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The Pricing Debate over Russian Gas Exports to China

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Preface

Russian pipeline gas exports to China have been one of the most anticipated global gas trades since the end of the Cold War. There have been many suggested projects, many meetings of presidents and prime ministers, and many false dawns, but so far agreement has proven elusive. The difference, as we enter the 2010s, is that this bilateral trade has potential significance far beyond the borders of the countries themselves. Substantial Sino-Russian pipeline gas trade would have a significant impact Central Asia countries and the global – but particularly the Pacific Basin – LNG markets. The longer it takes these two countries to agree on the terms for bilateral gas trade, the greater the likelihood that China will opt to import larger volumes of Central Asian pipeline gas and Pacific Basin LNG.

The major public stumbling block to Sino-Russian gas trade has seemed over the past five years to be disagreement over pricing. But James Henderson's paper suggests that, while this is certainly a significant issue, there are other fundamental disagreements between the countries notably involving the initial source of the gas to be exported, the question of loans for development and equity ownership of gas and infrastructure.

This an excellent summary of recent history and an immensely useful guide to the issues which will determine how these negotiations may unfold, hopefully to a successful conclusion, in the future. Should negotiations fail, or be delayed for several more years, this could have significant consequences for the availability of gas in Eurasia and the Pacific region, and therefore this paper has significant relevance for gas markets beyond these two countries.

Jonathan Stern
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Abbreviations and Units of Measurement

bbls	Barrels
bcm	Billion cubic metres
bcma	Billion cubic metres per annum
bn bbls	Billion barrels
boepd	Barrels of oil equivalent per day
bpd	Barrels per day
E&P	Exploration and Production
ESPO	East Siberia – Pacific Ocean (Pipeline)
FSU	Former Soviet Union
IOC	International Oil Company
kboepd	Thousands of barrels of oil equivalent per day
kbpd	Thousands of barrels per day
km	Kilometres
mm bbls	Million barrels
mcm	Thousands of cubic metres
mmboepd	Millions of barrels of oil equivalent per day]
mmbpd	Millions of barrels per day
mmbtu	Million British thermal units
mmcm	Millions of cubic metres
mmt	Millions of tonnes
mmtpa	Millions of tonnes per annum
Mm tonnes	Millions of tonnes
P&P	Proved and Probable
tcm	Trillion cubic metres

Conversion Factors

<i>Equals</i>			
1	tonne oil	7.3	barrels of oil equivalent
1	tonne condensate	8.0	barrels of oil equivalent
1	bcm gas	6.6	mm barrels of oil equivalent
1	bcm gas	35.3	billion cubic feet of gas
1	bcm gas	0.9	mm tonnes of oil equivalent

Source: BP Statistical Review

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Summary

On June 17th 2011 Chinese President Hu Jintao and Russian Prime Minister Vladimir Putin met at Gazprom's headquarters in Moscow to continue the negotiations on the terms and conditions for the delivery of natural gas from Russia to China.² These discussions marked a further stage in the latest attempts by the two countries to reach agreement on volumes, contractual terms and most importantly gas pricing based on the Framework Agreement signed by Gazprom and CNPC in October 2009. However, although the two sides continued to express optimism about a potential deal,³ in reality the negotiations appear if anything to have re-opened debate about many issues that had supposedly already been agreed. In March 2011 Gazprom and CNPC claimed to have made significant progress "in the agreement on the technical parameters of the pipeline",⁴ with volumes and dates, take-or-pay levels, the period for increasing deliveries and the level of guaranteed payments all apparently confirmed, and the two parties even agreeing that the gas price will be linked to the Japanese Crude Cocktail (JCC). However, by the end of the June meeting sources were being quoted as stating that "the problem is much broader [than just that of price]. Our main task is to forge a long-term agreement on co-operation in the energy sector. Therefore the parties have a big stake not only in defining a formula for calculating the price, but in the problem as a whole, covering the level of gas intake, the price and many other components. We are trying to come to terms on these issues."⁵ It would therefore appear that the negotiations are as mired in difficulty as ever.

