

**A STUDY ON GAZPROM GROWTH STRATEGY
IN NORTH EAST ASIAN REGION**

**By
ANDROPOVA Tatiana**

THESIS

Submitted to
KDI School of Public Policy and Management
in partial fulfillment of the requirements
for the degree of

MASTER OF PUBLIC POLICY

2009

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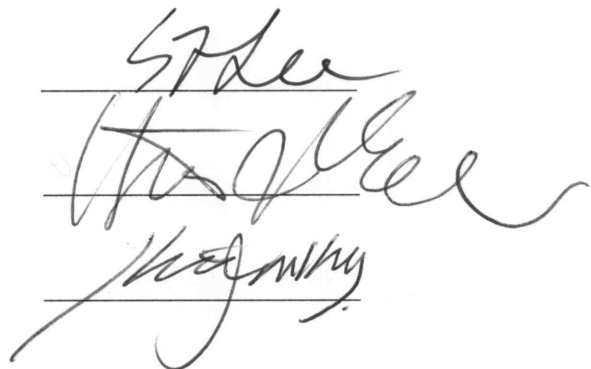
MASTER OF PUBLIC POLICY

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ABSTRACT

A STUDY ON GAZPROM GROWTH STRATEGY IN NORTH EAST ASIAN REGION

By

ANDROPOVA Tatiana

The work outlines current state of Joint-Stock Company «Gazprom», Russia's and world's biggest natural gas producer and exporter. The natural gas market is still developing, and it is highly profitable for Gazprom to fix its presence not only in the traditionally gas-dependent Europe, but also in the rapidly growing Asian market as well. To succeed in this goal, Gazprom has already made a number of acquisitions and started several projects aimed at the North East Asian consumers.

The market of North East Asia is highly dependent on the gas supply from the middle East, and the readiness to switch to a neighboring gas producer therefore eliminating unnecessary risks, enabling flexible contracting and improving the energy security in the region.

The analysis shows that the potential of Eastern Siberia and Russian Far East natural gas exports is more than enough to feed the needs of the key three importers of the North East Asia – China, South Korea and Japan. Each of three has its own preferences and requirements for the supplies, and therefore Gazprom needs a diversified infrastructure in order to gain and maintain the leading position in the regional gas market. Hence, the strategic development of Gazprom should include the upgrade of the infrastructure and massive investments, including expanding the Liquefied Natural Gas (LNG) division to meet high demand for it.

ACKNOWLEDGEMENTS

For a few years by now I've been destined to live, work and study in Korea. To be true, I cannot refer to mastering the courses at the KDI as an easy job to do, but happily I had a chance to follow the patient, professional and experienced guidance of the esteemed professors of the School of Public Policy and Management, learning the new approaches to the teamwork, analyses, understanding and presentation. Not to mention the perfectly balance approach to the multinational students' community which shows the outstanding capabilities of KDI SPPM and its staff as a leading institute of international education in Korea.

As per my own experience there is no way to estimate the value of advises, notes, remarks and pure help provided by my thesis adviser Prof. Lee, Seung-Joo at the making of this work. It's hard to imagine, where could I end up in the debris of information and everyday changes, if not for his precious guidance and prompt advises. I may now conclude that his courses of <Corporate Strategy and Strategic Leadership> had been of a great value for me as a source of skills and techniques necessary for the success-minded person. In particular, my deepest appreciation to Professors Chung Chin-Seung, Taejong Kim, Oh Byungho, Park Hun Joo, Behling David for their invaluable support.

My new friends from around the globe, those who shared their time at KDI SPPM with me, their readiness and willingness to study, work and debate, it gave a new look at the global cooperation idea – it should not necessary be the same language or nation for the team to act as one.

Last, but not least, I would like to share my proud feelings with those beloved ones who stayed by me for all times in my life - my dear parents, my husband and my son. Yes, it's "we" who did this work – not necessarily meaning, "who actually wrote this thesis" but "who made it possible for the thesis to be written".

TABLE OF CONTENTS

| | |
|--|----|
| 1. Introduction..... | 5 |
| (a) Background..... | 5 |
| b) Object of the Study..... | 5 |
| (c) Research Methodology and Organization of the Thesis..... | 6 |
| (d) Literature review..... | 7 |
| 2. Global gas industry overview..... | 11 |
| (a) Role of natural gas in the energy balance..... | 11 |
| (b) Natural Gas production and consumption..... | 12 |
| (c) World Gas Markets..... | 16 |
| (d) Russian players on the global market..... | 20 |
| 3. Gazprom – company overview..... | 21 |
| (a) Company history profile..... | 21 |
| Financial highlights..... | 22 |
| Transportation system and storage review..... | 24 |
| Exploration and Production..... | 25 |
| (b) Deposits and Reserves analysis in Russian Far East..... | 26 |
| Kovykta gas field..... | 26 |
| Yakutia gas and oil field..... | 27 |
| Sakhalin Island’s projects..... | 27 |
| (c) Interaction of Gazprom and independent producer Rosneft..... | 29 |
| (d) Value Chain of Gazprom Company..... | 30 |
| 4. Gazprom growth strategy in North East Asia..... | 33 |
| (a) Current situation and prospects of NEA Gas Markets..... | 33 |
| (b) Gazprom Challenges and Future Scenarios..... | 38 |
| (c) SWOT Analysis..... | 40 |
| 5. Recommendations..... | 43 |
| APPENDIX..... | 44 |
| BIBLIOGRAPHY..... | 55 |

LIST OF TABLES AND GRAPHS

| | |
|--|----|
| Table 1. Natural Gas Consumption by Country..... | 11 |
| Table 2. World Natural Gas Reserves By Country..... | 13 |
| Graph 1. World Natural Gas consumption by sector, 1990-2030 | 14 |
| Table 3. Natural Gas Reserves of the RFE | 15 |
| Table 4. Countries that import and export LNG..... | 18 |
| Table 5. Gazprom Activities Structure | 22 |
| Table 6. Financial performance of Gazprom | 23 |
| Table 7. Russian Natural Gas Production and Export | 25 |
| Table 8. Value Chain of Gazprom Company..... | 30 |
| Table 9. Five Porter's Forces | 36 |
| Table 10. Demand for Natural Gas Import in the NEA Countries | 37 |
| Table 11. Chinese demand for Russian gas | 37 |
| Table 12. SWOT Analysis | 40 |

1. Introduction

(a) Background

For the long years the natural gas was considered a useless (if not dangerous) companion of the oil extraction process, until the techniques for the gas collection, transportation and utilization were introduced. The “blue fuel” has no smell or color but has a huge value and prospects, and those states possessing vast reserves of the gas are deemed to be in a superior position to the others bonded to import the fuel. There are certain advantages in natural gas exporting but some major catches as well: the higher the export is the deeper the economy dependence goes, which, in terms of world economy instability, means very fragile income. Instead of the simple strategy “to sell as much as can be bought” leading to oversaturation of a given market, the natural gas exporters need to diversify the strategy regionally.

b) Object of the Study

It's been proved by the recent two or three decades that there is nothing as vital for the world's economy as the continuous and sufficient supply of the energy. The rapid development of the petrochemical industry, highest ever (and still increasing) demand for the new materials and composites, growth of the automotive market and expanding consumption of electric energy, everything roots from the natural energy resources, oil, coal and gas.

Russia is now often referred to as the “oil-n-gas economy”, which economically means that a huge percent of GDP and state revenues comes from the export of fossil fuels crude oil and natural gas. Hence, the Russian Federation greatly depends on the market prices of oil and gas and the Russian budget is extremely fragile due to unexpected fluctuations of the trade prices; but at the same time the volume of exported oil and gas also puts the importers into a tricky dependence on the Russian fuels and threats sole countries' and regions' energy security.

This study aims at revealing possible future of the North-East Asian natural gas market for Gazprom company, Russia's and world top gas exporter.

The world natural gas market is highly regionalized and each area has its own specifics shaped by the resource base, transportation options and overall development level. In case of the relatively young North-East Asian gas market, three developed states of the region – continental China, South Korea and Japan – are importing gas, but the volume and means are different for each. China is trying to avoid rising the NG consumption level by promoting its own coal and gas supplies, but its growing economy demands more fuel; Japan still imports mostly oil, but is likely to shift to gas consumption in case stable pipeline supply provided; South Korea is worlds biggest liquefied gas importer but is ready to give up sea-freight imports in favor of landline supplies. All of the mentioned three are perfect buyers for the gas originating from the neighboring Russia, and such volumes can only be handled by Gazprom, Russian near-to-monopoly natural gas company. With its world's biggest deposits of NG multiplied by experience and huge infrastructure, Gazprom is likely to become the regionally dominative supplier of natural gas both via continental pipelines and LNG carriers. In order to reach this goal, continuous development and upgrade of the infrastructure (both new and existing) is required, which in turn means re-balancing the investment scheme in the region. At this point the strategy of Gazprom involves major shift to LNG production to feed the needs of Japan and Korea in the initial stage and gradual expanding of the pipeline network to China, South Korea and Japan in the long-term perspective. The measures taken to extend the Russian gas export agreement framework will not only benefit the importing states' energy security but also contribute to the regional peace and security. Thus this study's object is Gazprom's ability to perform such rebuilding and initiate sufficient investment for the purpose of gaining the dominant market share in the North East Asia.

(c) Research Methodology and Organization of the Thesis

In this study basically was used method in-depth analysis by exploring different scientific research papers, materials from international energy conferences and academic books. Considerable contribution in gathering latest information was made by help of specialists analytics from company Gazprom. Internet resources were used for getting last statistic data for financial performance outlook.

At the beginning, the overall energy industry situation was revised, making an emphasis on the Russian position in the global arena by examination of international articles,

academic papers, and analyzing different visions on natural gas perspectives from worldwide analytics. The author also examined open Internet resources in order to obtain the latest statistic data available.

In the Chapter III, the case study of Gazprom's history and growth strategy was examined, basing on the company vision and perspectives of development in the future. In this chapter the scientific papers were also used, but the author found extremely discrepant position and vision on Gazprom performance in most sources. There is a number of contradictions among academics from different countries. Therefore, it was challenging to compose independent point of view on current situation.

Returning to case study, in Chapter IV the author considered problems in Gazprom performance by means of SWOT analysis. Finding gaps in the marketing strategy, the value chain and the company development strategy, it helped to give recommendations in Chapter V and sketch out concrete measures in achievement of the future perspectives.

(d) Literature review

Since the energy exports are the most profitable field of the Russian economy, it is understandable (although still strange) that the leaders of the state, the President and the Chairman of the Government, are usually involved in the procedures of signing the contracts that seem to be purely commercial.

The whole industry is ought to change it's face, and probably it will differ form the predicted one. It is almost a common vision that Gazprom will sooner or later combine all energy sources and possibly the electricity production in a globalized conglomerate that would follow not only the market trends but the government guidelines as well. In Russia, the very name of "Gazprom" has turned into a symbol of a successful, rich and powerful company, extremely close to the political elite.

The literature of the subject is far from being numerous and tends to include various political connotations related to former President, current Prime Minister V.Putin's activities. Aside of that, most of the dedicated researches are somewhat outdated as the gas market has been actively developing in the recent years and project deemed 'eternal' (for their delayed planning and overwaited implementation) have been finally completed.

I would like to emphasize several opinions expressed by the following authors.

“The future of Russian Gas and Gazprom”

By J. Stern, Oxford Institute for energy studies, 2005

The Author analyses the main concerns of the Russian Natural Gas Industry – its position in the market, the possibilities and challenges, the necessity of the industry reform and facilities renewal, as well as some political aspects of the gas trade. Another strong concern is the possible domestic profitability of the further gas fields development as the local gas prices are far from being sufficient source of capital and most of the cash comes from abroad. Thus the local producers, non-capable of exporting their gas outside of Russia, will form the new domestic market, less dominated by Gazprom. The economical instability of the early post-Soviet years has brought to life numerous ‘intermediaries’ which helped to protect the gas trade from the possible damage from the rapidly-growing debts and non-payment. Some of the former intermediaries have turned into top independent producers, others have disappeared from the gas stage. The current policy of Gazprom implies the direct inter-state long-term contracting, omitting the third parties from the business chain.

But one should keep in mind that the work originates from the period when Russia started gaining huge revenues of natural resources’ exports and therefore was blamed for using its supplies as a political tool.

Three Asian countries that are the main driving forces of the NEA gas market development still are the most favorable partners for the future exports via traditional pipeline. China is still somewhat unpredictable, but still it is bonded by numerous agreements to the Gazprom’s future strategy. Besides the internal concerns of each mentioned county there are several political concerns require joint actions several of the regional players. Another potential market for the Russian gas, Korea, needs to solve its internal problems and reform the gas importation system. The Japanese demand for gas contradicts the political antipathy to Russia itself, and these uncertainties make the prospects of the Russian natural gas in Asia far less optimistic. Intention to diversify Russian gas exports to Asia may not be to the advantage of S. Korea – given the likelihood that any pipeline gas would need to pass through China (unless it was to transit North Korea) – but the continuing uncertainties that surround privatization of KOGAS and the liberalization and restructuring of the gas industry may also suggest a longer time frame. When this is considered in the context of Japanese reluctance – for reasons relating both to demand uncertainties and political antipathy to Russian gas – to import Sakhalin LNG in large quantities let alone even more substantial

volumes of pipeline gas the prospects for significant Russian gas exports to Asia appears to be somewhat further distant than is often believed.

