FROM THE EDITORS

Introduction to This Special Issue on Russia's Foreign Economic Relations

This issue of the Russian Analytical Digest includes three articles that were developed by teams of American and Russian authors working under the aegis of the Yegor Gaidar Fellowship Program in Economics. The Gaidar Fellowship is a program of the U.S. Russia Foundation for Economic Advancement and the Rule of Law (USRF) and is administered by the International Research & Exchanges Board (IREX). The goal of the program is to support economic advancement in Russia by strengthening the human capacity at Russian institutions in developing entrepreneurship, economic diversification, technological innovation, and globalization. The program provides opportunities for leading Russian economists to conduct collaborative research in the United States with U.S. experts in the same field, and to engage with the wider community of U.S. and Russian economists on topics of importance to both countries. The Yegor Gaidar Fellowship Program in Economics is named in honor of Yegor Gaidar (1956–2009), the first Minister of Economy and Finance of the RSFSR, the first Minister of Finance of the Russian Federation, Deputy Prime Minister, Chairman of Democratic Choice of Russia, and Member of the State Duma.

The RAD Editors

ANALYSIS

The "Golden Age" of Gas in China: Is There Still a Window of Opportunity for More Gas Exports to China?

By Ksenia Kushkina and Edward Chow, Moscow and Washington[1]

Abstract

China is conducting pricing reform that could make its markets more attractive to exporters. However, it is also developing unconventional sources that could reduce demand for imports. Currently, the Chinese market has enough gas, but there may be opportunities for exporters like Russia in the future. Nevertheless, both Russian and U.S. companies should be careful about overly optimistic expectations for doing business in China's dynamic market.

Introduction

Chinese gas consumption was comparable to Germany's in 2010 and is expected to match that of the entire EU by 2035.[2] Given China's attractiveness for potential liquefied natural gas (LNG) and pipeline gas imports, what happens in such a large market is of the utmost interest to Russia, the United States, and the rest of the world, particularly when American shale gas technologies are transforming the global market.

A quick increase in Chinese gas consumption provides opportunities for gas exporters, but how much of the gas consumed in China will be imported and from where still present major uncertainties for potential gas suppliers.

This article examines the major factors that might drive Chinese natural gas production (with a special focus on pricing reform and shale gas) and provides estimates for the window of opportunity that companies from Russia and the U.S. might enjoy in China over the next 20 years.

What Is the Basis for High Estimates of Chinese Gas Consumption?

Talk about a "golden age" of gas in China started in 2011 when the International Energy Agency published its "Golden Age of Gas" report, increasing its forecast for annual Chinese gas demand from roughly 400 billion cubic meters (bcm) to as much as 634 bcm by 2035.[3]

1 The authors would like to acknowledge additional contributions by: Frank Verrastro, Senior Vice President and Director, Energy and National Security Program, Center for Strategic & International Studies (CSIS); David Pumphrey, Deputy Director and Senior Fellow, Energy and National Security Program, Center for Strategic & International Studies (CSIS); Jane Nakano, Fellow, Energy and National Security Program, Center for Strategic & International Studies (CSIS); and Aloulou Fawzi, Energy Economist, International, Economic, and Greenhouse Gases Division, Office of Integrated Analysis and Forecasting (OIAF), Energy Information Administration (EIA)

2 International Energy Agency, World Energy Outlook (New Policies Scenario), 2011.

3 International Energy Agency, World Energy Outlook (Golden

Higher consumption forecasts also reflected China's newly published 12th Five-Year Plan, which envisions a major expansion of domestic use of natural gas. Many analysts and market players were inspired by China's ambitious target to double the share of gas in its primary energy mix by 2015 and expect this big leap in consumption will lead to a substantial increase in imports. Forecasts of Chinese gas imports by 2035 vary greatly, but most of them lie in the upper end of the 120–330 bcm range (Figure 1 on p. 9).

However, few experts noticed that, apart from environmental reasons, there were other considerations forming the basis for the energy policy shift towards gas. In 2010, the Chinese Ministry of Land and Resources (MLR) published a reassessment of national oil and gas resources, which helped inform the 12th Five-Year Plan. An official reassessment, conducted by the main Chinese national oil companies (NOCs) and covering the largest 13 oil and gas fields, revealed that, compared to the first national oil and gas resources assessment in 2008, China has 45–49% more recoverable and geological resources. More optimistic data on resources prompted suggestions that Chinese domestic production also might grow larger. Consequently, MLR increased its forecast for Chinese domestic gas production from 200 to 300 bcm by 2030.[4]

It is worth mentioning that these new forecasts rely on exploration data available only for conventional, tight gas and coal-bed methane (CBM) and do not yet include shale gas. A national shale-gas resources assessment was launched just this year and is expected to be finished in a few years, so gas production from shale might be covered only in the 13th Five-Year Plan.

As a result, the high 12th Five-Year Plan's gas consumption target is based mainly on anticipated growth in domestic gas production and does not rely on shale gas at all.

