

Integration of gas markets in the Asia Pacific Region – Russia's role

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Keywords: gas market, Asia Pacific, Russia, gas demand, export, energy policy, LNG, modeling, prices.

Background

The Asian gas market is the most dynamically developing and high potential market in the world. It is the Asia Pacific region that will provide most of the increase in natural gas demand in the world in the period up to 2030. This evident demand growth requires a corresponding increase in imports and significant energy infrastructure development, which would enable to create a single integrated gas market.

Russia is the top gas exporter in the world market. It has the largest gas reserves in the world. At the same time Russia only started exporting gas to Asia in 2009, following the commissioning of the Sakhalin-2 plant. This enabled Russia to increase the share of exports to Asia to 6-7% of total volumes.

Nowadays Russia is a new player in the Asian market, with good prospects and the experience of operating in other markets (Europe, the CIS). Whether the Asian direction will become key for Russia's growing gas trade with other countries remains the main question. Various projects to export pipeline gas from Russia to China, South Korea and Japan have been under discussion for several decades. However, none of these has been implemented so far. What is the future for all of these projects? Which factors will drive forward the development of these projects or become long term barriers to their implementation?

From the Russian leaders' point of view, energy development of Russia's East Siberia and the Far East is becoming an important issue. Will this promote or constrain the development of trade with the Asian countries?

There are technical and natural obstacles to the expansion of gas exports from Russia to the Asia Pacific Region, including the issue of a high content of impurities in gas at some fields (in particular helium), a high level of seismic hazard in the region, ice conditions (on the northern routes) etc. How can these barriers be removed and which scientific, technical or political decisions are needed?

Russia is a big player in the international gas market, therefore the issue of it being able to re-orient deliveries to meet peak demand is important. The situation in Japan at the beginning of 2011 is an example of this.

The proposed research paper aims to answer the questions outlined above.

Aims

1. Determining resource capability to increase Russian gas exports

2. Analysis of gas demand in the region and competitive ability of various suppliers.
3. Analysis of Russia's energy policy and a comparative analysis of priorities for the development of trade between Russia and the European and Asian countries.
4. Establishing possible scenarios for the development of trade with the Asia Pacific Region
5. Evaluation of the possibilities for international cooperation in relation to project implementation in Russia
6. Evaluation of the impact of the political, scientific, technological and institutional factors on the development of cooperation between Russia and the Asian countries in the gas sphere.
7. Identifying the optimum price setting mechanisms in the Asian gas market.

Methods

The method of economic and mathematical modelling is used to determine demand in the Asian market, competitive ability of various suppliers and resource base potential. The modelling (simulation) complex also analyses the potential for replacing gas with alternative fuels. As a result demand and prospects for the deliveries of Russian gas to the Asia Pacific Region are determined.

Transportation costs for gas delivered from Russia to various Asia Pacific countries are estimated using economic calculations and project analysis.

Costs of gas deliveries to the Asia Pacific Region are compared in relation to various suppliers.

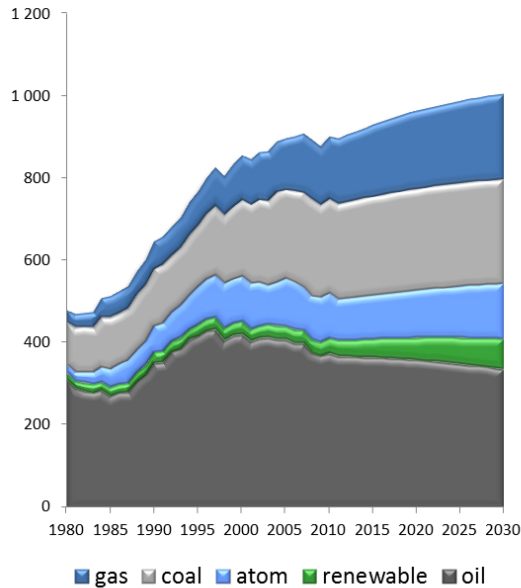
The modelling complex also produces a comparative evaluation of the attractiveness of natural gas deliveries from Russia towards Asia and Europe, as well as investment priorities.