The future of Gazprom is clear, although not definitely bright. The once-awaited merger with Rosneft is unlikely to happen in any near future, but the two companies are acting with full support of the Government and are likely to continue their aggressive policy both domestically and abroad.

Gazprom still has numerous issues to face, and author outlines it as below:

1. Corporatization and legal unbundling
2. Maintaining the reliability of pipeline network
3. Replacing gas production from declining fields
4. Developing and maintaining reliable large-scale import relationships with Central Asian states
5. Maintaining stable sale and transit relationships with Ukraine, Belarus and Moldova
6. Managing a very large European export portfolio in regards to liberalization and competition¹.

The outline gives a straight direction for Gazprom's future strategy development – in order to maintain a stable and, more important, profitable business, Gazprom will have to re-balance its price and volume policies, fixing its outdated approach to the three main markets – the local, CIS, and EU. Allocating the priorities will largely depend not only on the global pricing and demand trends, but also on the political guidelines of the Russian government.

“Energy Dimension in Russian Global Strategy” *By Energy Forum Baker Institute for Public Policy, Rice University, 2004*

Oil and gas exports are still the main momentum providers to the Russia's economy development, and it is clear that Russia is capable of further extension of the raw fuel production. In case of the natural gas exports it is clear that the competition is near to zero, thus Gazprom does not have to struggle to maintain its market position. Gazprom's ambitions are realistic, i.e. in the situation of near-monopolistic exports the company only has to worry about the technical capabilities of the infrastructure leaving aside the possible threats.

¹ «Russian Oil and Gas Industry: Energy dimensions in Russian Economic and Foreign Policy», Kong Chyong Chi, <http://www.futureofenergy.org.uk/uploads/>

Exportation of the Russian fossil fuels follows the traditional routes. The pipelines that have been used for decades to deliver Russian gas to Europe are facing numerous challenges of both technical and political nature. New pipelines, and what's more important, new delivery options like LNG or CNG are critical for maintaining the sustainable growth of Gazprom and retaining its leading positions in the regions of Russian gas export interests. Oil and gas pipelines' management as an influential mean for controlling independent producers. As it was re-confirmed by the President of Russia in 2004, the pipelines will remain a state-manipulated tool to control the gas flow (and cash flow) and maintain government influence in the fuel exports. But it is clear that such policy will also minimize the trust potential of the gas importers and is likely to undermine Gazprom's development strategy (especially in the business-independence concerned European market). EU-Russia energy chain and the US gas market policy. The Strategic Energy Partnership signed between the Russian Federation and the European Union in 2000 marks the new stage of Russia-EU energy cooperation. The agreement turned out to be of a great value for both parties, making the supply of the natural gas to Europe a highly profitable project for Russia and secure power source for Europe. The annual gas supply is to reach 187 bcm by 2010 and is most likely to increase in the future.

Russia's dominating position in the world natural gas production originates from its location and resources, but the market domination is far less determined since competitors, even distant ones, are reaching every available importer with LNG offers. The pipeline supplies are far more cost-effective and secure, but sticking to the pipes means limiting the possibilities with the geographic neighbors. In this view, the only logical solution is to diversify the supply means and enter the new markets unavailable to the pipeline delivery. The current strategy of Gazprom on the most perspective U.S. and North East Asia markets will contribute to the price-generation of the latter and will have an extended outcome in the coming years throughout the industry.

The above can be summarized as an extensive, comprehensive but outdated analysis. The current situation urges the whole system of the Russian gas industry to be reviewed. So far the prospects of the Russian gas in the Asian market have not been the subject of a thorough academic study, but, assuming the world economy crisis will be managed successfully, the region will be in need for the cheap and effective energy supply, and Gazprom cannot lose this opportunity to gain the leading positions in the North East Asia.

2. Global gas industry overview

(a) Role of natural gas in the energy balance

Amid growing demand for the energy, the new sources of cheap energy are welcome in any sphere, from house heating to the car engines. It was not long ago that the natural gas emerged as a convenient energy source: but in today's world it became an important supply for diversified spheres – it still burns at most kitchens but it can also be bought in a liquefied form at the gas stations around the globe for use in the modern vehicles.

In the past years the global consumption of the NG has continuously increased, pushing exporters to produce more NG and importers to look for better deals and lower prices. (Table 1.)

Table 1. Natural Gas Consumption by Country, 2009

| Rank | Country | Natural Gas consumption (cu m) |
|-------------|----------------------|---------------------------------------|
| 1 | United States | 640,900,000,000 |
| 2 | Russia | 405,800,000,000 |
| 3 | Germany | 99,550,000,000 |
| 4 | United Kingdom | 92,850,000,000 |
| 5 | Japan | 80,420,000,000 |
| 6 | Ukraine | 79,860,000,000 |
| 7 | Iran | 72,400,000,000 |
| 8 | Italy | 71,180,000,000 |
| 9 | Saudi Arabia | 56,400,000,000 |
| 10 | Canada | 55,800,000,000 |
| 11 | Indonesia | 55,300,000,000 |
| 12 | Mexico | 55,100,000,000 |
| 13 | Netherlands | 49,720,000,000 |
| 14 | Uzbekistan | 45,200,000,000 |
| 15 | France | 42,010,000,000 |
| 16 | United Arab Emirates | 33,700,000,000 |
| 17 | Malaysia | 31,250,000,000 |
| 18 | Argentina | 31,100,000,000 |
| 19 | Venezuela | 29,400,000,000 |

| | | |
|----|--------------|----------------|
| 20 | China | 29,180,000,000 |
| 21 | Thailand | 23,930,000,000 |
| 22 | Pakistan | 23,400,000,000 |
| 23 | Australia | 23,330,000,000 |
| 24 | India | 22,750,000,000 |
| 25 | Algeria | 22,320,000,000 |
| 26 | Egypt | 21,200,000,000 |
| 27 | Korea. South | 20,920,000,000 |

Source: IEA

In Asia only few countries have significant deposits of the natural gas on their own territory, and the gas supplement is often vital for the countries that are lacking their own energy supplement. Since Natural Gas (NG) (and Liquid Natural Gas (LNG) as the way of transporting it) is convenient to transport, store and use, the demand is continuously rising.

The Asia-Pacific region, far from being rich with oil or gas (comparing with Russia or OPEC) is one of the most important markets for the gas exporters. NEA countries, led by China, are importing up to 75% of their annual gas needs.²The ongoing growth is explained by the technology development and energy consumption rise in the region: China, South Korea and Japan belong to the world top economies, and require great deal of oil, gas as well as raw material for their substantial development.

(b) Natural Gas production and consumption

Russia is topping the list of the countries with biggest confirmed reserves of the gas, its continental part and sea shelf contain roughly 34% of the world's deposits; Iran is following with almost two times less reserves, and if the above two added to Qatar and Saudi Arabia it will total over 60 percent of the world's reserves. In other words, only about 10 to 15 countries can afford exporting the natural gas aside from feeding their own needs, which actually creates the complicated market of the Blue Fuel.

Russia is the world's largest holder, producer and exporter of natural gas, with huge amount of the world's overall explored reserves has an ambitious goal to become an "energy superpower," since its pure geographic location ensures its dominance in Asian market in the future. (Table 2.)

² Energy Information Administration, "International Energy Outlook, 2009 http://www.eia.doe.gov/oiaf/ieo/nat_gas.html

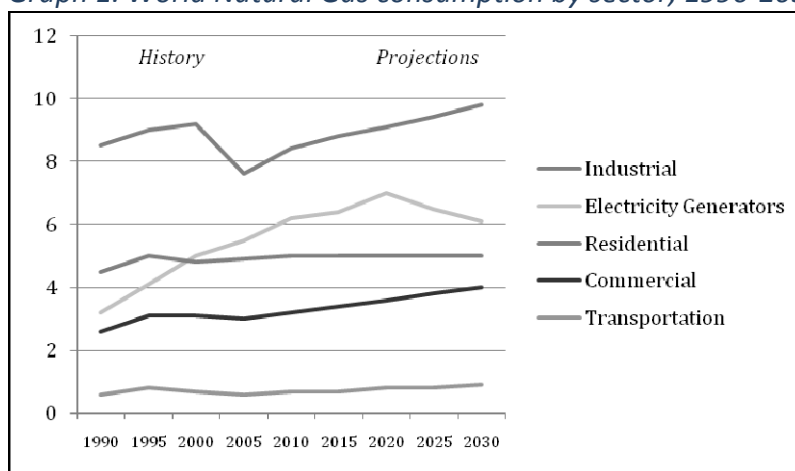
Table 2. World Natural Gas Reserves By Country as of January 1, 2009

| Country | Reserves (Trillion Cubic feet) | Percent of World Total |
|----------------------|-----------------------------------|---------------------------|
| World | 6,254 | 100.0 |
| Top 20 Countries | 5,674 | 90.7 |
| Russia | 1,680 | 26.9 |
| Uran | 992 | 15.9 |
| Qatar | 892 | 14.3 |
| Saudi Arabia | 258 | 4.1 |
| United States | 238 | 3.8 |
| United Arab Emirates | 214 | 3.4 |
| Nigeria | 184 | 2.9 |
| Venezuela | 171 | 2.7 |
| Algeria | 159 | 2.5 |
| Iraq | 112 | 1.8 |
| Indonesia | 106 | 1.7 |
| Turkmenistan | 94 | 1.5 |
| Kazakhstan | 85 | 1.4 |
| Malaysia | 83 | 1.3 |
| Norway | 82 | 1.3 |
| China | 80 | 1.3 |
| Uzbekistan | 65 | 1.0 |
| Kuwait | 63 | 1.0 |
| Egypt | 59 | 0.9 |
| Canada | 58 | 0.9 |
| Rest of World | 581 | 9.3 |

Source: "Worldwide Look At Reserves and Production", *Oil & Gas Journal*, Vol. 106, No.48 (December 22, 2008) pp. 22-23

The versatility of the natural gas makes it a useful commodity in various fields: it is clean, cheap and efficient thus the natural gas is an essential supply for most of the environment-friendly industries and technologically advanced spheres. The advantages of the natural gas allowed it to gain strong position in the energy production, and at present roughly 40 percent of the gas consumed in the industry sphere. Its affordable price makes a serious challenge to the traditional oil and coal in the modern economy crisis. The industry forms the most important consuming sector for the natural gas with 44 percent of world consumption in 2007 estimated to grow to 47 percent in 2030, possibly replacing liquid fossil fuel in some applications. (Graph 1.)

Graph 1. World Natural Gas consumption by sector, 1990-2030 (trillion cubic feet)



Source: IEA

Industrial use of natural gas will probably reach an average annual consumption increase rate of 1.9 percent from 2007 to 2030, as compared with an average increase of 1.1 percent per year for liquids consumption.³

Many countries are now using gas to generate power for local consumption, reserving their oil for export. Companies are pursuing both LNG and regional pipeline-network options.

The core technologies of LNG, liquefaction and regasification, are steadily advancing towards the minimizations of costs and time. To this extent LNG is the best alternative for those countries bound to import gas from far abroad and also allows the producers to reach stranded deposits without heavy investments to the pipeline building. The scale of usage of LNG as the vehicle fuel has grown from its growth initiated the new parts of industry – both

³ Energy Information Administration, "International Energy Outlook, 2009" http://www.eia.doe.gov/oiaf/ieo/nat_gas.html

car conversion and widespread LNG/CNG (Compressed Natural Gas) gas station networks, which in turn attracts more consumers to the idea of using cheap LNG as the fuel for their car.

The Liquefied Natural Gas export has shown its profitability for those countries, which, like Republic of Peru, Republic of Venezuela, Islamic Republic of Iran, Republic of Iraq, State of Kuwait, State of Qatar, United Arab Emirates etc. have proven reserves that allow to maintain high reserves-to-production ratio. The above is true for all states that have an appropriate technological and infrastructure basis, but some of the gas-rich countries prefer to use the relatively cheap gas for the domestic needs and export it via old-style pipeline networks rather than invest in LNG facilities.

In case of other new players on the market, like China or India, the willingness to enter the LNG trade urges the massive capital and technology investments along with extended research works that are necessary to overcome the infrastructure, geopolitics and accessibility issues.

The vast deposits of gas in the Russian Far East may form the major supply base for the Asian market. The reserves can be subdivided into four geographical clusters: Chukotskiy Autonomous Region, Kamchatskaya Oblast, Sakhalinskaya Oblast and the Republic of Sakha. (Table 3.)

Table 3. Natural Gas Reserves of the RFE (billion cub.m.)

| | Explored Deposits | Overall Reserves | Prospective Resources |
|---------------------------------|-------------------|------------------|-----------------------|
| Sakha Republic (Yakutia) | 26 | 2,200.0 | 123.3 |
| Kamchatskaya Oblast | 4 | 22.6 | 11.5 |
| Sakhalinskaya Oblast | 50 | 946.6 | 2000.2 |
| Chukotskiy Autonomous Region | 2 | 14.7 | 11.4 |
| Total | 82 | 3,183.9 | 2,146.2 |

Source: Andrey Vasenev, “Gasification Projects in the Russian Far East and Eastern Siberia”, May 2006

(c) World Gas Markets

The geographical differentiation of natural gas markets is based on the location of the main gas consuming highly developed countries – European market, North East Asia market, American market, etc. Today, Europe is clearly the oldest and most institutionalized market, American and NEA gas markets are still building itself up – the most general agreements for long-term large-scale supplies were signed in the past 10-12 years, setting up the grounds for major shift towards gas promotion and consumption.