However, although the details of volumes and routes are clearly ongoing topics of discussion, the widest area of disagreement does seem to be price. Negotiators for CNPC have apparently made it clear that they are not prepared to pay more than \$250/mcm (\$6.95/mmbtu) at the Chinese border⁶ and would prefer the gas to be delivered via an eastern route to north-east China. Meanwhile Gazprom has made an equally firm statement that it is looking for a price closer to \$350/mcm (\$9.75/mmbtu) and would prefer a western route from West Siberia to Xinjiang province in western China.⁷ Nevertheless, despite this apparently wide disparity in expectations, this paper will argue that price, which has been the ostensible stumbling block since initial energy negotiations began between Russia and

² Reuters, 17 June 2011, "China-Russia gas talks fail to reach agreement", Moscow

³ UPI, 21 June 2011, "China-Russia optimistic about gas deal", Beijing

⁴ Interfax, 16 March 2011 "Gazprom continues talks with China on gas deliveries", Moscow

⁵ Interfax, 17 June 2011, "Russia-China gas talks not failure, to be continued", St Petersburg

⁶ Reuters, 15 June 2011, "China firm on Russia gas price, Hu heads to Gazprom", Moscow

⁷ UPI, 21 June 2011, "China-Russia optimistic about gas deal", Beijing

China in 1992, is in reality being used as a convenient mask for commercial and political concerns on both sides. Lack of clarity in China about future levels of demand and the geography of growing gas consumption, combined with huge uncertainty about the future potential for indigenous gas supplies, especially from unconventional sources, has led to a reluctance to commit to potentially excessive levels of high cost imports from a geopolitically sensitive source. From a Russian perspective, the desire to create competitive tension between Europe and Asia for its gas exports, combined with a complicated strategy towards Central Asian gas, which Russia would prefer to be exported to Asia rather than provide new competition in Europe, has meant that it has also not been desperate to conclude a price negotiation that could have unintended consequences beyond the pure economics of a sales agreement with China. Nevertheless, the rapid growth in Chinese gas demand and the emergence of a multi-vectoral supply strategy in China has meant that the grounds for these concerns have been diminishing over the past five years, and indeed the foundations for a price negotiation have been strengthened by the establishment of benchmark prices from a number of competing gas supply sources for China. These could, by inference, allow Gazprom to generate a reasonable return on export sales and CNPC to establish an additional source of gas supply without paying an excessive premium for diversity. As a result, although the June 2011 talks again failed to produce a concrete result in the ongoing Sino-Russian gas price debate, and hope for a short-term resolution remains remote, commercial and strategic logic continues to point to an agreement on gas exports from Russia (and in particular East Siberia) to China in the next five years.

1. Introduction

Russia is the largest holder of gas reserves and resources in the global energy industry, while China has the world's fastest growing energy economy and is currently attempting to diversify its energy usage away from coal towards more energy efficient and cleaner fuels. Increasing gas usage is part of this planned change in its energy mix, making it a natural customer for gas on its northern border, to compliment its own indigenous supplies as well as the import options it has established from the west (from Central Asia), the south (from Myanmar) and from the east (via LNG). However, despite almost two decades of negotiations no agreement has yet been reached, for a variety of commercial and political reasons. This paper will therefore explore the background and history of the negotiations between the two countries, the logic of a commercial relationship based on piped gas exports and the potential for a solution to be found that suits all parties.

Section 2 outlines a brief history of the negotiations to date and describes the main reasons for the ongoing disagreement between Russia and China over the volume, price and direction of gas exports. Section 3 then examines the Chinese gas supply and demand balance and identifies Russia's potential place in it, highlighting the risks for both parties of an excessively delayed agreement. Section 4 then describes the potential importance of Eastern markets for Russia's energy strategy and highlights government policy in this direction.

Section 5 then identifies the key pricing benchmarks for potential Russian gas sales into China, highlighting the agreements with Turkmenistan and Myanmar and the ongoing purchases of LNG in a rising oil price environment, while also addressing the issue of the regulated gas price environment for indigenous Chinese gas production. Section 6 then attempts to demonstrate that, although there appears to be a significant difference between the Chinese and Russian positions at present, in fact a solution can be found that can satisfy Russia's demand for a price equivalent to its European export sales on a netback basis and China's preference for gas delivered in the east at a price competitive with its other imports. Section 7 then examines the negotiating positions of the Russian and Chinese players and examines why both may be prepared to wait in the belief that their bargaining strength may increase over time, while Section 8 presents conclusions on the potential for an agreement in the short- to medium-term.