An evaluation of profitability of Russian gas exports to the Asia Pacific Region is made using economic and mathematical modelling, in relation to various price setting systems and taking into account scenarios of payback periods for the projects.

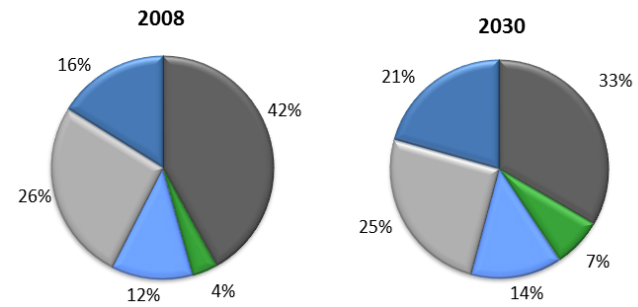
Results

Results of modelling done at ERI RAS have so far shown that in the long term the role of gas in the energy balance of the OECD-Asian countries will grow (figure 1). In absolute terms its consumption will increase by 43% in 2010-2030.

Primary energy consumption, mtoe.



Shares of fuels in primary energy consumption



Consumption of oil, gas, coal

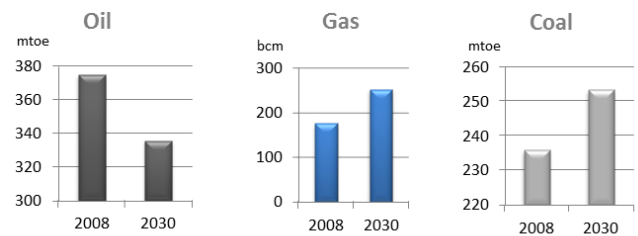
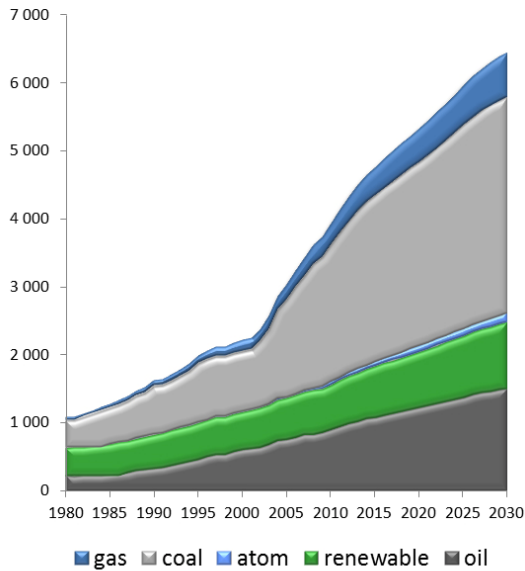


Figure 1 – Primary energy consumption in OECD Asia

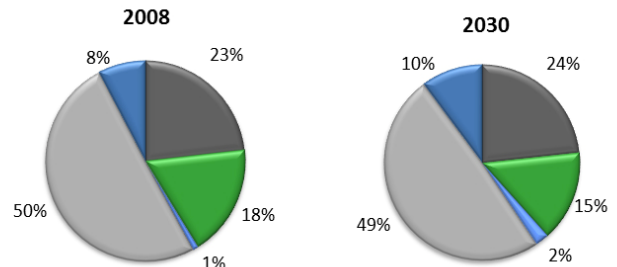
Source: ERI RAS.

Coal will continue to dominate in the energy balances of the non-OECD Asian countries. However, even in these countries the share of gas will grow. In absolute terms gas consumption growth will be very significant – more than doubling in 2010-2030 (Figure 2). Environmental policy will be very significant for the region, since it can encourage an increase in the consumption of gas as a more environmentally friendly fuel than coal.

Primary energy consumption, mtoe.



Shares of fuels in primary energy consumption



Consumption of oil, gas, coal

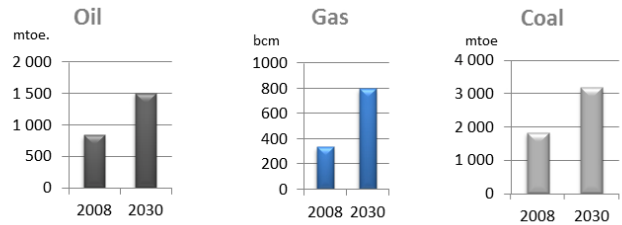


Figure 2 – Primary energy consumption in non-OECD Asia

Source: ERI RAS.