The European imported gas dependence has played a meantrick with Europeans earlier in 2009, showing that sometimes gas supply can be turned into a political weapon not even by the exporting country but by the transiting state. But the situation clearly showed the importance of the natural gas supply to the European consumers, primarily for the electricity- and heat-producing enterprises. Russian gas accounts for more than 44 % of annual NG consumption in Europe, and wise versa the revenues from the gas exports form roughly 25 % of the Russian budget. Europe has no replacement for the gas imported from Russia, and the dependence on Russian import creates huge security concerns within the EU states, but no sufficient substitute was ever suggested.

Demand for gas in Asia will rise by an average 3.6 percent a year through 2030 as economic growth boosts the use of fuels, according to the International Energy Agency. While consumption has been eroded this year by the global recession, the region's gross domestic product (GDP) is set to expand by an average 4 percent annually over the next 20 years, ExxonMobil Corp. data shows. Demand in Europe will advance at an average annual rate of 1 percent through 2030, which advises 28 industrialized countries on energy policy.

Thus the main players for any given gas market are clear: a group of states with high demand for natural fuel and deficit of domestic production represents the Buyers and a group of (or single) gas-rich neighboring state forms the Seller. The nature of the natural gas transportation presumes that the markets tend to be regionally oriented, and only large exporters are capable of delivering their production far outside the 'domestic region'.

Current direction of the gas industry development includes creation of the wide and sophisticated pipeline network along with LNG (Liquid Natural Gas) and CNG(Compressed Natural Gas) transportation routes and means. Further extension of these will eventually bring up new buyers presently located aside from the main pipelines or lacking the access to the gas transportation routes (e.g. away from seashore).

The global consumption of the natural gas has reached 3 trillion cubic meters of gas, with 2 trillion consumed by North America, Europe and Eurasia, while the rest was exported. The global consumption is likely to exceed 5 trillion cbm in 2008, with most of additional volume attributing to the LNG exports.

In comparison to the oil market, gas exporters are not dominated by the states with the largest reserves, some of which are even out of the top-10 providers. Over 50 percent of the world exports are provided by Russia, U.S. and Canada. The pipelines are still the most cost-effective way to deliver gas to the end-users, although the construction costs are high, the technology allows continuous massive transportation of gas. The pipelines are limited by the physical and geographical factors and are getting more expensive to build, and island-states are literally excluded from the potential pipeline importers.

Another complication of the pipeline trade is the political situation – the pipe might get used in the political games not only by the suppliers themselves but by the transiting countries as well, which puts the recipients in a fragile position of double dependence as it happened with Ukrainian transit in 2008 and Turkmenistan transit in 2007.

The supplies by means of LNG may become the other option for the importers, but the technology has its own flaws as well – the LNG availability is subject to the port infrastructure and certain climatic options. For the providers the technology also poses numerous requirements, and all these points combined sometimes prevent the natural gas exporters states from entering the LNG market.

According to the EIA, global trade of LNG amounted to about 200 billion cbmin 2008, which is less than 15 percent of the global natural gas trade. By 2008, 17 states entered the LNG export business, and the same number of importers was noted.. (Table 4.)

Table 4. Countries that import and export LNG

| Countries that Export LNG | Countries that Import LNG |
|---|-----------------------------------|
| Algeria (1971) | Belgium, Kingdom of (1987) |
| Australia (1989) | China (2006) |
| Brunei (1972) | Dominican Republic (2003) |
| Equatorial Guinea (2007) | French Republic) (1972) |
| Egypt (2004) | Greece (2000) |
| Indonesia (1977) | India (2004) |
| Libya (1970) | Italy (1971) |
| Malaysia (1983) | Japan (1969) |
| Nigeria (1999) | Mexico (2006) |
| Norway (2007) | Portugal (2003) |
| Oman (2000) | Puerto Rico (2000) |
| Qatar (1997) | South Korea, Republic of (1986) |
| Trinidad and Tobago, Republic of (1999) | Spain, Kingdom of (1969) |
| United Arab Emirates (1977) | Taiwan (Republic of China) (1990) |
| United States of America (1969) | Turkey, Republic of (1992) |
| | United Kingdom (2005) |
| | United States of America (1971) |

Source: <http://www.energy.ca.gov/lng/worldwide/>

The LNG contracts tend to be of a long-term type, but ‘spot trade’ or ‘spot contracting’ is also widely used. The short time trading is common for the situation with interrupted supplies and unpredicted consumption growth. Since the world demand for the natural gas is growing, the expensive LNG is likely to expand its infrastructure and gain more popularity among importers. The regionalization of the natural gas market is explained below:

Russia/Eurasia/Europe. The importers of Europe and Central Asia represent about 45percent of the world's gas consumption. The European Union member states along with others use substantial amounts of natural gas; roughly a one fourth of the E.U.’s energy comes from natural gas, and Russia makes half of its energy with the natural gas. The supplies are made via numerous pipelines mostly going from East to West. Russia (more

than 25 percent of world exports and largest reserves), Norway, the Netherlands, and Uzbekistan are highest net exporters in Europe.

In addition to its own exports, Russia also provides its pipelines for the transit of the Central Asian gas to Europe, which, again, rises concerns of the energy security in the region. In this regard several concurrent projects of alternative pipeline routes are underway as well as other activities aimed at minimizing the European dependence on Russian gas.

North America. This region accounts for another quarter of the world's import and has its own extensive pipeline system. North America makes up to 25 percent of all energy consumed in from natural gas. The United States ranks first in the gas consumption (with about 20 percent imported) and second in the gas production. Neither Canada nor Mexico are major exporters outside the continent. The United States is a major player in the LNG market, its export reached 1,7 billion cbm in 2007 and almost all of those went to Japan; **Asia/Oceania.** The most populated region in the world accounts for only 15 percent of global consumption. In case of China the rate of gas usage in energy production is only 3 percent, India makes as much as 8 percent and both states are importing very small amounts of LNG, producing the rest domestically. Gas is outbeat by coal in both regions due to its cheaper price and easier accessibility.

In case of the Republic of Korea, the gas consumption is estimated to double in coming 20 years, which, in the view of near-zero domestic production, gives the country no other choice but securing the long-term supplies from the gas-rich neighbors. But for continental China the situation is not that straight: it is capable of producing certain percentage of domestic needs, but has to import gas for the regions far from its own supplies. At the same time China has to limit the imports not to let the imported gas outbid its own producers from the local market.

Asian countries export and import LNG actively, leaded by Malaysia and Indonesia (both in the world's top ten net exporters) and world's biggest LNG importers – Japan and the Republic of Korea.

Africa and Middle East. The consumption reaches less than 13 percent of the world's total, but many of the world's leading LNG exporters belong to the area- Algeria, Oman, the United Arab Emirates, Nigeria, Qatar, Egypt, and Libya. Almost half of the worlds LNG exports originates here – and the region is most likely to keep its dominance in the future. Noticeably, most of the gas produced goes abroad with extremely little part used

within the region. Iran has certain limitations implied to its technology advance and hence has to stick to the pipelines for its exports. Saudi Arabia does not export gas despite being the fourth-largest reserves holder. Nigeria is also in the top-ten list of reserves' holders but so far have not found a way to utilize the gas coming with the oil and simply burns it.

Latin America. The smallest amounts of gas consumed annually, with only a small amount being exported. The misbalance of projected supply and actual demand has driven the LNG importation program to the active stages.

(d) Russian players on the global market

Among several key players of the Russian natural gas industry, Rosneft is active with the surveillance on Sakhalin and Kamchatka in order to prepare future grounds for the big projects. Rosneft was granted surveying rights to Veninski (Sakhalin-3), Western Schmidski (Sakhalin-4), Kaigansko-Vasyukanski and Western Schmid (Sakhalin-5) in 2003, with foreign businesses actively participating in the process of surveillance (Rosneft controls 49.8%, 51%, and 51%, respectively of the S-3, S-4, and S-5 projects above)⁴.

The Exxon-Mobil and Chevron have been in control of Western-Odoptinski, Aiyahskii, and Kirinski of Sakhalin-3 since 1993 until the licenses were revoked in 2004 therefore eliminating the future of the PSA project, which was able to outgrow the ambitious Sakhalin 1 and 2. The foreign participation was limited to 50% or less after the revocation, and the remaining blocks of Sakhalin were contended by Rosneft, Gazprom, Lukoil, Sinopec, ONGC, ExxonMobil and Chevron. Thus foreign participation in this project will represent the “government-business partnership” instead of PSA and will mean smaller scale. The costs for each project are estimated around \$10-15 billion; exploration activities conducted in 2006-2008 alone will cost \$100 million⁵.

A consortium was created between Gazprom, Rosneft, and Surgutneftegas in 2003 in order to coordinate the joint development of hydrocarbon resources in Eastern Russia, but the consortium did not make it way to successful operating due to numerous disputes of its members. Though, the idea may get revived for the purpose of further development of Russian Far East. The procedure finished in April, 2007, allowed Gazprom to join the other parties of the Sakhalin-2 project as the leader: while Shell, Mitsui and Mitsubishi are holding 27.5 to 10 percent of shares each, Gazprom got 50 percent plus one share.

⁴ Rosneft website <http://www.rosneft.ru/> (Accessed August 15, 2006.)

⁵ Ibid

3. Gazprom – company overview

(a) Company history profile

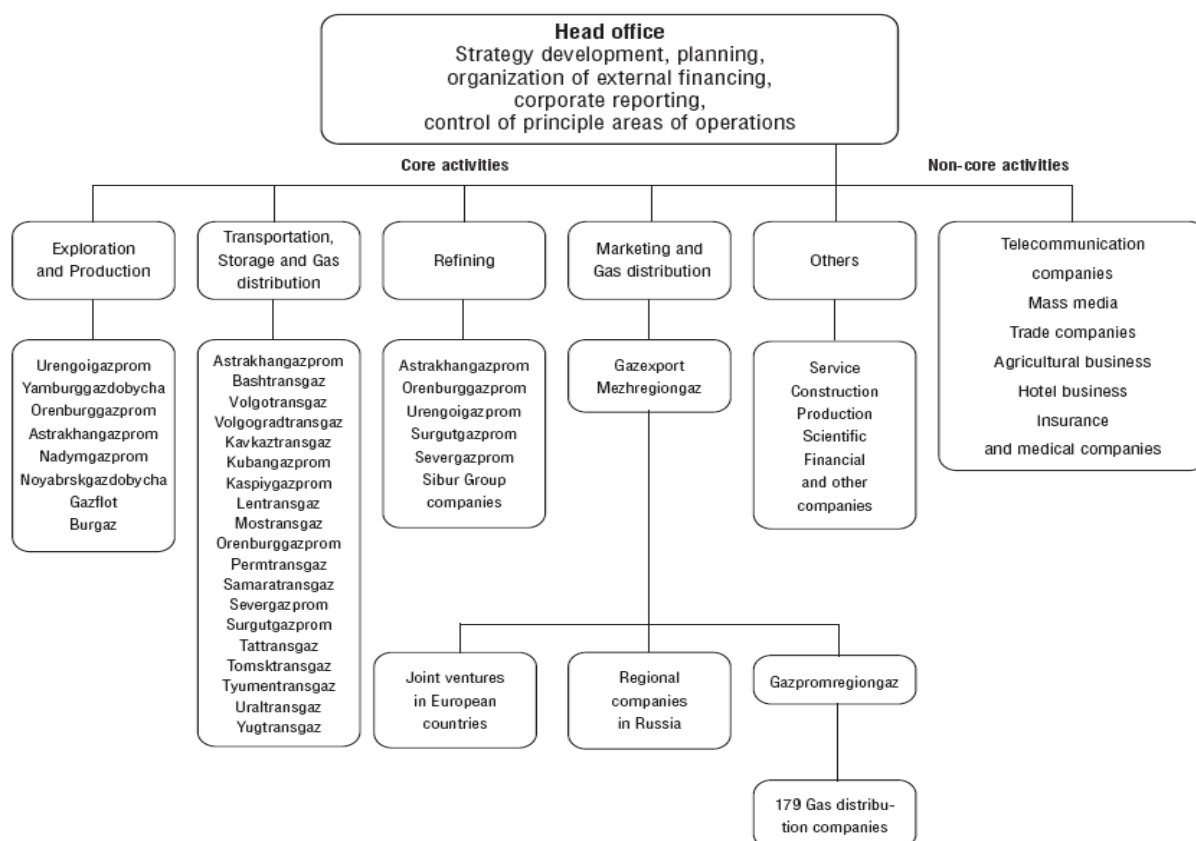
Gazprom (Russian derivative from *Gazovaya Promyshlennost* – [Ministry of] Gas Industry) was established in 1965 after a series of successful researches led to exploration of massive deposits of natural gas in Siberia. The Ministry dealt with exploration, extraction, transportation and distribution of the natural gas. In 1989 it was reformed into RAO ‘Gazprom’, later in 1990-es transformed into ‘Gazprom JSC’.