But concluding that gas production in China will grow three times by 2030 is not that simple. On the one hand, there is huge potential for future production growth. Due to low domestic gas prices, Chinese producers have not had much incentive to produce gas. Chinese gas exploration density still is very low (18%[5]), and most of the exploration wells were drilled recently (16,000 wells from 2004–2009[6]). However, the coming price liberalization might heighten companies' interest in gas exploration and production, and more gas discoveries might be coming in the future.

On the other hand, the 12th Five-Year Plan targets should not be taken too literally. China has a long history of not fulfilling its plans, especially energy ones. The country simply lacks institutional capacity for calculating reachable targets and largely is setting targets as guidance, rather than as an ultimate goal. At the same time, national companies may overestimate their resources and capabilities, since it helps them keep control over resources and enjoy benefits from the government.

Taking into account that the Chinese gas market largely is supply-driven, and the country has abundant coal, it is easy to imagine that in case of a lack of domestic gas supply, China might prefer not to meet gas targets and use more coal instead of expensive imported gas. It is very likely that higher gas consumption in China won't translate into equal growth in Chinese gas imports.

How Far Reaching Is Pricing Reform, and How Will It Influence Import Projects?

Currently pipeline gas in China is priced on a cost-plus basis. The federal government sets city-gate, transportation and well-head prices. The latter are being calculated on a base of costs and moderate margins for producers, so prices for producers are set at a comparatively low level ($3–6$MBTU).

At the same time, the government does not control prices for LNG, and most of the LNG cargoes are priced at an international level. Early long-term LNG contracts were concluded at a stable $3–4/MBTU price, but later ones have much higher prices, which also have a tendency to grow over time ($7–18/MBTU[7]) (Table 1). Also, about 20% of Chinese LNG imports are coming in at high spot prices.

Table 1: Average Prices on LNG Coming Into China

Province	Start year	LNG export country	LNG average price, $/MBtu	
			2010	IVQ 2011
Guangdong	2006	Australia	3.2	3.2
Fujian	2009	Indonesia	4.0	4.0
Shanghai	2009	Malaysia	6.6	9.2
		Qatar	10.3	18.2
Liaoning	2011	Qatar	-	11.9

Source: author's calculations based on Chinese customs data, 2012

Age of Gas Scenario), 2011.

4 Ministry of Land and Resources of PRC, China oil & gas resources reassessment, 2010 (in Chinese).

5 Ministry of Land and Resources of PRC, China oil & gas resources reassessment, 2010 (in Chinese).

6 Ministry of Land and Resources of PRC, China oil & gas resources reassessment, 2010 (in Chinese).

7 Calculated by author based on the China customs data (in Chinese), 2012.

With imports expected to double within the next few years, pricing reform that will let the government better balance low domestic and high imported prices is inevitable. Chinese policymakers also feel the need to encourage domestic production instead of using expensive imports and to create conditions for building a unified national pipeline transportation system, which also requires a more market-oriented approach to pricing. Changes in the pricing policy have been discussed for many years. In December 2011, the government made the first real steps towards reform and unveiled details of the prospective pricing system.

The pricing experiment was launched in two southern provinces, Guangdong and Guangxi. Since then, pipeline gas in those provinces has been priced under a net-back mechanism. The city-gate price is calculated on the basis of the discounted average price of liquefied petroleum gas (LPG) and fuel oil imported to Shanghai (as a hub of the future unified gas transportation system) and transportation costs.[8] If the system works well, as it has so far, the government likely will extend it to other provinces.

The new system might have some very important implications for import projects. First, domestic prices calculated with a close reference to international ones means that Chinese producers might enjoy much higher well-head prices, which could lead to a substantial increase in domestic gas production and decrease the share that is left for gas imports. Second, the new system is designed so that in the coastal provinces, pipeline gas, while becoming more expensive, still stays much cheaper than spot-priced LNG and in some cases, even cheaper than LNG coming in under long-term contracts. That might lead to a pipeline for liquefied natural gas substitution and also decrease the amount of gas imported from the international market.

And, finally, the new mechanism creates incentives not only for domestic pipeline projects, but also for imported ones. The author's calculations show that after pricing reform and completion of the second West-East pipeline, CNPC, which has been suffering multimillion-dollar losses selling Turkmen gas in Shanghai, now can sell the gas in much more distant Guangdong province at a profit. The same would be true for imports from Russia. CNPC can afford to pay comparatively high prices for Russian gas now, if it is sold in Guangdong. After extending pricing reform to other provinces, the Chinese position on imported gas prices might become even more flexible.

The new Chinese net-back pricing formula also is very close to the one used in the European market. Before the new formula was developed, gas prices in China changed occasionally—about once in a year or even three years. Under the new pricing mechanism, they probably will change on a more regular basis and follow the track of European prices. If applied nationwide, pricing reform can help to overcome one stumbling point in Sino–Russian gas negotiations—compatibility of Chinese prices with European ones. However, this does not alter the higher transportation costs for potential Russian gas exports to China, when compared to its current exports to Europe.

It is likely that pricing reform will be implemented in other Chinese provinces, most probably after the 2013 political leadership transition. The reform might have a positive effect on Russian and Turkmen import projects, since Chinese importers will be able to sell imported gas at higher prices. At the same time, it might have a negative effect on LNG projects because LNG will have to face higher competition from domestic and imported pipeline gas.