ERI RAS forecast is on the whole in line with the estimates of long term development of the Asian market made by other well-known research organisations (Figure 3).

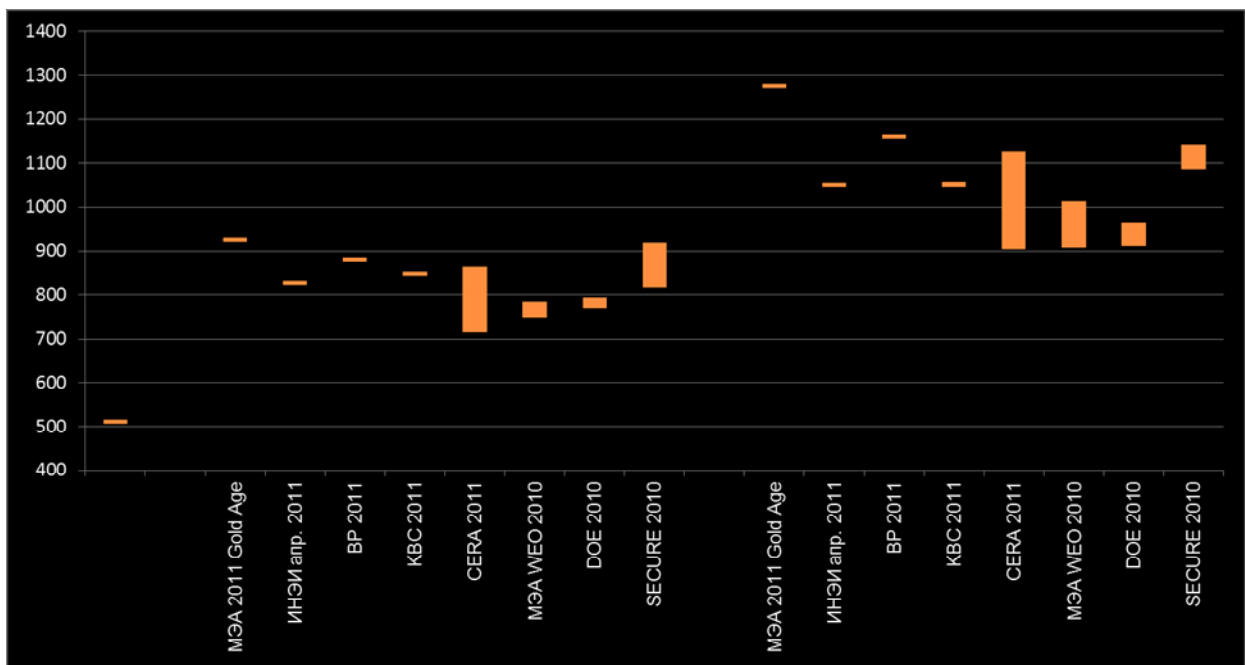


Figure 3 – Projected gas consumption in the Asia Pacific Region, bcm (forecasts made by various organisations)

Given such a significant increase in gas consumption, Asian countries have to seek new import sources. It is quite natural that Russia located nearby and possessing the world's largest natural gas resources, is of much interest as a source of new supplies.

Plans to develop exports to Asia are on the whole in agreement with the aims of the energy policy of Russia, specified in the Energy Strategy of Russia for the period up to 2030, the General Scheme for Gas Industry Development and the Programme for the Development of East Siberia and the Far East.

The Asian direction will be one of the key ones for the development of the Russian gas sector. The Asian gas market is becoming no less attractive for Russia than the European and the CIS markets. A rapidly expanding demand, comparatively high prices – all of these suggest that future projects will be profitable. However, important decisions will need to be made in the area of regulation and scientific and technological developments and in relation to building a regional trading structure, so that gas trade can be expanded.

Implementation of gas projects in the East of Russia and transformation of world flows of gas will lead to the establishment of a new large Asian gas market, which in the long term could become the determining one for the whole of world trade. Development of the gas sector of the Russian East Siberia and the Far East will make a contribution to the formation of the new structure of the Eurasian gas transportation system. In the long term it will be possible to speak not of separate demand markets but of a single Eurasian and global gas market, where it will be possible to optimise flows and distribute supplies depending on current demands.