After the collapse of the Soviet Union, Gazprom lost roughly one fourth of its infrastructure located in now ‘former Soviet Republics’, but continued its work on both domestic and foreign markets, remaining one of the few companies with stable income regardless of political and economic situation in Russia.

Gazprom’s top management submitted a new corporate reform plan to its board of directors on March 29, 2006. This latest reform involves two key steps and should have taken about two years to complete. In the first step, the Gazprom subsidiaries, which own or lease about 80% of the company's property, separate out their non-core assets into special “buffer” companies. In the second step, the “buffer” companies are to merge according to business segment. One company will then be selected to be the principal company at the core of the segment, and the others will be linked to it. The buffer companies will be consolidated into six new entities managing different business segments: Gazprom-PKhG (underground storage), Gazprompererabotka (processing), Gazpromseverpodzemremont (northern underground maintenance), Gazpromyugpodzemremont (southern underground maintenance), Gazpromtrans, and Gazpromtrans-Kuban. Gazprom expects to increase its share in Gazpromtrans to 100%.

The projected reforms were estimated to increase bureaucracy and expand annual corporate administrative spending by \$100 million per year or more but also to reveal Gazprom's actual expenses, and with such new transparency, market capitalization was expected to increase by more than \$30 billion. A successful reorganization should allow the Gazprom management to find out whether or not its businesses are profitable. (Table 5.)

Table 5. Gazprom Activities Structure



* For production, transportation, refining and marketing activities only major wholly-owned subsidiaries are listed. Part of production, transportation and refining companies is also engaged in other activities.

The future of the company's reforms is unclear, and will depend to a large extent on progress made within the larger economy. Specifically, the process of reforming the Gazprom monopoly should be linked with major reform in internal energy prices; otherwise, major economic distortions will ensue.

Financial highlights

The financial highlights of the Gazprom as per the fiscal year ended on December 31, 2008, are given below:

Earnings (net of VAT, excise and other taxes) RUB 2,507 bln

Net profit RUB 173 bln

Profit per share RUB 7.31

Capital investments (net of VAT) RUB 264 bl

Table 6. Financial performance of Gazprom

| | Year ended 31 December 2008 | Year ended 31 December 2007 |
|---|--------------------------------|--------------------------------|
| Sales (net of excise tax, VAT and customs duties) | 3,518,960 | 2,423,245 |
| Operating expenses | (2,159,690) | (1,713,759) |
| Impairment and other provisions | (98,964) | (7,708) |
| Operating profit | 1,206,306 | 701,778 |
| Gain on disposal of a share on subsidiary | - | 50,853 |
| Profit (loss) from changes in fair value of call options | (50,738) | 50,738 |
| Revised Accounting treatment of NPF Gazfund | - | 44,692 |
| Finance income | 165,603 | 159,380 |
| Finance expense | (341,179) | (132,573) |
| Share of net income (loss) associated undertakings and jointly controlled companies | (16,686) | 24,234 |
| Gain on disposal available-for-sale financial assets | _14,326 | _25,102 |
| Profit before taxation | 1,031,632 | 924,204 |
| Current income tax expense | (307,094) | (218,266) |
| Deffered profit tax expense | 46,846 | 10,953 |
| Income tax | (260,252) | (229,219) |
| Profit for the year | 771,380 | 694,985 |
| Profit for the period attributable to: Equity holders of OAO GAZprom | 742,928 | 658,038 |
| Minority interest | 28,452 | 36,947 |
| | 771,380 | 694,985 |

Sales (net of excise, VAT and Customs duties) increase by RR 1, 095,715 million , or 45%, to RR 3, 518, 960 million in the year ended 31 December 2008 compared to the year ended 31 December 2007. This increase was primarily due to the increase of the volume of gas sold to Europe and Asia and as well higher gas prices in all geographical segments.

Transportation system and storage review

It was in 1930s when the first pipeline linked Moscow and Saratov establishing the future gas transportation network. Today's Unified Gas Supply System of Russia, solely owned and operated by Gazprom, was mostly completed in 1970-1990, covering the tasks of collecting, processing, storing and transferring the vast amounts of gas both internally and on the export routes. The scale and complexity of the system are unprecedented.

Within the framework of bilateral agreements Gazprom secured its presence in the strategic countries by either acquiring or setting up its own warehouses and storage facilities in Austria, Belgium, Rumania, Turkey and UK, aiming at the future establishment of a separate "Podzemgaz" storage operating subsidiary. But here comes another problem that Gazprom could not avoid – the aging of its infrastructure and facilities.

Gazprom owns the entire 150,000-kilometer gas-pipeline infrastructure in Russia, including the compressing stations, to control the delivery of gas to domestic and export markets⁶.

More than 70% of the large diameter transmission lines were commissioned before 1985, and more than 19,000 km of pipeline are beyond their designed life span and will need replacement soon. The investment required for the renewal and repairs of the transmission system will increase sharply over the next two decades, including the investments needed to connect new fields to the existing pipelines.

The project of separating the transportation and Gazprom's production arm, has been abandoned. It is frequently stated by Gazprom that it has no intention to limit the independent producers' access to the pipelines' network. It is clear the Gazprom will only benefit if its gas on domestic market will be replaced by the other suppliers' therefore leaving more for Gazprom to export. However, lack of transmission capacity has precluded independent producers from gaining access.(see Appendix)

As part of a larger strategy of international expansion, Gazprom has a stake in a number of transport companies outside Russia, such as SPP in Slovakia, and has also formed alliances and partnerships in key transit nations to secure deliveries. In 2006, Gazprom

⁶ Under the current law, Gazprom is the only company in Russia authorized to export gas outside the CIS. It is also obligated to provide its' domestic pipelines' capacity to the independent producers, but Gazprom usually refuses to do so referring to the 'overloaded capacity'.

negotiated the purchase of Armrosgazprom and a 40-km section of the Iran-Armenia gas pipeline with the Armenian government.

Historically, most of Russia’s natural gas exports went to Eastern Europe and to customers of the Soviet Union (now independent CIS states). The turning point appeared in the mid-80s, when export shifted towards major consumers – Europe, Japan, Turkey, and other Asian countries. The goal of Gazprom is clear – in order to maintain European export growth it has to both increase the output and secure alternate transportation routes. Another issue is related to the pricing policy of Gazprom, namely the difference between the domestic price and the export one. EU economists accused Gazprom of its dominant market position and double-tiered pricing. The result was not surprising: the domestic independent producers were granted access to the pipelines network, and the domestic prices for industrial consumers were doubled (although still remaining twice as low as the European ones), showing signs of fair trading..

As with oil, Russia encounters with Kazakhstan as a competing gas provider to the Asian Gas markets. In case the projected pipeline is built from Kazakhstan to China, it may become an alternate route for Uzbekistan and Turkmenistan exports to China as well.

Exploration and Production

Among the world’s top 24 oil and gas companies, Gazprom holds third place in combined hydrocarbon reserves with roughly 200 billion barrels of oil equivalent. Natural gas constitutes the vast majority of the reserves.

Table 7. Russian Natural Gas Production and Export

| Year | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Total production | 590.1 | 584.1 | 581 | 596.6 | 617.6 | 634 | 641.9 | 656.2 |
| Gazprom | 545.5 | 523.1 | 512 | 523.8 | 540.2 | 545.1 | 547.9 | 550.5 |
| independents | 6 | 18 | n.a | 29.9 | 33.5 | n.a | 36 | 47.3 |
| Oil Companies | 38.6 | 43 | n.a | 42.9 | 43.9 | 44.9 | 58 | 58.4 |
| Gas Export | 126.8 | 129 | 126.7 | 129.4 | 138.9 | 149.1 | 151.3 | 151.5 |

Source: Gazprom: “*Gas Matters*” (August 2006); *Interfax*, January 9, 2007 BP *Statistical Review of World Energy* (2007); Jonathan Stern, “*The Future of Russian Gas and Gazprom*” (Oxford University Press, 2005)

The most promising are the Yamal, Shtokmanovskoye and Kovyktinskoye fields. The Shtokmanovskoye field has development priority over the Yamal because the estimated cost for development is about one-half that of Yamal. Moreover, there are unresolved ecological issues associated with the development of Yamal.

The growth of gas production in Eastern Siberia and the Far East will depend primarily on the profitability of gas exports to Asia-Pacific regions. The second potentially large-scale development will be the Kovyktinskoye field in the Irkutsk area. It is very likely that Gazprom will take control of the Kovyktinskoye field in the near future.

(b) Deposits and Reserves analysis in Russian Far East

Russia is sometimes adjected as the world's gas-holder, with up to twenty new giant gas fields containing over 500bcm of gas discovered thus comprising close to three-quarters of Russia's total gas reserves. The Russian Far East alone can produce up to 130 bcm of natural gas by 2020 – the scale of today's export to Europe – and is surely to play important role in the East Asian energy system.

Kovykta gas field

Discovered in 1987, this Russia's largest gas field contains an estimated two trillion cubic meters of natural gas and condensate⁷, which is more than Canada has in all of its deposits. Kovykta's location provides great opportunities for China and South Korea, as well as benefits for Russia. The development of the field would mean a major shift in the export routes balance, resulting in diversification of Russia's gas export market. A carefully planned pipeline extension to the North East Asia would present significant opportunities for Russia in the increased tax revenues, boosted regional development and energy security. Gazprom produced 570bcm of gas in 2008 and exported around 300bcm — approximately half the total—to Europe, the Baltic States, and Central Asia⁸. Thus, potential Kovykta gas exports of 30 bcm per year yields 10% of Gazprom's present export volume.

However, domestic consumption of gas supplied from the Kovykta field is relatively small, it amounts to only 2 bcm used by small cities of Angarsk, Sayansk, Irkutsk, and

⁷ "Kovykta Project," TNK-BP u <http://www.tnk-bp.com/operations/exploration-production/projects/kovykta/>

⁸ "Gazprom Annual Report 2006," OAO Gazprom, 2006 u http://www.gazprom.com/documents/Report_Eng.pdf

Usolye-Sibirsk⁹. These populations are unlikely to use as much gas as this field could produce, which again underlines the necessity of pulling the Kovykta gas to the Asian markets.

Yakutia gas and oil field

Yakutia is another huge reserve of gas available for Asian delivery. Talakan and Chayandinsk gas deposits, located close to the well-known Koviktinsk gas field combined with other smaller ones are estimated up to 9.4 trillion cubic meters with 2.3 billion cubic meters explored reserves. Most resources are concentrated in region bordering Irkutsk, in Southwest Yakutia with Chayandinsk leading 1.24 trillion cubic meters reserves managed by Gazprom and Sakhaneftegaz with projected yearly output of up to 23-27 billion cubic meters, and \$3.5 billion dollars of investment required to develop. There is six times as much gas as oil in Yakutia, but the development is still at the very basic stage if non-yet started. The reason is not obvious – since Yakutia gas is rich with helium (roughly 70 percent of Russia's deposits), it is more profitable to develop the chemical processing infrastructure first to use full advantages of the deposit later. The political reasons are less obvious but are still influential: a kind of counteraction is seen in the management of the region since the federal government has increased its control over regions. It is clear that regional leaders are promoting the earlier development of these deposits, counteracting with the federal authorities who call for conservation.

Sakhalin Island's projects

At present, 5 projects are being carried out on Sakhalin based on licenses granted in the 1990s:

(1). Sakhalin 1 (deposits: oil - 307 Mt., gas - 485 Bcm), carried out by a consortium directed by the American company Exxon Mobil (30%) with the participation of the following companies: the Japanese SODECO (30%), the Indian ONGC (20%), and the Russian Rosneft (20%). Until now, the invested funds have amounted to over 4.5 billion USD (for a planned total of 12 billion USD). In October 2005, oil production began, which from the end of 2006 is to be sold on the world market.

⁹ Ibid

The three fields - Chayvo, Odoptu and Arkutun-Dagi - potential recoverable resources are projected to yield 2.3 billion barrels (366 million m.) of oil and 17.1 trillion ft. (485 billion cubic meters of gas) of gas¹⁰.

The consortium completed a Production-Sharing Agreement (“PSA”) between the Sakhalin-1 consortium, the Russian Federation (“RF”), and the Sakhalin Government in 1996¹¹.

(2).Sakhalin 2 (deposits: oil - 185 Mt., gas - 800 bcm. A consortium was formed to recon and process the gas offshore and in-land, with two main fields of Piltun-Astokhskoye and Lunskoye¹².

The consortium was originally formed by Marathon, McDermott and Mitsui in 1991, joined by Shell and Mitsubishi in 1992. The first PSA was completed in 1994 after establishing the consortium, the production started in 1999. One year later only Mitsui, Mitsubishi and Shell remained in the list of participants.

Before shares in the Consortium consisted by:

55% - Shell Sakhalin Holdings B.V. (Shell - UK/Netherlands), 25% - Mitsui Sakhalin Holdings B.V. (Mitsui - Japan), 20% - Diamond Gas Sakhalin (Division of Mitsubishi - Japan).

New agreed distribution of shares after nationalization are:

50% - Gazprom, 27.5% - Shell, 12.5% - Mitsui, 10% - Mitsubishi¹³.