Shale Gas in China—Will the Export "Window of Opportunity" Close?

Judging from media reports, shale gas in China seems to be a very promising story. NDRC plans to produce 6.5 bcm of shale gas by 2015 and from 60–100 bcm by 2020. If developed that quickly, shale gas could displace most Chinese imports soon. But how realistic is that scenario?

There is only one thing about shale gas in China that can be said for sure—it is still too early to make any judgments. Critical resource evaluation data might be obtained only through drilling, and there are just a handful of shale wells drilled in China so far, compared to approximately 40,000 wells[9] in the U.S. Most of the wells are vertical, with just a few horizontal ones, which are critical for shale-gas production. None of these wells produce gas at a sustained, high rate.

Without actual production, it is impossible to estimate how much gas might be recovered, which is why recoverable-resource numbers for Chinese shale gas vary greatly. The U.S. Department of Energy's Energy Information Agency (EIA) applied a pretty optimistic recovery factor of 25% and estimated that out of 134 trillion cubic meters (tcm) of potential shale-gas resources, 36 tcm are recoverable. After obtaining first-drilling data and realizing the complexity of the shales, Chinese

8 "Provisions of the NDRC about reforming the gas pricing mechanism in Guangdong, Guangxi" (in Chinese), NDRC, Dec. 26, 2011.

9 Number provided at author's request by Aloulou Fawzi, Project Manager, International Shale Gas Resources and Activities, Energy Information Administration (EIA).

Ministry of Land and Resources applied a more moderate 18.5% recovery factor and stated the country has 25 tcm of recoverable resources.

But all of those numbers are largely analytical estimates and, without substantial geological backing, are highly speculative. China does not have any proven shale gas reserves yet and, during the 12th Five-Year Plan, the Chinese intend to verify only 1 tcm geological and 200 bcm of recoverable reserves by drilling only 50 exploration, 150 production and 990 water wells.[10]

Although China is still at the beginning stage of creating a regulatory framework for the industry, it is putting a large emphasis on shale gas and already has done a lot to encourage the sector's development. Chinese policymakers promised not to regulate shale-gas prices[11] and allowed private companies into the sector.[12] They also pledged to prioritize land approvals, allow duty-free equipment imports and provide subsidies to companies tapping shale gas.

These are important regulations that already have given an initial boost to the Chinese shale-gas industry. But major challenges that might hinder the sector's development still exist.

Technology is the critical challenge for the future of the shale-gas industry in China. Chinese shales differ from American ones, so existing technology simply cannot be replicated in China.

Shales in most Chinese basins are rich in clay. When hydraulic pressure and energy are injected into shales with high clay content, they tend to be ductile and deform instead of shattering, so productivity of such shales is very low. Only two Chinese basins, Tarim and Sichuan, have more favorable shales with a high percentage of quartz. However, geological conditions in even the most promising Chinese basin, Sichuan, still are less favorable than those in the U.S. The first drilling results published by CNPC show that Sichuan shales are up to three times less thick, have two to three times lower porosity, lower pressure and much lower gas content[13] (Table 2 on p. 9). Consequently, the extraction of gas will require more complex technology and productivity of the wells probably will be much lower.

Shale-gas development in the Tarim basin might be hindered seriously by another challenge—water scarcity. Shale-gas extraction is extremely water intensive, and the Tarim basin lies in the desert, which makes it very difficult, if not impossible, to develop large-scale shale-gas production there.

However, the widely-held opinion that the water issue might become the main obstacle to shale-gas development in China probably is not true. There are several approaches to solving it, although each would take time to develop and require costly infrastructure and technology investments. They also involve some political risk, since water contamination or scarcity could lead to disaffection among the local people, and the Chinese government is very sensitive to public discontent. But local governments also are interested in developing higher value-added production (compared to water-intensive coal production and farming) and probably will be able to deal with the water issue through better water management and more thorough regulations. A lot will depend on whether companies will be able to find less water-intensive ways of production, such as using recycled water, replacing it with chemicals and fluid combinations and developing technology that uses gels.

Apart from water and technology, there are two interrelated problems that will be more difficult to overcome. One is high production costs. According to a recent EIA study, it would cost from $7.3 million–13.7 million per well to develop shale formations in Sichuan.[14] These numbers are similar to Chinese estimates[15] and compatible with American costs. But this geologic formation is relatively young, and the cost of developing older and deeper shales, such as those in Tarim, may run as much as $25 million per well.[16]

This means the average cost of shale-gas production in China may start at $6.6–12/MBTU.[17] These are the numbers for shallower Sichuan shales—Tarim wells are 30–80% more expensive.[18] They don't include "above

10 "Five-year shale-gas development plan" (in Chinese), NDRC, March 2012.

11 The shale-gas market pricing commitment officially was mentioned in "Provisions of the NDRC about reforming the gas- pricing mechanism in Guangdong, Guangxi" (in Chinese), NDRC, December 2011.

12 "Mineral resource law provisions" (in Chinese), State Council, December 2011.

13 Li Liguang (CNPC), "Status and Practices of Shale Gas Exploration and Development in Sichuan Basin", presentation at U.S.–China oil and gas industry forum, September 2011, Chendu, China.