Growing participation of the Russian companies and the Russian gas in the LNG trade makes it possible to optimise and reroute deliveries during peak demand times, planned and unplanned decommissioning of other generating capacities,

The results of the modelling process show that absorption of the market makes it possible to increase gas exports from Russia to Asia in the period up to 2030 even above the level set within the Energy Strategy of Russia and the Programme for the Development of East Siberia and the Far East. Russian gas will not only enable to ensure required energy demand but will also partially resolve ecological problems in the region.

LNG production is more expensive than pipelines deliveries on some routes. However, it avoids the risks of demand instability and ensures sales at the global price level.

The Sakhalin-2 project is the only current source of gas exports from Russia to the Asia Pacific Region. However, a whole number of projects are being considered in the long term. These would significantly increase gas supply volumes (Figure 4). Certainly practical implementation of these projects would depend on several factors, the key ones being as follows:

- Confirmation of gas resources and discovery of new reserves in volumes sufficient for the implementation of the projects;
- resolution of technological production and transportation issues;
- contracts being set at prices which would ensure a return on investment;
- the government being ready to support the projects, including the introduction of tax concessions;
- demand dynamics in the domestic market;
- availability of investment;

The following gas export projects should be specifically mentioned among those being discussed in relation to exports from Russia to Asia:

- Expansion of LNG production in the Far East as part of the Sakhalin projects;
- Construction of a new LNG plant in Vladivostok;
- Research on the new regions with gas potential on the shelf of the Far East with the possibility of subsequent production and construction of LNG plants;
- Pipeline deliveries to China on the eastern route;
- Pipeline deliveries to China on the western route;
- Pipeline deliveries to South Korea;
- LNG deliveries as part of the Yamal LNG and Stockman LNG projects on the Northern Sea Route.