In 2005, Shell signed the document where by agreement swap 25% of Sakhalin-II to Gazprom, in exchange for 50% of a natural gas field in the Russian Arctic, plus cash. Shell doubled its cost estimates for Sakhalin-II to \$20 billion. On December 21, 2006, Gazprom took control over a 50%-plus-one-share stake in the project by signing an agreement with Royal Dutch Shell¹⁴.

In 2005 Sakhalin Energy signed a deal with Korea Gas Corporation (KOGAS). Under the agreement, Sakhalin Energy will ship 1.5 million tons of LNG annually to KOGAS for 20 years from a LNG plant south of the Sakhalin Island, starting 2009.

¹⁰ Sakhalin 1 project www.sakhalin1.com/index.asp

¹¹ Tatiana Pashchenko, Geoffrey Picton-Turbervill, «Gas Regulation 2007»

¹² Sakhalin 1 project www.sakhalin1.com/index.asp

¹³ Sakhalin 2 project www.sakhalinenergy.com/project/prj_overview.asp

¹⁴ Ibid

(3). Sakhalin 3 (deposits: oil - 800 Mt., gas - 1,4 Bcm) is in the preliminary stages of realization, although the consortium under the direction of ExxonMobil (33,3%), with the participation of Texaco (33,3%) and Rosneft (33,3%) has won the relevant call for tenders in 1993. For the time being, only several dozen million dollars have been invested, which led to the Russian government cancelling the results of the call for tender in February 2004, and announced the organization of a new one. In October 2005, the company Rosneft announced the granting of a 25% stake in the project to the Chinese Sinopec.

(4). Sakhalin 4 and 5 - both are under the control of the consortium of BP (49%) and Rosneft (51%) and, for the time being, are in the very early stages of either realisation, geological studies, or the first drillings¹⁵.

(c) Interaction of Gazprom and independent producer Rosneft

Gazprom is facing a tough competition with Rosneft, which in contrast with Gazprom, has the actual ownership rights to develop Far East gas fields.

Rosneft is the second largest oil company in the world in terms of recoverable reserves (3.4 billion tons)¹⁶. At its IPO in summer of 2006, 49% of shares were sold for \$10.4 billion, therefore giving Rosneft a market value of \$80 billion with shares acquired by BP, China National Petroleum, and Petronas of Malasia. The largest stake of \$2.6 billion went to a single unidentified buyer (possibly Gazprom).

Rosneft's Far Eastern gas proven reserves total 63.3 billion cubic meters, with unexplored probable reserves of 402 billion cubic meters. When possible reserves are included, Rosneft's resources in the RFE total up to 1,630 billion cubic meters of gas. Rosneft has been involved with the Sakhalin-1 project since its inception. It owns 20% of the operating company *Sakhalin Energy*, established by Product Sharing Agreement. The gas portion of this project is currently exported to Russia for domestic use, and is slated to provide gas to Japan, China, and/or South Korea. In an important agreement of June 2006, Rosneft and Gazprom signed a contract that will give Gazprom control of Rosneft's share of

¹⁵ Energy Information Administration www.eia.doe.gov/emeu/cabs/Sakhalin/Background.html

¹⁶ Nina Poussenkova, "Rosneft as a Mirror of Russia's Evolution," originally published in Pro et Contra Journal 10, no 2 (June 2006), <http://www.carnegieendowment.org/files/Rosneft.pdf> (accessed July 15, 2006).

gas from Sakhalin projects for export¹⁷. This agreement suggests that Gazprom's relationship with Rosneft may prove to be more cooperative than competitive.

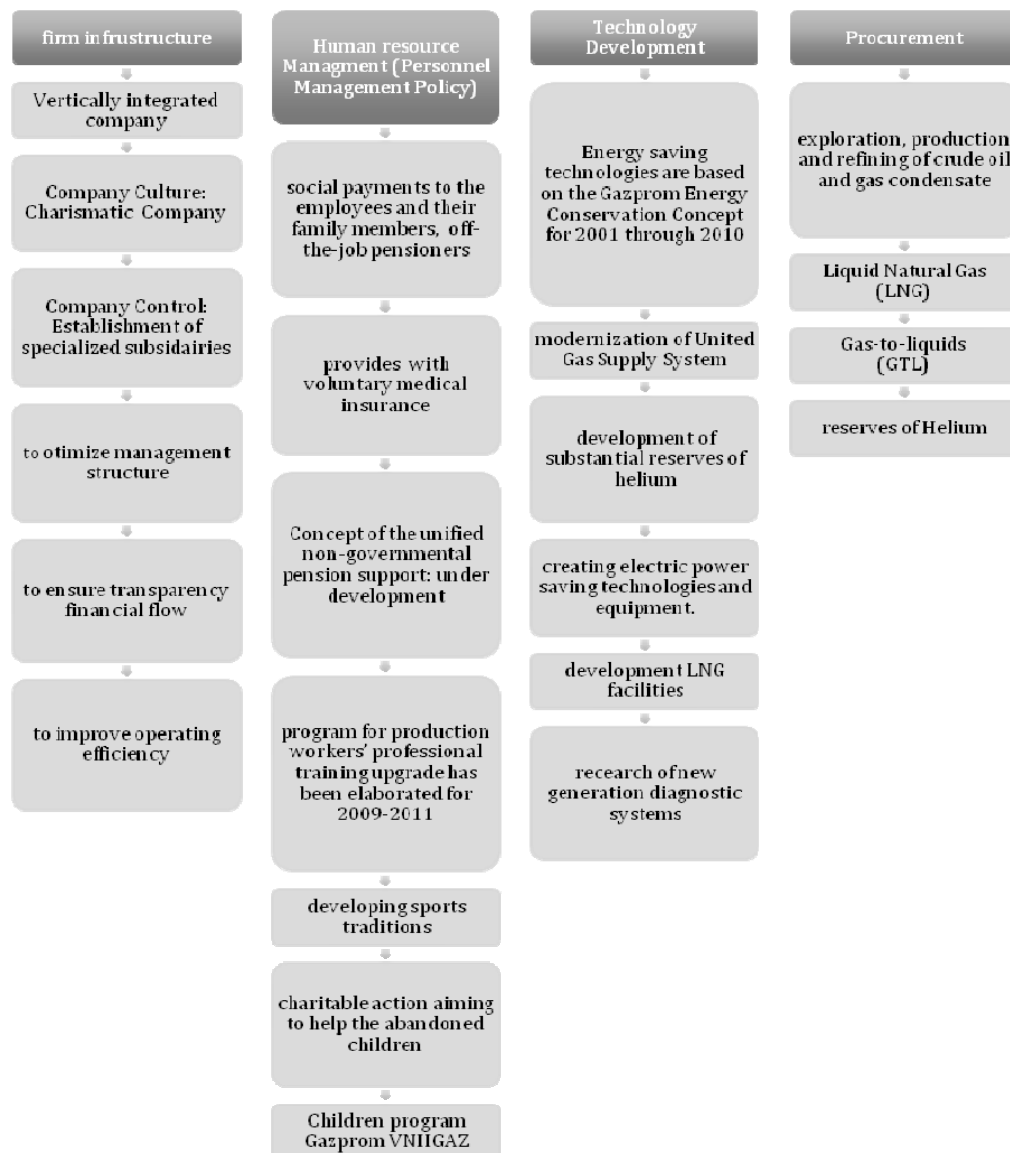
(d) Value Chain of Gazprom Company

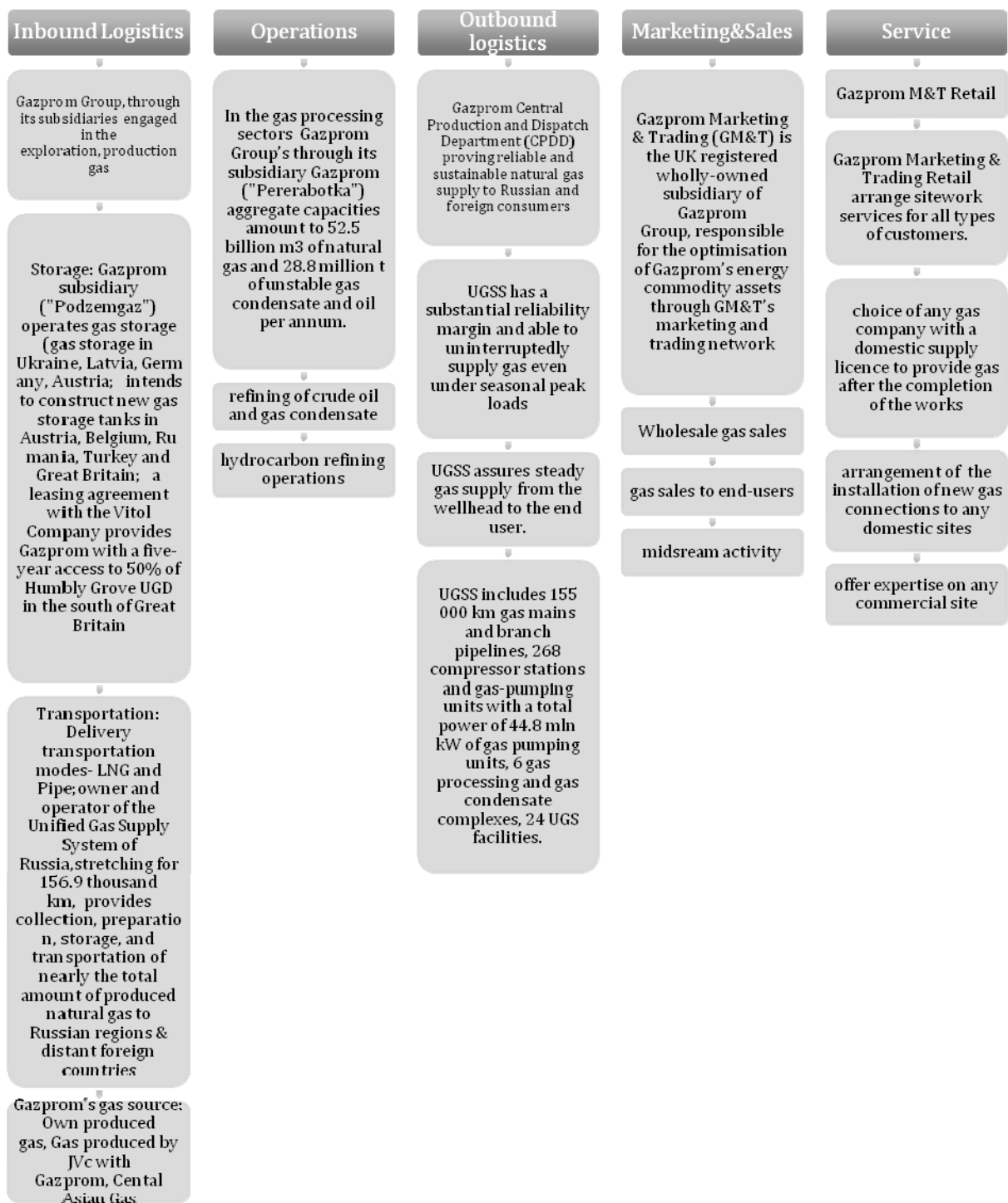
Gazprom is vertically integrated so fully diversified energy company managing the exploration, production, sale, and distribution of gas for both domestic and foreign markets; the production and sale of crude oil and gas condensate; hydrocarbon refining operations. Gazprom has a heavy presence in the petrochemical industry, in machine tools and metallurgy, and has also branched much further a field in recent years by moving into the media and banking sectors.

Gazprom's "networks" are organized around its subsidiaries. It has more than 60 branches. (see in Appendix)

Table 8. Value Chain of Gazprom Company

¹⁷ Doklad «Ekonomicheskoe Razvitie Vostoka»





Since 2001, the company has been in the process of intracorporate reforms aimed at enhancing business efficiency. A successful reorganization should allow the Gazprom management to find out whether or not its businesses are profitable.

4. Gazprom growth strategy in North East Asia

(a) Current situation and prospects of NEA Gas Markets

The natural gas market of North East Asia is one of the youngest yet fastest-growing markets. As it was mentioned before, there are no significant gas deposits aside from the ones hidden in the vast territory of China. Japan and South Korea are leading the list of the gas importers worldwide with growing demand for efficient and clean fuel. The three Asian giants are in continuous quest for minimized costs and maximized efficiency of fuel supplies, and the trend of surging LNG consumption is not likely to be affected by the 2008-2009 economic downturn. Compared to the pre-crisis forecast of 80-100 percent growth of natural gas consumption in the region within coming decade, today's outlook is less determined but yet better for NG producers. The crisis has set the new standards for cost-efficiency and energy-saving, and these trends are likely to stay mainstream in coming years. Thus, natural gas fits most of the requirements of the post-crisis energy source demand: it is efficient, relatively cheap and ecologically friendly.

In terms of the pre-crisis development terms the consumption of the natural gas in the region was supposed to almost double within coming decade. The economic downturn of 2008-2009 resulted in numerous issues for both exporters and importers of the natural gas, although the original concerns of the energy security in the region are still topping the list: the traditional way for importing gas is the sea freight (except for China) which is very vulnerable and is subject to numerous obstacles of climatic and political nature. The analytics of energy industry are far from being unanimous in their forecasts: Thus, the supply of LNG by sea from Middle East is neither stable nor reliable, and the pipeline feed with a long-term contract would be a much more preferable in terms of national energy security of Korea and Japan.