14 Aloulou Fawzi, "The Potential for Shale Gas in China", Council on Foreign Relations, April 13, 2012, Washington, D.C., U.S.

15 According to Chinese media, drilling costs per well in China range from $7.6–9 million, but in some cases might be as high as $15 million. (CNPC worker); Honghua Group chief geologist confirms this number stating that per-well cost is around $7 million. (Zhang Yu, "Chinese shale gas 12th Five-Year Plan revealed in hope" (in Chinese), Dec. 13,2011.)

16 Aloulou Fawzi, "The Potential for Shale Gas in China", Council on Foreign Relations, April 13, 2012, Washington, D.C., U.S.

17 Author's estimates, based on average EUR of American shales (EIA data) and average costs per well (A.Fawzi, EIA). In the best-case scenario (if the Chinese recovery factor equals the highest recovery factor of U.S. shales) this number would transform into $1.8–3.3/MBTU.

18 Aloulou Fawzi, "The Potential for Shale Gas in China", Council on Foreign Relations, April 13, 2012, Washington, D.C., U.S.

ground" costs (water, infrastructure access, defining property rights, drilling rigs etc.), that might increase cost estimates by 30–50%.

At the same time, the cost of conventional gas production in Sichuan lies in the range $4.4–$5.7/MBTU, and Sichuan gas retails at $6.3–$6.7/MBTU. If the gas-pricing reform experiment is extended to other Chinese provinces, shale-gas producers might sell their gas, for example, in Shanghai, where retail prices could be around $9/MBTU.[19] Shale-gas prices might be a little higher (since the price is not regulated by the government), but it still should be competitive with a $9/MBTU level.

That said, the main problem that is slowing development of the Chinese shale-gas sector is market monopolization. With the current costs and pricing structure, big Chinese oil and gas companies[20] do not have much incentive to produce shale gas since, compared to conventional gas, its costs are too high. Pricing reform, which lets them sell gas with more profit, would strengthen their interest in conventional resources even more.

The Chinese shale-gas industry might be fueled only by either small companies that would be satisfied with small margins between high costs and market prices or foreigners who may substantially decrease the costs using advanced technologies and effective subcontractors. But none of them currently are represented on a large scale in China.

The Chinese approach to foreign investors is "get the technology, do not give the market." Foreign companies can get access to Chinese shales only in partnership with a Chinese counterpart, and the latter usually does not offer very favorable terms. That is why, despite many companies signing letters of intent to come to China, there are just a few working on Chinese shale gas so far.

Lack of foreign investment blocks Chinese access to experience and technology. Despite the common perception the Chinese might acquire technology through extensive investment in shale gas abroad, in many cases, when buying shares in foreign companies, the Chinese are not necessarily allowed to send many representatives to the field. Of course, the Chinese are trying to keep up with the technology chase, but in most cases when investing in U.S. shales, they are driven primarily by expectations of higher returns rather than other reasons. While the Chinese market is closed to foreigners, Chinese NOCs strive to look for technology on their own.

The challenge with private companies is their paucity. The Chinese gas industry is in its infancy, and historically, only three big state oil companies dominate 90% of the market. State companies also control the petroleum service sector, as well as access to infrastructure and resources. The latter is especially important, since in most cases, NOCs hold the most promising shale-gas areas because conventional and unconventional fields often overlap.

Anticipating the challenge, MLR is drafting a rule that will allow it to seize blocks from companies that fail to invest at least $4,700/km^2 annually, and it already has applied new regulations requiring lease holders to relinquish 25% of acreage not held by an Operational Development Plan every two years. But it will take years until a new regulatory framework can have a real effect on the market.

The lack of private companies and limitations on foreign participation, together with other technological, geological and water problems, could substantially slow down Chinese shale-sector development.

The unofficial target to produce up to 100 bcm of shale gas by 2020 would mean the Chinese shale-gas sector must develop as quickly as America's, which is unlikely. It is interesting that at the end of 2011, the Chinese Ministry of Land and Resources came up with a much more moderate forecast of shale-gas production, anticipating that it will grow to 3–5 bcm by 2015 and 15–30 bcm by 2020. This estimate seems more realistic,[21] and that is why further estimates of Chinese gas-production numbers in this paper are based on this MLR forecast.

Shale gas won't close the export window of opportunity, at least not within the next 10 years.

Is There Still a Window of Opportunity for More Gas Exports to China?

So far Chinese NOCs are not in a rush to develop the shale-gas business. They have a long-term view of shale-gas development, while in the mid-term, there are other unconventional gas products that might develop much more quickly.

Although Chinese tight gas and CBM attract less attention than shale gas, it is these unconventional options that will provide most of the Chinese gas production growth within the next 10 years. Chinese companies have been producing tight gas and CBM since the mid-2000s, and currently these unconventionals account for more than 35% of production (Figure 2 on

19 Author's estimates, based on the new pricing formula and historical data on oil products import prices.

20 At least CNPC, as Sinopec and CNOOC, might have other reasons for extending its presence on-shore upstream.

21 Calculations using 150 production wells planned to be drilled during 12th Five-Year Plan and an average recovery factor prove that number (4.5 bcm by 2015). NOC's corporate plans, taken altogether, also equal 4 bcm of shale gas by 2015.

p. 10). Within the next decade, production of tight gas and CBM may increase substantially, and American companies (Conoco, Far East Energy, etc.) may take part in these developments as well.

