaiysk-Shanghai	3,190	4,450	—
Route2	Pur-Tazovskie fields-Urengoy-Tomsk-Krasnoyarsk-Irkutsk-Ulan Ude-Ulaan Baator-Beijing-Shanghai	3,550	900	1,850
Route3	Urubchenskoe-Paitinskoe-Sobinskoe-Kovyktinskoe-Irkutsk-Ulan Ude-Ulaan Baator-Beijing-Shanghai	1,570	900	1,850
Route4	Pur-Tazovskie fields-Omsk-Novosibirsk- Tomsk-Krasnoyarsk-Irkutsk-Ulan Ude-Chita-Yakutia - Blagovestchensk-Khabarovsk-Sakhalin-Komsomolsk na Amure-Vladivostok-Harbin-Beijing-Seoul	6,300	700	—

Source: *Federal Reference Book 2000* ( ) :1999-2000

additional incentives for the development of natural gas deposits in Krasnoyarskiy Krai, Irkutskaya Oblast and Yakutia, by providing these projects with delivery infrastructure and integrating them in a larger regional natural gas development scenario in the long run.

- \* A Trans-Siberian pipeline could provide cleaner energy to all major cities and industries in Eastern Russia, while ensuring that the long-term needs of international users, including those who prefer to import LNG, are met. Therefore, the support of both domestic and international constituencies in such a project will be strengthened.
- \* This "west-to-east" pipeline could also better serve the funding needs of the project, particularly if an "open access" pipeline scheme is adopted. Also, it will allow natural gas from Western Siberia to back up the entire system and access the markets in Asia on a larger scale (at present and for the foreseeable future, the reserves located in Western Siberia will remain superior by far to those in Eastern Siberia and the Far Eastern region combined).
- \* The main advantage of such a Trans-Siberian pipeline system is the possibility of combining the multiple sources of natural gas in the northwestern, northern, and northeastern areas of Siberia and the Far Eastern region with the multiple users located in the south and southeast areas of Eastern Russia and Northeast Asia.

In promoting such a concept Russia could strengthen its position by working more closely with Japan, and also with China and the Koreans. This must not be seen as a matter of choice in favor of one or another partner but as a strategic device to maximize and share the benefits of natural gas projects as soon as technically possible.

### Japan as a partner

It seems that Japan can be supportive of this concept because its own demand for natural gas is likely to grow. Recently, the Advisory Committee for Natural Resources and Energy under the Ministry of Economy, Trade and Industry of Japan proposed raising the share of natural gas in the primary energy supply from the current 13% to 20% by 2020. Therefore a "west-to-east" trunk pipeline infrastructure constructed in Eastern Russia will allow flexible marketing and expanded reserves of natural gas traded via pipelines and as LNG. It is particularly important that Japan has the capacity and institutional instruments to influence investment decisions in continental Northeast Asia.

Also, the existing regional environment for trading natural gas in the form of LNG must not be ignored by Russian planners. Between 1990 and 1997 the global LNG market grew at 6.7% a year, with 75% of all LNG trade being centered on Japan, Korea and Taiwan. Indeed, Sakhalin-2 plans to construct a LNG plant of 9 million ton

capacity, or about 11 Bcm of gas. However, the gas market in Japan, Korea and Taiwan combined is estimated at about 135-160 Bcm by 2020 and LNG would supply most of it.

Japanese importers of LNG are the key actors that could really change existing LNG trading environment in Asia. In 2009-2010, 24 long-term contracts will end, creating a large niche that could be partially filled by Russian gas. The question is whether a single LNG plant in southern Sakhalin (and the available gas-extracting capacity on the island) will be sufficient to compete for a larger LNG market share in Japan and other economies.

On the other hand, it is important to note that in 2000 39 individual LNG cargoes were sold "spot," accounting for about 8% of the traded LNG volume. If the Asian market for LNG evolves with additional LNG sources opened and receiving terminals built, the sale of LNG on a spot basis and more intensive introduction of the LNG-based power generation facilities may considerably influence the prospects for Russian pipeline gas to be exported to East Asia.