Countries like Korea and Japan have long been known for their hi-tech industry that is based mostly on the imported resources. The economical success roots in their ability to manage profitability of the industry by minimizing the costs of imported resources and raw materials while using the most out of the imported ones, improving the recycling and energy saving technologies as it directly reflects on the national economy.

Hence the prospects for the natural gas in Asia look brighter now and the predicted consumption growth rate is not to be noticeably affected by the recession, but the situation differs for each country of the region.

Statistics show that Asia consumed 459 bcm of natural gas in 2008 and regional demand is supposed to exceed 560 bcm in the next 5 years, with local production of 356 bcm of 2008 expected to grow up to 490 bcm by 2013. The figures above include both huge importers like Korea and Japan together with the major exporters like Malaysia and Indonesia. The gap is to be filled with the imported gas, though the need for the import differs from country to country as the locally produced gas goes other parts of the globe as well. Three biggest economies of the North East Asia – China, Japan and Korea – need to be examined one by one to understand the regional future of the natural gas. Although China puzzles its partners with delays of the agreed deliveries, and Japan claims that LNG import is likely to decrease due to large stock accumulated during the recession period, most analysts agree that Asia-Pacific consumers will follow the European scenario in the gas consumption.

a) People's Republic of China

According to BMI report China consumed 17.60 per cent of gross Asian gas in 2008, while producing 21.36 per cent of the regional gas. Despite the downturn of the world economy, China is expanding its gas consumption steadily, with estimated regional gas consumption share forecast to reach 20.70 per cent with production of roughly 20 per cent.

Chinese domestic gas production scaled 76 bcm in 2008 but the government reports confirm that the national production should reach 120 bcm by 2018. Still, growing domestic production will not be able to feed the surging domestic demand which is estimated to almost double in the coming decade. The gap is intended to be filled with the imported gas, partially with the Russian supplies over two projected pipelines to be built, partially by LNG imports from the regional producers.

During the latest economic downturn China maintained stable demand for the natural gas, having no spot contracts in the late 2008 but following the long-term contracts with Australia and accepting single cargoes of LNG reverted by Japan and Korea due to their internal situations.

b) Japan

Japan's share of Asian gas intake reached 20.43% in 2008 but, unlike China, it has an extremely small volume of production. The consumption of Japan is expected to be around 17.73% within coming 5 years.

Japanese real GDP is expected to decline by 6.1% in 2009, compared to 0.7% fall of 2008, and the gas consumption in 2009 is forecasted to fall by 10 percent. This tendency has already caused Japan cancel several LNG cargoes (all of which has been resold to China or Europe). Starting from 2010 the GDP is expected to begin slow growth, bringing the country's annual natural gas consumption to an approximate 100bcm of gas by 2013, 100 per cent of which brought via LNG supplies, and possibly up to 105bcm by 2018. The freshly built Sakhalin Prigorodnoye LNG terminal is to become the main source for supplies, while expensive LNG from Middle East is unlikely to be contracted massively anymore.

c) Republic of Korea

Among Asian consumers South Korea took 8.66% share in 2008 while domestic production being minimal. The need for gas is forecast to be 7.44% of Asian gross by 2013.

At the present economical state Korean demand is falling, but the future prospects are similar to those of Japan: spot trading of LNG cargoes may be given up in favor of long-term contracts for easily and quickly accessible Sakhalin LNG supplies. The natural gas is more favorable for the commodity usage in the quasi-island isolated South Korea, and a favorable choice for environment-concerned highly populated country.

Commonly referred to as a market with moderate possibilities, Korea may expand its gas consumption once the LNG supplies become as stable as pipelines, and thus the original forecast of 41.8 bcm demand for 2013 may get revised. In terms of regional proportions, South Korea will still be a middle range importer, and, unless a major political shift in the North Korean communist state occurs, incapable of using any other but LNG source of gas. In case the pipeline via North Korean territory becomes a reality, South Korea may become a regional hub for the Russian gas transit.

The unified development plan is surely to face certain problems in implementation since development of the Russian Far East is connected to the issues of producing capacity, markets and political situation.

Table 9. Five Porter's Forces

| | | |
|---|---|---|
| | <p><u>Threats of Substitutes</u> <u>(very low)</u></p> <ul style="list-style-type: none"> • new 'clean' technology • coal, in some sectors | |
| <p><u>Bargaining Power of Suppliers</u> <u>(very High)</u></p> <ul style="list-style-type: none"> •Controls more than 70% in Russia and 17% reserves globally •diversified energy company managing the exploration, production, sale, and distribution •sole owner and operator of the Unified Gas Supply System of Russia •cost effective type of gas transportation (LNG) •creation gas national unified system •proximity to the market •strong Government support | <p><u>Intensity of Rivalry</u> <u>(Medium)</u></p> <ul style="list-style-type: none"> •more deposits of gas •cost effective projects offer by independent producers | <p><u>Bargaining Power of Buyers (Medium)</u></p> <ul style="list-style-type: none"> •End-users face minimal cost •eco-friendly fuel •domestic gas price relatively low |
| | <p><u>Threat of new entry</u> <u>(Medium)</u></p> <ul style="list-style-type: none"> •Reserves declining and no rights on unexplored and potential resources of Sakhalin •Intention of independent gas producers to enter the market •lack of infrastructure (use expensive technology) | |

The domestic consumption is too weak to justify the investment needed for the RFE projects development, therefore the international coordination and investment will be necessary. Gazprom's focus on the Asia Pacific region may be limited by the market characteristics of the countries of this region. Since China, Korea and Japan use mostly LNG (75% of total world production of LNG), and have only just begun considering pipelines, Gazprom may find its possible market in the North East Asia highly limited.

Transporting via LNG (liquefied natural gas) tanker becomes more cost effective than pipeline at distances greater than ~1,200 miles. The first shipment of LNG by Gazprom to Japan and Korea was completed on 11 September 2006.(Table 10)

Table 10. Demand For Natural Gas Import In the NEA Countries, Billion Cubic Meters {1,2}

| Indices | 2005 | 2010 | 2020 |
|----------------------------|-------------|-------------|-------------|
| Total demand | 144,3 | 229-316 | 269-386 |
| China | 24,3 | 100-140 | 130-180 |
| Republic of Korea | 40 | 41-72 | 46-82 |
| Japan | 80 | 88-104 | 93-124 |
| Domestic Production | 55,8 | 54-86 | 74-106 |
| China | 52,8 | 50-80 | 70-100 |
| Republic of Korea | - | 1-2 | 1-2 |
| Japan | 3 | 3-4 | 3-4 |
| Import Demand | 117 | 175-230 | 195-280 |
| China | - | 50-60 | 60-80 |
| Republic of Korea | 40 | 40-70 | 45-80 |
| Japan | 77 | 85-100 | 90-120 |

The Gazprom Development program is now working in the framework of the agreement regarding building gas pipeline to China. Initial 'counter-pipeline' decision was cancelled by the new agreement signed in March 2006, which committed Russia to deliver 80 billion cubic meters of natural gas annually via two projected pipelines. (Table 11.)

Table 11. Chinese demand for Russian gas (Forecast, in bcm per annum)

| | 2005 | 2010 | 2020 |
|-----------------|------|------|------|
| Eastern Siberia | 0.0 | 12.0 | 30.0 |
| Western Siberia | 0.0 | 0.0 | 30.0 |
| Total | 0.0 | 12.0 | 60.0 |

Source: China OGP 2003, in:Keun-Wook Paik,op.cit.

Gazprom is now to control the gas supplies to China, expected to begin in 2011 through the western, or “Altai,” pipeline. (The “Eastern” pipeline will transport gas from Eastern Siberia and the RFE to China, with the mainframe infrastructure to be completed between 2011 and 2020. The supplies, which will feed the Eastern pipeline, will originate from the Koviktinsk field and Sakhalin shelf deposits. The annual flow will reach 30-40 billion cubic meters supplied by Eastern Siberia and Sakhalin in rough 5:3 proportion.

The Koviktinsk field alone is capable of covering the Eastern pipeline quota, while Sakhalin is likely to be used for Asian exports. Sakhalin’s location, quantity and accessibility of its resources of 1,118.8 billion cubic meters of gas and 88.5 million tons of gas condensate make the perfect match for the Asian consumers, with the total possible resources of 5 trillion cbm. Should the plans be implied in a proper way, the output of Sakhalin may exceed 125 billion cbm of gas per year. Another advantage of Sakhalin projects is absence of helium in the gas, which makes it easier and cheaper to process.

A boom in Asian demand may open export opportunities as Gazprom taps new Siberian fields. The Moscow-based company, which in 2008 sent all its exports west, entered the Asian market this year by shipping liquefied gas from its Sakhalin Island development. It’s seeking to add customers in the region after pricing disputes with Ukraine disrupted shipments to Europe twice since 2006.

(b) Gazprom Challenges and Future Scenarios

Gazprom, the world’s biggest natural gas producer, is planning to start piping East Siberian gas to Asia, where an increase in demand over the next 20 years may outpace growth in its traditional European markets. Gazprom will send surplus gas east from the Yakutia fields, Deputy Chief Executive Officer Alexander Ananekov said at a ceremony in the eastern town of Khabarovsk, as work began on a new pipeline to the Pacific Ocean.

While Gazprom may benefit from increased demand in Asia, the company will need to contend with lower prices in the region. European gas supply contracts are linked to oil with a time lag of six to nine months, meaning the 2010 price will reflect crude’s 60 percent jump this year. By contrast, Asian prices probably won’t be pegged to oil cost.

China, Asia Pacific’s fastest-growing gas market, caps prices for the fuel. The country has kept tariffs lower than international market rates to promote the use of gas over coal, according to IEA.

Europe will continue to pay the highest prices, making it “the most attractive gas market in the long run. Gazprom may also face competition from other exporters to Asia. Asian nations already purchase gas from Atlantic, Pacific and Middle Eastern suppliers, mostly in the form of liquefied natural gas (LNG), a business that Gazprom only entered.

The Russian government has instructed Gazprom to coordinate its Eastern gas development plan, prioritizing supply to local residents isolated from the grid. Most gas from Sakhalin Island, which is only 100 miles from the northern tip of Japan, will be used domestically, meaning Gazprom will need to tap new Siberian fields for export.

Gas demand in Russia’s Far East may reach 25 billion cubic meters in 2020, outstripping forecast production of 24 billion cubic meters from Gazprom’s Sakhalin-3 offshore project, according to company estimates. Yakutia may pump more than double that amount. The area, which holds about 2 trillion cubic meters of gas, may produce as much as 53 billion cubic meters a year by 2030, Deputy Chief Executive Officer Alexander Ananenko said. That gas will feed a planned 2,700-kilometer (1,680-mile) pipe to Khabarovsk, which will be extended to the Pacific port of Vladivostok.

Gazprom is studying fuel exports from Vladivostok in the form of liquefied natural gas (LNG), which is gas that’s chilled to a liquid for transportation by tanker, or as compressed gas¹⁸. The company aims to send a third of its exports to new markets in the US and Asia by 2030 after opening up fields in eastern Russia.

Russia has enough gas to supply Asian customers as well as European markets, “without diversifying the development of the country eastward, our economy has no future.” President Dmitry Medvedev said. Gazprom accounted for 10% of Russian GDP last year.

The company entered the market for liquefied natural gas in March when it started shipments to Asia from Russia’s first LNG plant on Sakhalin Island. Sakhalin Energy, led by Gazprom, has so far sent 27 tankers loaded with LNG. It plans to ship about 55 tankers this year. An annual 7 billion cubic meters of Sakhalin gas will feed the first phase of Gazprom’s pipeline to the Pacific coast. Transit capacity will later be expanded to 47.2 billion cubic meters to include a proposed link from the Yakutia fields, allowing exports to Asia-Pacific markets.

¹⁸ Alexandr Ananenko’s, Report Theses delivered at 4th “ALL-RUSSIAN OIL AND GAS WEEK” <http://www.gazprom.com/press/news/2004/october/article62914/>

Natural gas is the cleanest fuel for toxic air pollutants greenhouse gases. The environmental concerns, oil prices instability and the world economic crisis may result in the major shift towards gas usage. But, as any other source of energy, gas sets its own challenges: limitations of the pipeline building, transiting states' political issues, infrastructure requirements for LNG infrastructure are somewhat deterring the possible buyers. In the middle of the 2009 spring the first supply of LNG was made from the ambitious and long-anticipated Sakhalin-2 project, starting a new era of the Russian gas presence in the North East Asian market. The ceremony of launch was attended by the Russian president and Japanese Prime Minister, underlining the importance and political significance of the event. Of course, Japan is not the only recipient of the Sakhalin gas, it will also get its users in US, Korea and other Asia-Pacific countries, since its projected capacity exceeds 9,5 million ton a year.

The launch of this project means first serious step towards diversifying the Gazprom's export directions. The major part of 100 percent pre-contracted output of the Sakhalin gas will be consumed by Japan, and the rest will go to the LNG-hungry South Korea and US.

The closely neighboring Prigorodnoye LNG Plant is the closest source of high-quality LNG for Korea and Japan, and it is likely to replace the Middle East suppliers for its reliability and vast reserves. Another party to benefit from the launch of Sakhalin projects is the South Korea's KOGAS corporation, which estimates the Russian pipelines to drive up to 20 percent of the Korean gas needs. But, unless political problems solved, South Korea will have to rely solely on the sea LNG imports, which are to be improved with the now available Sakhalin LNG as well.