Having a better understanding of the source and scale of China's gas supply for satisfying its domestic market allows us to estimate the potential for future gas imports.

To do so we compared production[22] and consumption[23] forecasts (Figure 3 on p. 10), then divided import estimates into contracted and uncontracted volumes. Uncontracted imports are those that do not have guaranteed (by contract, as well as resource availability) supply yet. That is why these imports might be considered windows of opportunity for foreigners striving to increase their presence in the Chinese gas market. For the long-term, we also considered two scenarios—one assuming quick shale growth and one not.

Guaranteed supply criteria explains the quite moderate numbers used for Turkmen future gas export evaluation. The current Sino–Turkmen gas contract stipulates that out of 30 bcm of contracted gas, 13 bcm come from fields operated by the Chinese, with the other 17 bcm provided by Turkmens. This 17 bcm may come from currently operated fields, but any further increase in exports (up to 40 or even 65 bcm) would require development of new fields, which, so far, is not guaranteed. Even though construction of the third line of the Central Asia–China gas pipeline already has started, it is still not clear yet whether there will be enough resources to fill the pipeline. Also, about 10 bcm of gas may come from Uzbekistan, but since the availability is not clear yet, Uzbek exports were regarded as feasible only in the longer term.

Due to the preferable pricing regime of a few years ago, China was very bullish on LNG projects. LNG capacity increases every two years, and by 2013 it is expected to grow from the current 20 bcm of gas to as much as 38 bcm. Most of the terminals currently operating and under construction have plans for expansion, so the capacity of LNG plants easily may be increased to as much as 70–90 bcm of natural gas a year.

Many terminals have imports contracted for many years ahead. China already has signed contracts for 25 bcm of gas supply in a form of LNG, and by 2015 that number will increase to 40 bcm. About one third of these imports will be provided by Australia, another third by Malaysia, Indonesia and Qatar. Pricing reform may postpone plans for further terminal expansion, and some of the import contracts already have been delayed. For further calculations, we used an assumption that by 2015, China will have guaranteed supply for all terminals operated by that time, and that by 2020 and 2030, LNG imports will increase by a rather moderate 10 bcm during each period.

Results of this import evaluation are presented in the graph "Chinese gas import structure" (Figure 4 on p. 11). Largely due to big amounts of contracted LNG, the Chinese market proves to be oversupplied in the short-term, and by 2015, there is not much room for further increased exports to China.

In the mid-term, export opportunities arise, but 2020 also is the time when many currently planned and constructed LNG export projects will come onstream, so competition in the market will arise as well.

In the longer term, much will depend on the pace of shale-gas development. If developed quickly, shale gas can replace most of Chinese LNG imports; little progress in shale-gas development would mean that some 40 bcm in gas demand could be covered by more imports.

Recommendations

The Chinese market is one of the most dynamic in the world. Each Chinese policy decision (pricing reform, environmental policies etc.) may have a huge effect on the market, so one of the first recommendations for potential exporters is to keep pace with Chinese gas market developments, find the most updated information and analysis and adjust their export strategy correspondingly.

Recently, Russian and Chinese policymakers began a dialog on gas cooperation. There are two main projects currently under discussion. One, which is preferable for Russia, is the 30-bcm pipeline from the fields in Western Siberia. The fields also supply European markets, so one of the main requirements from the Russians is that the Chinese price be comparable with the European one. For many years, such prices were unacceptable to the Chinese, but pricing reform may bring Chinese and Russian negotiating positions much closer.

Russia should take a close look at future developments in pricing reform and adjust its supply contract terms accordingly. The closer the contract formula is to the Chinese domestic one, the higher the value this contract will have for the Chinese, since CNPC would not have to deal with a pricing differential—buying gas at

22 Production forecast is based on 2015 and 2020 tight gas and CBM production targets and corrected MLR gas production forecast (mentioned in "Oil and gas resource reassessment", MLR, 2010).

23 Chinese gas consumption estimates are beyond the scope of this paper, so for further import estimates we used the numbers from IEA's World Energy Outlook 2011 (New Policies Scenario). New Policies Scenario is a base IEA scenario, and its forecast for Chinese gas consumption is right in the middle between the forecast of the conservative WEO 2010 New Policies Scenario and the very optimistic WEO Golden Age of Gas Scenario.

one price and reselling it at another. But not only pricing terms may make a difference. Overall flexibility of contract terms also may be of high importance. If pricing reform is implemented on the model conducted in Guangdong and Guangxi, Chinese domestic prices will change in correspondence with international ones, with a lag of one year. In that case, a contract with a lower take-or-pay requirement would let the Chinese better adjust to changes in international prices. Then they will be able to buy more pipeline gas when oil prices are going up and more spot when oil prices are going down. So a more flexible contract might be of higher value to China.