Furthermore, both Japan and Russia could become natural partners in changing LNG markets for their mutual benefit. Swap arrangements involving already developed LNG markets and new opportunities in the coastal regions of China and India could facilitate the marketing of Russian natural gas. India, for example, has entered several LNG supply agreements and recently its state owned company bought a large share in the Sakhalin-1 project. When five LNG receiving terminals under construction or announced will be completed, India could import about 23 million tons of natural gas or almost half of Japan's current LNG imports. India will import most of its LNG from Oman, Qatar and Malaysia—the very same sources that currently supply LNG to Japan, South Korea and Taiwan.

When LNG from the Sakhalin fields becomes available, both Japan and South Korea will have an opportunity to "swap" some LNG cargoes with Indian importers of LNG, reducing both transportation costs and delivery time. It is projected that the share of spot deals could grow to 12% by 2010 and it seems that this new trend deserves careful evaluation. Due attention to these developments could help Russian experts to assemble a comprehensive marketing strategy for natural gas exports.

In the longer-term, if the East Asian market for LNG evolves, with additional receiving terminals built, the sale of LNG on a spot basis may considerably expand the market for Russian LNG. Therefore, an expanded production base to capture such an opportunity will be needed—another argument in favor of the Trans-Siberian pipeline that could, at some point, be extended to the Korean peninsula and interconnected with the Trans-China pipeline by "north-to-south" joints.

### Conclusions and recommendations

In summary, it seems that at present Russia has yet to come up with the long-term and comprehensive strategy in promoting its natural gas in Asia. It is highly desirable that this strategy will coordinate Sakhalin projects with Kovykta and Yakutia projects. A trans-continental trunk pipeline constructed along the Trans-Siberian Railway will also enable commercialization of natural gas reserves in

Krasnoyarskiy Krai, in addition to Irkutskaya Oblast and Yakutia. These integrated reserves will be sufficient to supply gas to domestic and foreign users. The proposed infrastructure and its combined capacity will allow significant cross-border gas exports to China, the Koreas, Mongolia and even supplies of LNG to Japanese, South Korean and Taiwanese LNG users, provided that an expanded LNG export capacity will be available on the Pacific coast of Russia.

The current approach to Asia-oriented natural gas projects underestimates the LNG market, which will grow further. On the other hand, Russian experts overestimate the mid-term capacity (before 2010-2015) of Chinese market in absorbing natural gas from Eastern Russia (as well as China's interest in doing so). It seems that they tend to ignore a possibility of competition with pipeline gas from Central Asia. On the other hand, the significance of domestic market for natural gas in Eastern Russia has been downplayed. Finally, there is inadequate attention to the production plans of potential competitors such as Australia and other LNG producers, on the one hand, and the interests of potential strategic partners, including Japan, India and South Korea to natural gas supplies from Russia, on the other hand.

It is highly advisable that a long-term strategy for natural gas reserves development in Eastern Russia is, first of all, designed on the basis of comprehensive, independent and realistic assumptions and projections.

Second, this strategy must be driven by domestic

needs and long-term prospects for economic and social development of eastern provinces, particularly those areas located along the Trans-Siberian Railway. It could be worthwhile to consider the experiences of such gas-producing and gas-exporting countries such as Canada and Australia where the share of natural gas in primary energy supply over the last two decades reached 25-30% from rather insignificant levels.

Third, it is not enough to take into account the demand for natural gas only, while estimating export markets in Asia. The plans for exporting gas should account the transportation options such as LNG. This delivery technology will probably face a competition on the part of cross-border pipelines from Russia, but not in the immediate future. Also, the LNG technology is making progress, reducing the cost associated with LNG supplies.

Finally, it is more than natural to plan the trunk pipelines in Eastern Russia as based on the "multiple sources-multiple markets" principle, taking into account all potential users and markets in Northeast Asia, including Russia's own domestic market. It seems that that the option of building a Trans-Siberian gas pipeline has not being ruled out as the Figure 3 demonstrates. The problem, however, is that this option has yet to be emphasized by experts and the authorities on the federal and the regional level alike as a preferable choice. On the other hand, this option should be addressed during forthcoming consultations on energy issues with Japan, the Koreas and China.

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<sup>1</sup> この論文は、2001年9月19-20日にハバロフスク市で開催された国際投資フォーラム「極東ザバイカル地域における投資プロジェクト - 21世紀の優先課題」で発表したものをベースにしている。また、その改訂版はCNPC経済情報研究センターが2001年10月18-19日に北京で開催した第2回海外炭化水素資源開発シンポジウムでも発表した。