(c) SWOT Analysis

Table 12. SWOT Analysis

| Strengths | Weaknesses |
|---|--|
| <ul style="list-style-type: none"> • Gazprom is the legal successor of the | <ul style="list-style-type: none"> • Gazprom depends on unexplored future |

| | |
|--|--|
| <p>proprietary rights and obligations of Ministry of the Oil and Gas Industry, including the rights to use land, subsurface reserves, natural resources</p> <ul style="list-style-type: none"> • Engaged in production, transportation, distribution, sales, research, and even regulation • Gazprom controls more than 70 % of the natural gas reserves in Russia and about 17 % of natural gas reserves globally • Gazprom owns the gas trunklines integrated in the Unified Gas Supply System (UGSS) of Russia. • Strong Government support: • (The Government’s stake in Gazprom is over 50% and has a majority on the company’s board of directors) • Gazprom is the sole founder of about 60 subsidiaries • Gazprom provides 25% of all Russian tax revenues and accounts for 9% of the nation’s gross domestic product <p>LNG and CNG production</p> | <p>projects of Sakhalin</p> <ul style="list-style-type: none"> • Available reserves are declining • Some sources (rich fields) are geographically distant from the possible markets • Long-distance pipeline building questions the profitability of the new fields • Absence of sources in Russia for investment financing • The lack of sufficient international authority and image in Russian companies, Gazprom as well, for successful competition in international markets; • The absence of effective and ecologically safe technologies, facilities and services for the extraction of hydrocarbons in complex natural conditions and ice conditions from the sea shelf in Russia • Domestic and partially exporting pipeline network needs to be dismantled and repaired. • Not quite transparent structure is due to complicated system of internal transactions and unregulated system of internal pricing on the items. • Tax burden do not create a favorable investment climate. |
|--|--|

| Opportunities | Threats |
|--|--|
| <ul style="list-style-type: none"> • New sectors where natural gas widely used are emerging • Gazprom obtain huge amount reserves of undiscovered fields of natural gas, Yamal and Shtokman fields • Due to its geographical position and energy resources, Russia has all the prerequisites to become an energy bridge between Europe and Asia • Natural Gas Demand is raising fast | <ul style="list-style-type: none"> • The decline in the output of three oldest fields of Western Siberia- Urengoy, Yamburg, and Medvezh'ye - producing more than 70 percent of Gazprom's total. • Rise of the independent gas producers which make the main growth volume of gas trade. • An opposition to a projected Transcaspian pipeline which would enhance Europe's energy security but will definitely threat the Russian (literally: Gazprom's) positions. • Independent producers are obtaining stronger position |

Gazprom is most likely to succeed in the attempt to become the leading regional supplier since it has all geographic, political, material advantages necessary. If considered the vast unexplored deposits of natural gas in the Russian Far East, the enormous demand for the fuel in China and overall growth rate of Asian economy, the strategy has to meet numerous criteria to become the successful one.

5. Recommendations

The hydrocarbon resources of East Siberia and the Far East are of vital importance for the social and economic development of Russia's eastern regions, and are crucial for ensuring energy security of the North East Asia region. Once implemented, the main gas projects of Sakha, Irkutsk (Kovykta) and Sakhalin will form the basis for arranging the supplies of gas and deeper-conversion products to the Asia-Pacific countries via various routes. The major challenge should be to choose the best option to ensure comprehensive field development and use it as a basis to set up the production of polymer materials and a helium production center. This far only one noteworthy project was started with sole purpose for the regional supplies – the 'Sakhalin-2' system is clearly set to fill the need of two main importers, isolated from the continent – Korea and Japan. But still, both would prefer a sustainable supply via the traditional pipelines. In this regard, a careful feasibility study is suggested for Gazprom, Korea and Japan, since the construction of a underwater pipeline is just about as sophisticated as constructing the pipeline through the troubled North Korea.

As per the Chinese demand, the Gazprom made its intentions clear, but it remains to be seen what Chinese side will do next: the energy policy of China is not working like it did 5 years back, so it is likely that Beijing lifts the limits for the foreign fuel quota and therefore will let the cheaper foreign gas substitute the Chinese coal.

Each of the deposits set for development should be assigned a specific target for exportation, ensuring the most effective approach to the differentiated importers. Therefore, it appears feasible to develop Sakhalin gas exports only in the form of LNG, while supplying network gas and secondary products of hydrocarbon processing to China and Korea from East Siberia. This will promote the development of high-tech industries in the region, create opportunities for a concurrent development of deeper conversion facilities and hydrocarbon chemistry, encourage exports of LNG and high value-added products, and satisfy domestic and international demand for network gas. Basing on the result of the above analysis, it is obvious that Gazprom will not turn into a significant and massive regional supplier in the North East Asia unless a serious reform made in its infrastructure and investment strategy.

APPENDIX

Table 1. Gazprom Group's Natural Gas Sales in 2008

| | 2007 | 2008 | Changes, % |
|--|---------|---------|------------|
| Sales (net of VAT, excise tax, and customs duties), billion RR | | | |
| Russia | 399.5 | 474.3 | 18.7 |
| Far Abroad | 873.4 | 1,430.5 | 63.8 |
| CIS and Baltic states | 269.6 | 356.5 | 32.2 |
| Total | 1,542.5 | 2,261.3 | 46.6 |
| Sales volume, bcm | | | |
| Russia | 307.0 | 287.0 | -6.5 |
| Far Abroad | 168.5 | 184.4 | 9.4 |
| CIS and Baltic states | 100.9 | 96.5 | -4.4 |
| Total | 576.4 | 567.9 | -1.5 |
| Average price for natural gas (net of VAT, excise tax, and customs duties), RR per mcm | | | |
| Russia | 1,301.1 | 1,652.8 | 27.0 |
| Far Abroad | 5,181.9 | 7,757.0 | 49.7 |
| CIS and Baltic states | 2,672.9 | 3,693.9 | 38.2 |

Source: Gazprom

Table 2. Gas Received Into And Distributed From Gazprom's Gas Transportation System In The Russian Federation, Bcm

| | 2007 | 2008 |
|--|-------|-------|
| Total amount received into the gas transportation system | 706.7 | 714.3 |
| Amount received into the system | 654.8 | 669.2 |
| including Central Asian gas | 59.9 | 61.4 |
| Gas withdrawn from UGSF in Russia | 41.7 | 36.1 |
| Decrease in the amount of gas within the gas transportation system | 10.2 | 9.0 |
| Total distribution from the gas transportation system | 706.7 | 714.3 |
| Supply to Russian consumers | 356.4 | 352.8 |
| including Central Asian gas | 0.1 | 0.1 |
| Supply outside Russia | 247.3 | 251.1 |
| including Central Asian gas | 59.7 | 61.3 |
| Gas pumped into UGSF in Russia | 43.0 | 51.6 |
| Technical needs of the gas transportation system and UGSF | 49.5 | 49.6 |
| Increase in the amount of gas within the gas transportation system | 10.5 | 9.2 |

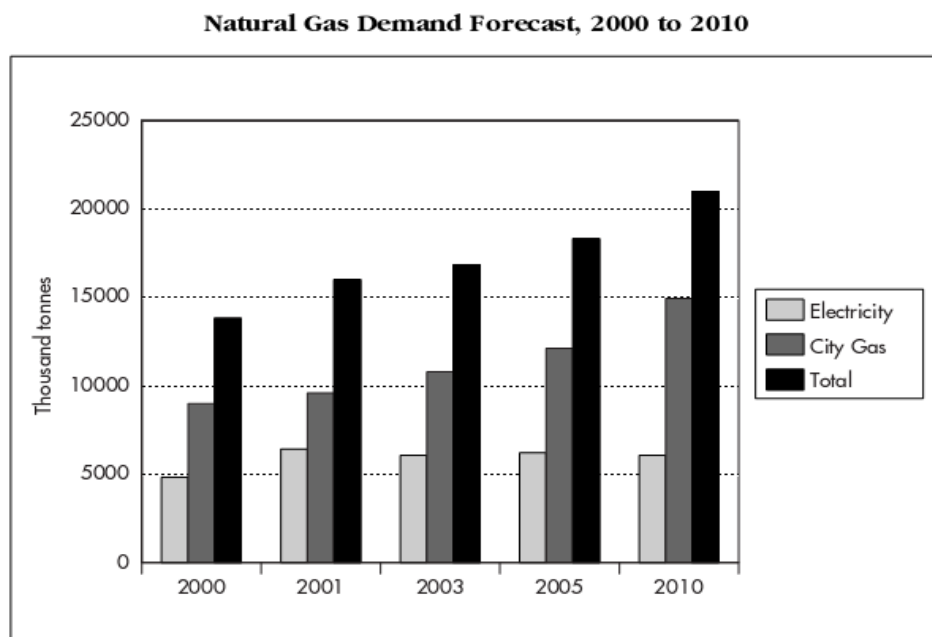
Source: Gazprom

Table 3. Gazprom Group's Hydrocarbon Reserves In Accordance With The International Prms Standards

| | Natural gas, bcm | Condensate, million tons | Oil, million tons | Total, million tce |
|---------------------------------|---------------------|-----------------------------|----------------------|-----------------------|
| Proved reserves | 18,175.56 | 587.90 | 713.13 | 22,863.2 |
| including Gazprom Neft | 60.99* | - | 615.56 | |
| Probable reserves | 3,066.26 | 141.86 | 565.04 | 4,473.0 |
| Including Gazprom Neft | 147.15* | - | 379.35 | |
| Proved and probable reserves | 21,241.82 | 729.76 | 1,278.17 | 27,336.2 |
| including Gazprom Neft | 208.14* | - | 994.91 | |

Source: Gazprom

Table 4. Japan's Natural Gas Production and Consumption 1987-2007



Source: KOGAS.

Table 5. List of major companies with full or partial Gazprom ownership (as of early 2009)

| 100% ownership | Ownership above 50% | Ownership 50% and less |
|--|----------------------------------|--|
| 1. Astrakhangazprom | 1. Brestgazoapparat | 1. AVTOGAZ |
| 2. Bashtransgaz | 2. Centrenergogaz | 2. ArmRosgazprom |
| 3. Burgaz | 3. Dialoggazservis | 3. Azot Agrichemicals Corporation |
| 4. Ecological and Analytical Center for the Gas Industry | 4. Ditangaz | 4. Belgazprombank |
| 5. Gazexport | 5. Druzhba | 5. BSPS B.V. (Blue Stream Special-Purpose Company) |
| 6. Gazflot | 6. Electrogaz | 6. Caspian Oil Company |
| 7. Gazkomplektimpex | 7. ForaGazprom | 7. Eesti Gaas |
| 8. Gaznadzor | 8. Future Fatherland Fund | 8. EuRoPol Gaz |
| 9. Gazobezопасnost | 9. Gazenergосervis | 9. Gas-Oil |
| 10. Gazoenergeticheskaya Kompaniya | 10. Gazcom | 10. Gasum |
| 11. Gazpromavia | 11. Gazmash | 11. Gaz-Agro-Friport |
| 12. Gazpromenergo | 12. Gazprombank | 12. Gazavtomatika |
| 13. Gazprom Finance B.V. | 13. Gazpromgeofizika | 13. Gazpromtrans |
| 14. Gazprom UK Ltd. | 14. Gazprom нефт | 14. Gaztransit |
| 15. Gazprominvestarena | 15. GazpromPurInvest | 15. Gaz-Truby |
| 16. Gazprominvestholding | 16. Gazpromtrubinvest | 16. Horizon Investment Company |
| 17. Gazpromokhrana | 17. Gaztelekom | 17. Imperial Bank |
| 18. Gazpromrazvitiye | 18. Gaztorgpromstroy | 18. Interconnector (UK) Limited |
| 19. Gazpromstroyengineering | 19. Gazstroydetal | 19. International Gas Transportation Consortium |
| 20. Gazsvyaz | 20. Giprogaztsentr | 20. Interprivatizatsiya International Fund |
| 21. Informgaz | 21. Giprospeitsgaz | 21. Intest Insurance Company |
| 22. Informgazinvest | 22. Krasnodargazstroy | 22. IVECO-URALAZ |
| 23. Irkutskgazprom | 23. Krasnoyarskgazprom | 23. KazRosGaz |
| 24. IRTs Gazprom | 24. Kaunas CHP | 24. Khimsorbent |
| 25. Kaspiygazprom | 25. Lazurnaya | 25. Khoroshevskaya Energeticheskaya Kompaniya |
| 26. Kavkaztransgaz | 26. Lengazspetsstroy (LGSS) | 26. Latvijas gaze |
| 27. Kubangazprom | 27. NEGP Company (NEGP operator) | 27. Lietuvos dujos |