Another Sino–Russian gas project relies on the construction of a 38-bcm pipeline from Eastern Siberia to northeastern China. The project is welcomed by China, since its eastern area is short of energy supplies, but less desirable for Russia, which prefers to diversify its export destinations and sell the gas in a form of LNG to all countries in the North-East Asia market.

One important conclusion might be made from the uncontracted import estimates—there probably is space for only one export project from Russia to China. Russia should choose between the two projects, and the overall recommendation for Russia is to proceed with negotiations on the western one.

Currently, the Chinese are not in a rush to make a final decision on imports because the market is oversupplied until 2015. It may take a few years until they learn more about the prospects for the country's shale-gas development and see the effects of pricing reform. Even if they succeed in producing shale gas—probably not on as large a scale as in the U.S.—there is still some space for Russian exports to China in both the mid- and long-term. By being patient and providing reasonable flexibility on the contract, Russia could reach a mutually beneficial agreement with China relatively soon.

The recommendation for American policymakers is not to overestimate prospects for the Chinese LNG market. By 2020, competition in the Asian LNG market will increase. LNG exporters that would like to enter the Chinese market also will face fierce competition from Chinese domestic and pipeline import supplies, so they will not be able to sell the gas for a very high price.

The prospects for American companies entering China's shale-gas sector also might not be as bright as previously expected. So far, China's approach is "get the technology, do not give the market," and it is likely they will follow this strategy in the future. But American companies (especially smaller ones) may also seize some opportunities in the tight gas and CBM sectors. Within the next two decades, it is these sectors that will provide the most Chinese gas-production growth.

About the Authors

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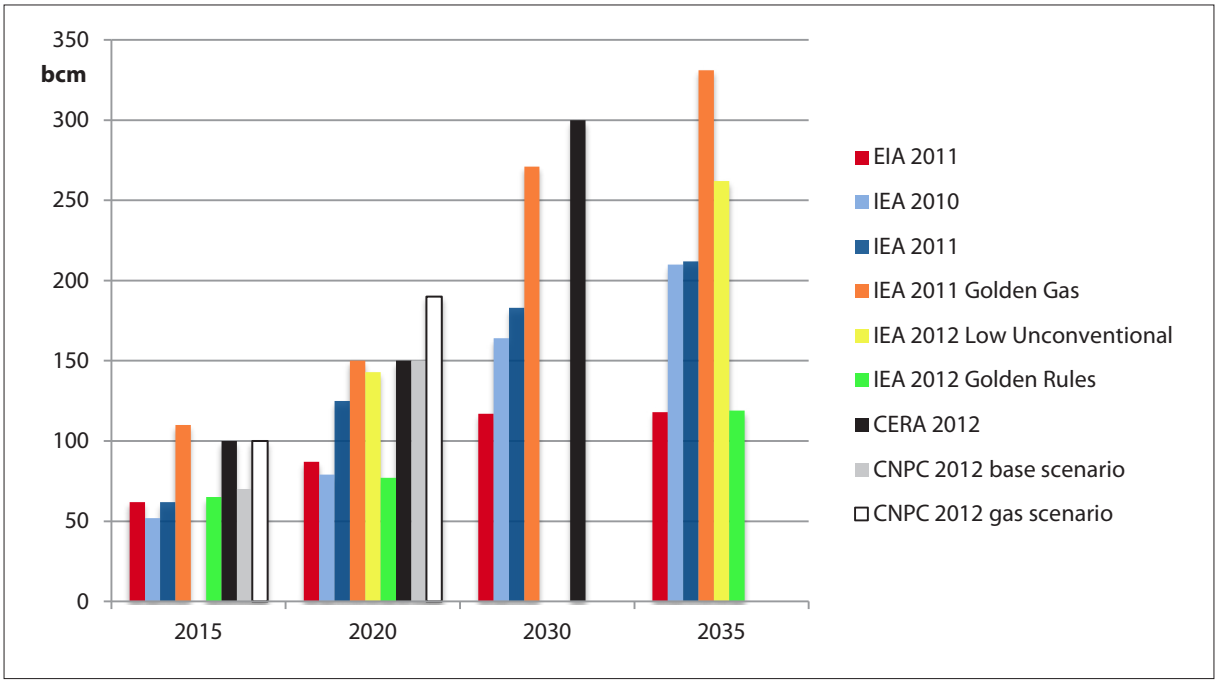
TABLES AND GRAPHS