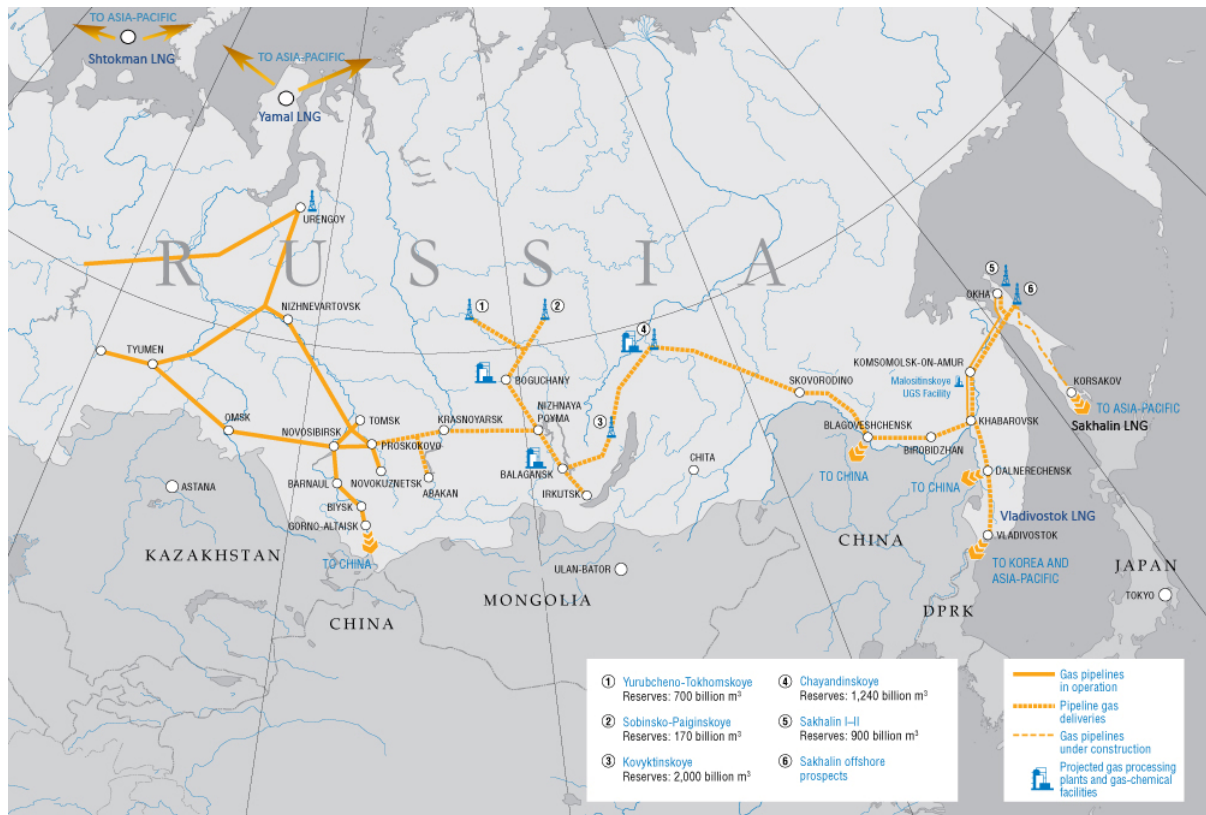


Figure 4 –Main production regions and gas export routes from Russia to Asia

Source: Gazprom, ERI RAS.

Pursuant to the Eastern Gas Program (EGP) it is planned to establish gas production centers in the Krasnoyarsk Krai, the Republic of Sakha Yakutia, the Irkutsk Oblast, the Sakhalin Oblast and the Kamchatka Krai. The Program stipulates that simultaneously with gas production centers and the UGTS (unified gas transmission system) formation, gas processing and gas chemical industries will be developed including the capacities for helium and LNG production.

The Sakhalin-2 project is operating successfully and has demonstrated its effectiveness. A confirmation of additional reserves is needed to expand LNG production as part of developing this project.

A new LNG plant in Vladivostok could be connected to the fields in the continental part of the Far East. Economic feasibility of the project would have to be confirmed and technological issues (including gas impurities) would have to be resolved before implementation can start. Government support and gas sales prices are also important for this project.

Preliminary geological estimates show a high probability of gas reserves in various territories on the shelf of the Far East. It is possible that new resources sufficient for the construction of new LNG plants will be confirmed in the process of further prospecting.

Pipeline deliveries to China via various routes have long been under discussion. Before final decisions can be made, there need to be firm guarantees of gas deliveries at prices ensuring return on investment of the projects. Given high transportation costs, these prices should correspond to average LNG import prices in the Asian region.

A project to supply gas to South Korea via a pipeline through the Korean Peninsula is interesting for both parties and economically quite feasible. However, its implementation is only possible provided there is an improvement in relations between South and North Korea.

Recently there has been increasing discussion on the possibility of delivering LNG from the Shtokman LNG and the Yamal LNG projects to the Asia Pacific Region via the Northern Sea Route.

These are fairly complex projects requiring not only large investment but also cutting edge technological solutions. No one in the world has ever sent LNG tankers through an ice-covered ocean. It is possible that climate change which has already led to a partial melting of the Arctic ice, will make this task easier. However, in either case estimates show that these projects will be quite expensive. Their implementation is only possible given significant tax concessions and relatively high prices in the sales markets.

Therefore we can speak of a whole number of projects which can significantly expand gas exports from Russia to the Asia Pacific Region in the next few decades.

An analysis of transport infrastructure development shows that a single gas market is gradually forming in the Eurasian market. It is closely integrated within the global gas market. Gradually alongside the implementation of new projects Russia should gain additional logistical capabilities to re-route deliveries between the European and the Asian gas markets, depending on the current demand situation. Even now, for example, gas from Central Asia can be delivered via a pipeline to China, or to Europe via the Russian gas transportation system. Therefore there is now flexibility not just in LNG projects but also in pipeline transportation.

Remaining uncertainty of price setting formulae in contracts is one of the main problems in the implementation of new projects to produce and transport gas for export to Asia. There is a lack of transparency around this issue. Individual buyers are not prepared to include prices corresponding to the average regional level of prices, in the contracts. These have been the obstacles to the implementation of production and pipeline transportation projects for many years. As estimates show, it is very important that the prices in the contracts are not below average market prices, to attract investment and ensure that most projects provide a return on investment. It is therefore sensible to develop unified transparent price setting mechanisms within the region, which investors could use to plan their long term activity. As

new projects are implemented, one of the options is to set up a regional gas exchange in the Russian Far East. Some non-contracted gas volumes could be sold at this exchange.