| | | |
|--|------------------------|--|
| 28. Lentransgaz | 28. Orgenergogaz | 28. Moldovagaz |
| 29. Mostransgaz | 29. PeterGaz B.V. | 29. Moskovsky Vekselniy Bank |
| 30. Mezhrefiongaz | 30. Promgaz | 30. Mospromagrotorgdom (Promagrokontract) |
| 31. Nadyngazprom | 31. SevKavNIPIgaz | 31. Motor Technologies |
| 32. Nadynstroygazdobycha | 32. Sibur | 32. Noyabrsky Gorodskoy Bank |
| 33. NIlgazekonomika | 33. Spetsgazavtotrans | 33. Olimpiysky Commercial Bank |
| 34. Nord Transgas | 34. Spetsgazremstroy | 34. ORFIN (Orenburg Finance Company) |
| 35. Novy Urengoy Gas Chemicals Company | 35. Stimul | 35. Overgas Inc. |
| 36. Noyabrskgazdobycha | 36. Tsentr gaz | 36. Permskiye Motory |
| 37. Orenburggazprom | 37. TsKBN | 37. Prometey-Sochi |
| 38. Permtransgaz | 38. Urengoystroygaz | 38. Promstroybank |
| 39. Podzemgazprom | 39. VNIPIgazdobycha | 39. Regionreestr |
| 40. Podzemgidromineral Science & Production Center | 40. Volgogaz | 40. Rosneftegazstroy |
| 41. Samaratransgaz | 41. Volgogradneftemash | 41. Rosshelf |
| 42. Servisgazprom | 42. Vostokgazprom | 42. Rus-Gaz Trade House |
| 43. Severgazprom | 43. Zapsibgazprom | 43. Russian Gas Universal Exchange |
| 44. Severneftegazprom | 44. Zarubezhneftegaz | 44. Sibur Holding |
| 45. Sevmorneftegaz | | 45. Slovrusgas |
| 46. Surgutgazprom | | 46. SOGAZ |
| 47. Surgutstroygaz Construction Company | | 47. SR-DRAGA |
| 48. Szhizhenny gaz (Liquefied gas) | | 48. Stella Vitae |
| 49. Tattransgaz | | 49. Stroytransgaz |
| 50. Temryukmortrans | | 50. TsentrCaspneftegaz |
| 51. Topenergy | | 51. Turusgaz |
| 52. Tomsktransgaz | | 52. Ural Bank for Reconstruction and Development |
| 53. TyumenNIlgipro gaz | | 53. Vega Investment Company |
| 54. Tyumentransgaz | | 54. VIP-Premier |
| 55. Uraltransgaz | | 55. Vologdapromresurs |
| 56. Urengoygazprom | | 56. Volta S. p. a. |
| 57. Volgogradtransgaz | | 57. YugoRosGaz |
| 58. Volgotransgaz | | 58. YuzhNIlgipro gaz |
| 59. VNIIGAZ | | 59. Zavod TBD |

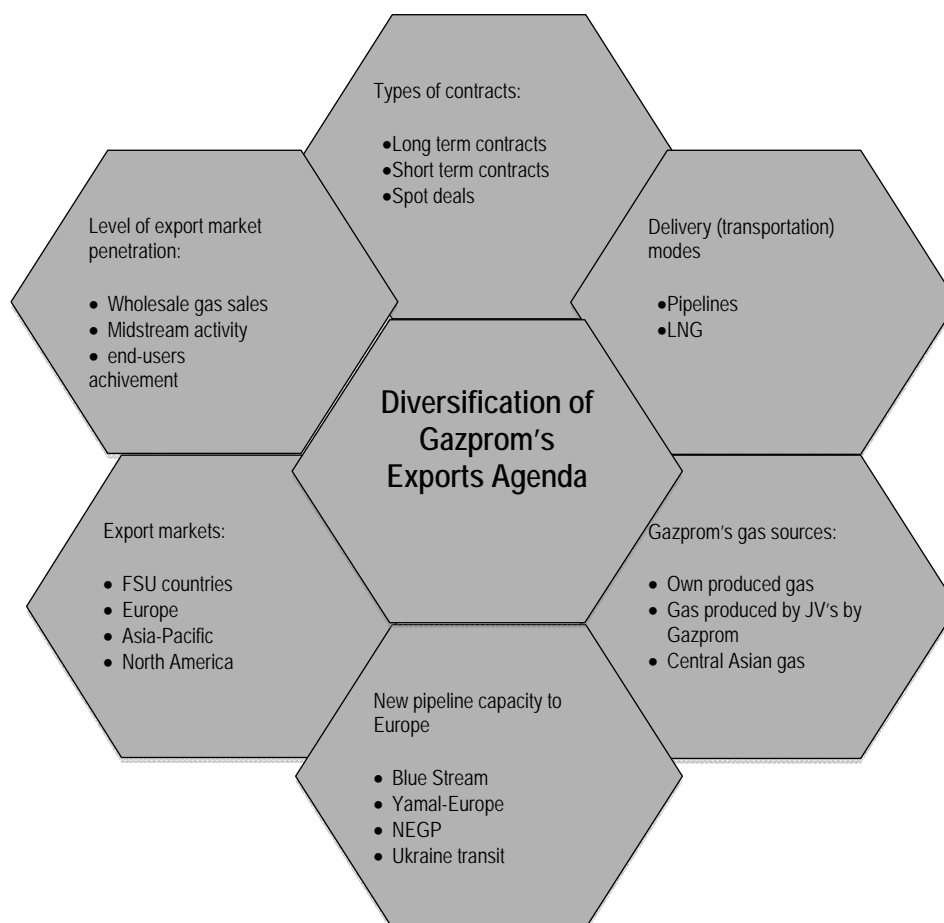
Table 6. Gazprom's Major Joint Ventures and Overseas Subsidiaries (incomplete)

| Country | Entity | Gazprom Share | Joint Venture Partner(s) | Description |
|----------------|-----------------------------------|---------------|---|--|
| Armenia | Armrosgazprom | 45% | | Gas marketing, trading |
| Austria | GHW ZGG | 50 % | OMV, Centrex | Gas marketing, trading |
| | Zarubezhgazneftechim Trading GmbH | 66% | | |
| | ZMB Gasspeicher Holding GmbH | 67% | | |
| Belarus | Belgazprombank | 50% | | |
| Bulgaria | Overgas Inc. AD Topenergo | 50% 10 | Overgas Holding AD | Gas marketing construction/ operation of transportation network |
| Cyprus | Leadville Investments Ltd | | | |
| Czech Republic | Gas-Invest S.A. | 37.5% | Centrex Europe Gas & Energy AG, other shareholders | Gas marketing, distribution and general trading activity |
| | Vemex s.r.o. | 33% | ZMB, Centrex | |
| Estonia | AO Eesti Gaas | 37% | E.ON Ruhrgas AG, Fortum Corporation, Itera-Latvia, other shareholders | Marketing of natural gas, development of Estonia's gas transportation networks |
| Finland | Gasum Oy | 25% | Fortum Corporation, E.ON Ruhrgas, the Republic of Finland | Gas transportation and marketing |
| | North Transgas Oy | 100% | | Planning and construction of North European Gas Pipeline |
| France | FRANGAZ | 50% | Gaz de France | Gas distribution and general trading activities |
| Germany | WIEH GmbH&Co KG | 50% | Wintershall AG | General trading business |
| | Agrogaz GmbH | 100% | | |
| | Ditgaz | 49% | | |

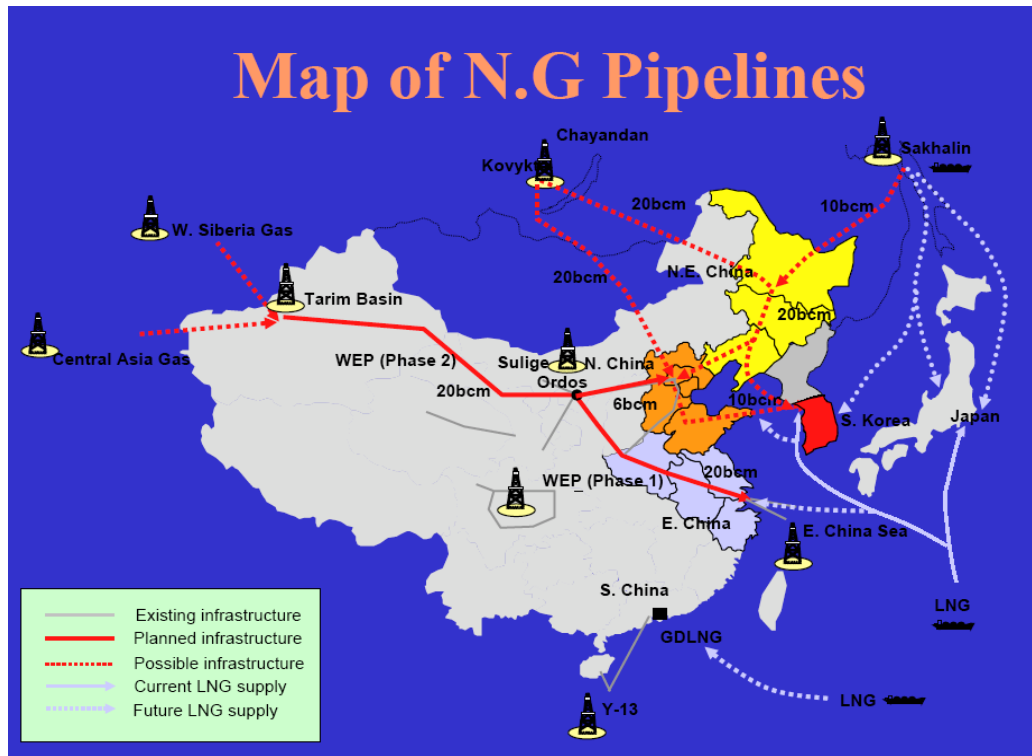
| | | | | |
|------------|--|------------------------------|---|--|
| | Verbundnetz Gas Gazprom Germania GmbH ZMB GmbH | 5.3% 100% 100% | EWE, VNG Verwaltung und Beteiligung, Wintershall, EEG- Erdgas Transport | |
| Germany | VINGAZ GmbH | 35% | Wintershall AG | Construction and operation of trunk gas pipelines, gas transportation, general trading business, wholesale gas trading |
| Greece | Prometheus Gas S.A. | 50% | Copelouzos Bros. Corp. | Gas marketing and construction of gas transportation network |
| Hungary | Panrusgaz Rt. Borsodchem TVK DKG-EAST Co | 40% 25% 13.5% 38.1% | MOL Gas, E.ON Ruhrgas, Centrex Hungária | Gas marketing and distribution |
| Italy | Promgaz SpA Volta SpA | 50% 49% | ENI Edison S.p.A. | Gas marketing and distribution |
| Kazakhstan | KazRosGaz | 50% | KazMunayGas | |
| Kyrgyzstan | Munai Myrza | | | |
| Latvia | AO Latvias Gaze | 25% | Itera-Latvia, E.ON Ruhrgas, other shareholders | Marketing of natural gas and liquefied gas, development and modernization of Latvia's gas and services industries |
| Lithuania | AO Lietuvos Dujos | 37% | E.ON Ruhrgas AG, the Republic of Lithuania, other shareholders | Marketing of natural gas, development of Lithuania's |
| Lithuania | OAO Stella Vitae Kaunas CHP | 30% 100% | Other shareholders | Oil, gas and gas refinery products trading |
| Moldova | Moldovagaz | 51% | Transdnistria | Shipments of Russian gas to Moldova |
| The | BSPS B.V. | 50% | | Operator of the Blue |

| | | | | |
|-------------|---|-------|---|--|
| Netherlands | Gazprom Finance B.V. | 100% | Heerema Oil and Gas Development Company | Stream pipeline |
| | PeterGaz B.V. | 51% | | |
| Poland | SGT EuRoPol GAZ S.A. | 48% | PGNiG S.A., Gas Trading S.A. | Transportation, construction, ownership and operation of the Polish section of the Yamal-Europe pipeline |
| Poland | Gas Trading S.A. | 35% | PGNiG S.A., Bartimpex S.A., WIEH GmbH&Co KG, Wenglokoks | Gas marketing, liquefied gas trading |
| Romania | WIROM | 25% | WIEE , DISTRIGAZ | |
| Serbia | JugoRosGaz | 50% | NIS, Progres, Progres-Gas Trading NIS | |
| | Progress Gas | 50% | | |
| Slovakia | Slovrusgaz a.s. | 50% | SPP | Gas transportation and marketing, general trading business |
| | SPP | 16.3% | | |
| Slovenia | Tagdem | 85% | Geoplin | |
| Switzerland | Baltic LNG AG | 80% | OAo Sovkomflot | Development and sale of LNG Operator of the planned Nord Stream pipeline |
| | Nord Stream AG | 51% | E.ON Ruhrgas, Wintershall, Gasunie | |
| | ZMB (Schweiz) AG | 100% | | |
| | WIEE (Wintershall Erdgas Handelshaus Zug) | 50% | Wintershall | |
| Switzerland | Gas Project Development Central Asia AG (Zug) | 50% | Centrex Gas & Energy Europe AG | Production and development of oil and gas fields in Central Asia |
| Turkey | Turusgaz | 45% | Botas International Ltd., Gama Industrial Plants Manufacturing and Erection Corp. | Gas marketing |
| Turkey | Bosphorus Gas Corporation A.S. | 40% | Tur Enerji | Transportation and distribution of natural gas |
| Ukraine | YuzhNIIgiprogaz | | | |

Graph-1 Diversification of Gazprom's export activity



Map 1. Natural Gas Pipelines



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