Chinese Natural Gas Import and Production

Figure 1: Chinese Gas Import Forecasts



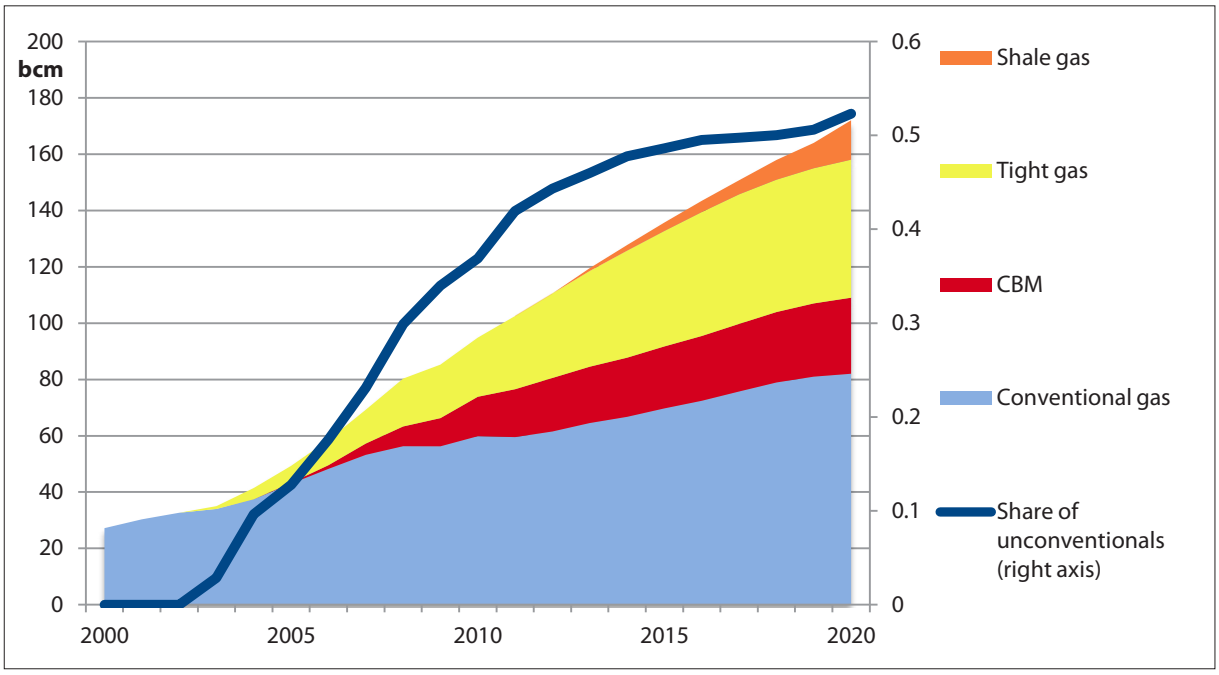
Sources: EIA, IEA, CNPC, CERA, MLR

Table 2: Comparison of Shales' Characteristics in China and the United States

Items	Barnett	Marcellus	*Eagle Ford*	Haynes-ville	Well Wei-201		Well Ning-201	Well Ning-203
					Long-maxi	Qiong-zhusi	Longmaxi	
Depth (m)	2286	2134	3505	3658	1503.6–1543.3	2652–2704	2479–2525	
Net thick-ness (m)	91	107	76	69	39.7	52	46	33.4
BHT (°C)	93	54	168	171	65	95		
TOC (%)	4.5	4.4–9.7	4.5	3	3.2	2.9	2–4.5	2.5–4
Ro (%)	2	1.23–2.56	1.5	2.2	2.7	3.5	2.8–3.2	2.8–3.2
Effective porosity	6	4.5–11.1	11	10	4	2.2	3–6	2–6
Total gas content (m^3/ton)	8.5–9.9				1.7–4.5	1.1–2.8	1.72-3.5	3.5–6.5
Adsorption gas content (%)	35	50	20	18	45	46	0.6–1.3	1–1.6
Reservoir pressure (MPa)	27.6	27.6	35.8	58.6	15.3	28.2	51	