Some of the projects, for example, exploration of the Chayandin field, are impossible to implement if you consider only gas production and transportation aspects. An integrated approach is needed here, with the resolution of social and economic problems, development of regional transport infrastructure and the setup of auxiliary enterprises. It is appropriate that other industries in the region develop in parallel to these projects, making it possible to reduce the investment burden of the gas industry. A territorial production complex would need to be created, with participation of representatives of other industries, construction of social facilities and transportation routes. These plans must certainly be implemented with the support and direct participation of the government. Russia already has experience in implementing similar integrated programmes. This practice was widely used in the Soviet times in the development of new territories. In later years some of the projects were put on hold. However, nowadays the government once again aims to unite the efforts of representatives of various business groups in setting up new territorial production complexes.

The project to explore the Lower Angara area is a good example. Metallurgical companies, energy companies, transport companies and regional authorities all saw that it was appropriate to implement a large project. However, if one of these links were missing, all other links would stop working. Therefore lengthy negotiations were necessary. All of the participants in the process undertook the obligation to do their part of the work, as guaranteed by the government. Substantial funds were also allocated to the project from the state budget, primarily to resolve social issues.

It is sensible to implement many projects in the territory of Russia jointly with foreign partners.

It would be useful to combine technological and management expertise of the Russian and foreign companies within the framework of the new planned projects

Auxiliary facilities and industries would need to be developed or restrictions on the export of gas containing helium would need to be lifted, in order to resolve the issue of high helium content.

It remains an important question whether expansion of gas exports to the Asia Pacific Region would be a restraining factor in the development of Russian territories of East Siberia and the Far East. According to ERI RAS estimates, by 2030 gas consumption in these regions of Russia will more than double compared to 2011. However, the potential to grow production is significantly higher. In addition, it is unprofitable to implement large projects just to meet domestic demand because of the high unit costs. Therefore meeting domestic demand and export demand should be complementary. Export projects will also promote the development of the regional industry and the social sphere, provide new jobs and increase investment in the region. Companies would have to resolve many complex technical problems during the implementation of the projects. This will become an impetus for the development of the scientific and technological sphere. Security and stability of gas supply are of considerable importance for the Asia Pacific Region. Events of 2011 also demonstrated that it is important that import volumes can be promptly increased in case of natural disasters and in case of shutdown of generating capacities operating on other fuel types, in particular nuclear power plants.

Russian gas enables the Asian countries to diversify import sources and increase supply security.

The short distance of LNG transportation to the main consumers means that it is possible to promptly re-route supplies in critical situations. An analysis of production and transportation costs shows that Russian gas is quite competitive in the dynamically developing gas market of the Asia Pacific Region.

Summary/Conclusions

Several main conclusions can be made following the study:

1. In the next decade a new large diversified market will be formed in Asia. It will be tightly integrated with other markets. Further development of the infrastructure will promote this. The market should ensure guaranteed supplies even during acute peak demand.
2. It would be sensible that the formation of the unified gas market in Asia would be accompanied by clear and understandable price setting rules. Only this will make it possible to guarantee return on investment and predictability of projects and uninterrupted supplies.
3. There is a high potential for further development of the gas sector in the East of Russia and for increasing exports to the Asia Pacific Region.
4. Russian gas is highly competitive in the Asia Pacific Region, thanks to the proximity of the market and comparatively acceptable production prices.
5. Government support is required to implement some of the projects to supply gas to East Siberia, the Far East and for export. This could take the form of tax concessions and promoting the setup of social and production territorial complexes.
6. Some of the potential production and export projects require new investment decisions in relation to technologies. Therefore it is essential to promote special scientific and technical research in the territory of Russia and to strengthen international cooperation in this area.
7. It is sensible to expand international cooperation in the implementation of gas export and production projects in the Russian East.
8. The Asia Pacific gas market is becoming as attractive for Russia as the European and the CIS markets.