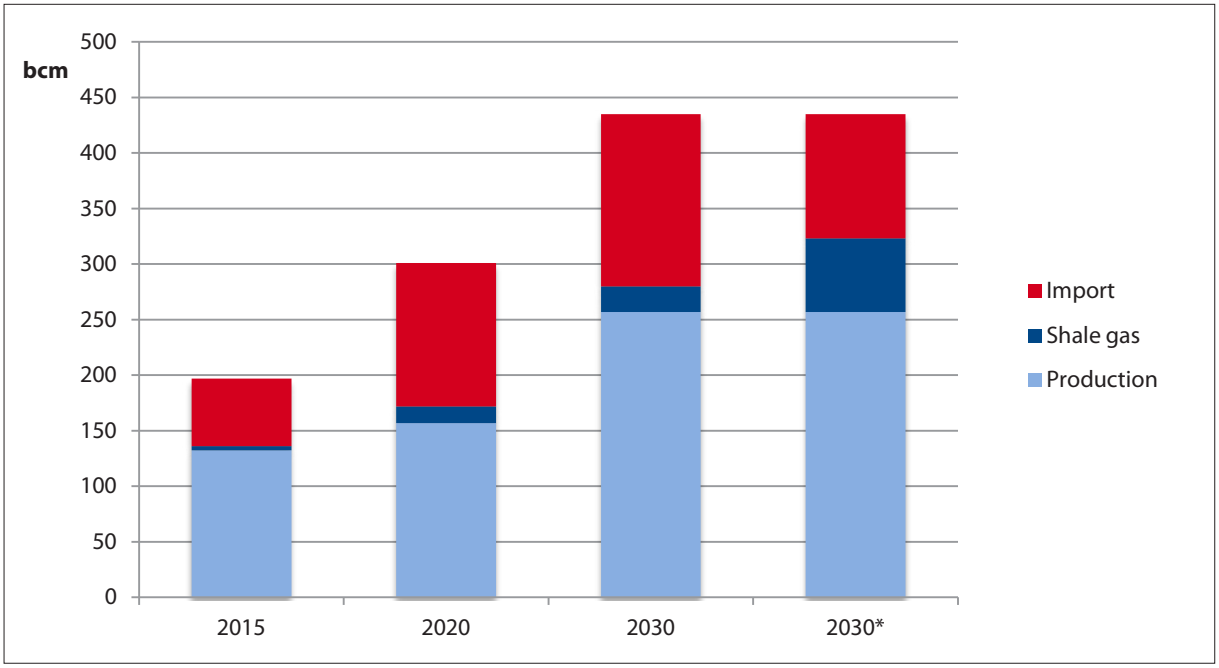
Source: PetroChina, 2011

Figure 2: Chinese Gas Production Forecast by 2020



Source: author's estimates based on long-term forecast of MLR and mid-term development plans for coal-bed methane and tight gas

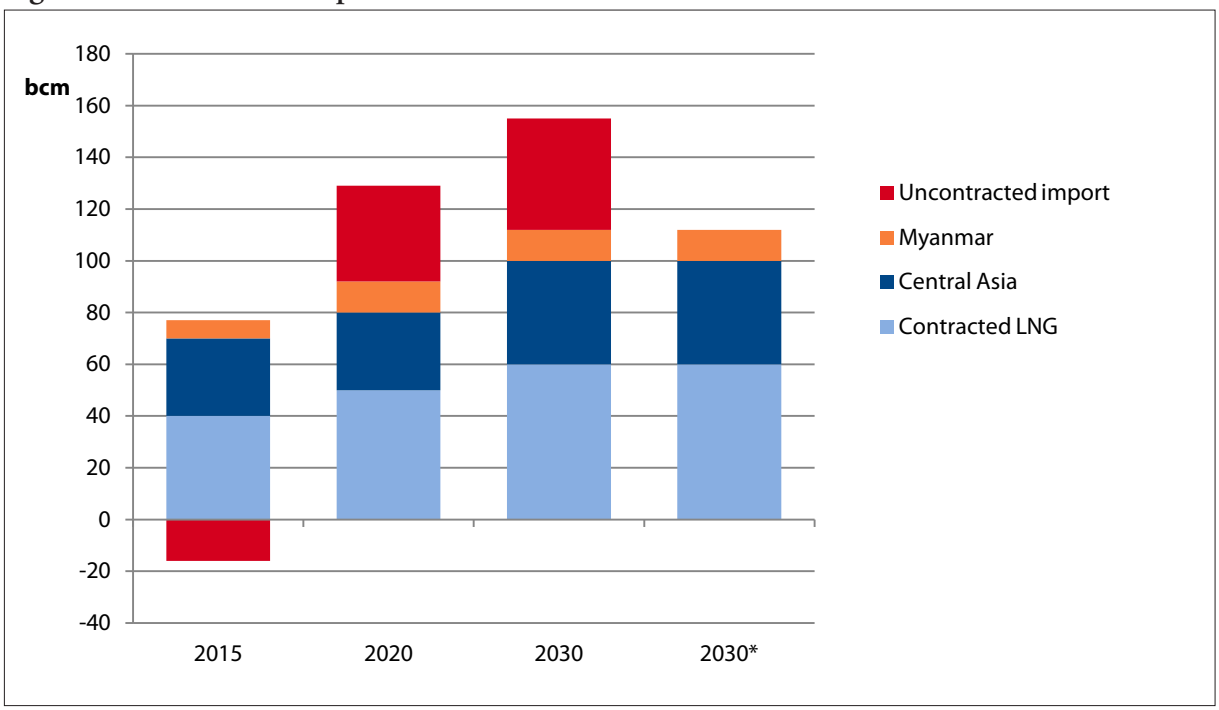
Figure 3: Chinese Gas Import Estimates



** shale gas scenario*

Source: author's estimates

Figure 4: Chinese Gas Import Structure



** shale gas scenario*

Source: author's estimates

ANALYSIS

WTO Accession: Implications for Russia

By Viacheslav Evseev and Ross Wilson, Washington and Moscow

Abstract

Accession to the World Trade Organization will have a variety of positive and negative impacts on the Russian economy. This article provides a guide of what to expect.

Introduction

The eighth World Trade Organization (WTO) Ministerial conference held Dec. 15–17, 2011 in Geneva approved Russia's accession after 18 years of difficult negotiations. The decision was historic—Russia had been the largest economy in the world outside the WTO system after China's accession in September 2001.

Russian and Western policymakers, trade professionals, companies and experts now are evaluating Russia's WTO accession and what will come next. Discussions in Russia are focused on the following issues:

- How successfully have Russia and the world trade community negotiated the terms of accession?
- Has Moscow managed to successfully defend the domestic market? Or, will Russia become wide open for foreign companies?
- How will it be possible to protect the domestic market against unfair trade practices in the new legal environment?

Western commentary has looked at other issues:

- How will Russia comply with its commitments?
- What role will Moscow play in global trade talks, including the Doha Development Round?
- How will accession impact market liberalization and the reinforcement of market economic values and thinking?