2. A History of Discussion, Delay and Disagreement over Price

Russia and China have been discussing the potential for energy links between the two countries since the fall of the Soviet Union in the early 1990s but unfortunately, due to a series of issues, of which price has always been an important one, the two sides have to date failed to realise the full potential of their relationship (Downs, 2010). The first major initiative was in 1992, when Zhang Yongyi, a vice president of CNPC, proposed the export of oil from East Siberia to China and Japan, and this was followed in 1994 by the signing of an MoU between CNPC and Mintopenergo (the Russian Energy Ministry) on the construction of long-distance pipelines to carry oil and gas across the Sino-Russian border (Paik, 2005 (a), p. 4). By this time the Kovykta gas field in Irkutsk had been identified as a potential source of gas supply, and the field operator Sidanco developed plans to export 20-30 bcma to China and Korea. The field's potential was well known to CNPC thanks to its investment, in 1993, in the exploration rights for two neighbouring licences where it drilled two wells in partnership with a number of local companies, demonstrating at an early stage its desire to be an active upstream player in Russia as well as a major customer for exported hydrocarbons.

The next commitment to cross-border energy trade was made in June 1997 when the then Russian Prime Minister Viktor Chernomyrdin visited Beijing. This time the inter-governmental agreement covered the potential export of gas and electricity, and as far as the gas element was concerned it effectively reconfirmed the MoU signed in 1994. It also confirmed gas export volumes of 25 bcma over a 30 year period, and Gazprom CEO Rem Vyakhirev then took the opportunity to underpin the agreement by announcing Gazprom's new Asian initiative at the World Gas Conference in the same year (Paik, 2008, p. 18). This commitment was further endorsed by the signing of a co-operation agreement on the gas sector between CNPC and Gazprom in the same year.

However, the fact that Gazprom did not own a significant gas asset in East Siberia, with the Kovykta field still under the control of Sidanco subsidiary Rusia Petroleum, meant that the source of any Russian gas supply was complicated. As a result, in 1998 Gazprom proposed for the first time a link between West Siberia and western China via the Altai project, with a pipeline running from fields in the Bolshekhetskaya Depression to Xinjiang and then onto Shanghai. At the same time an alternative route via Irkutsk and Mongolia to Beijing was also proposed, but did not yet include development of the Kovykta field. Indeed, over the next decade the anomaly of Gazprom being the state company responsible for gas exports but not

controlling a major asset in the potential supply chain to China would be one of the key elements in the frustration of a final gas agreement between the two countries.

This confusion was reflected in the inter-governmental agreements signed in 1999 between the new Russian Prime Minister, Yevgeny Primakov and Chinese Premier Zhu Rongji, which covered oil exports from the Irkutsk region to Daqing, and gas exports both from Irkutsk and from West Siberia, thus providing state backing for potentially competing Russian gas supply projects (Paik, 2005 (a), p. 5). As a result a dual negotiation process with China then began, with a three-country feasibility study of the Kovykta project, involving Russia, China and South Korea, running in parallel with Gazprom's attempts to promote a western route (Ahn & Jones, 2008). Indeed by the time that the Kovykta study had been completed in the summer of 2003, Gazprom had already signed an MoU in 2002 with PetroChina to join the West-East pipeline project to take gas from Xinjiang to Shanghai in order to provide the infrastructure to boost the hopes of its western Altai project.⁸ However, given Gazprom's status as a state-owned company, the dominant player in the Russian gas sector and the monopoly exporter of Russia's gas to Europe, it was clear that it would have to be involved in all fields with plans to export gas to Asia. (This was officially confirmed in 2006 when Gazprom's monopoly of Russian gas exports was given legal status,⁹ and was confirmed regarding the East in 2007 when the Eastern Gas Programme was endorsed by the Ministry of Energy).¹⁰ This left the partners of Kovykta and their Chinese negotiating partners in an awkward situation, with the result that, even though the Kovykta feasibility study concluded that the project was commercially sound and that the field could potentially deliver 30-35 bcma to China and South Korea, the fact that the most important players (Gazprom and CNPC) were not participants meant that all negotiations for export sales remained a theoretical, rather than a realistic, possibility. Gazprom's opposition to Kovykta then manifested itself in practical terms in 2004, when the company told TNK-BP (which had taken over Sidanco's role as field operator) that it would not support the development of the field without its involvement. Gazprom then reinforced its position by highlighting licence violations at the field which were subsequently investigated by the Ministry of Natural Resources (Stern & Bradshaw, 2008, pp. 242-3), who threatened to withdraw the licence.¹¹

⁸ Data from Gazprom web-site at <http://gazprom.com/about/history/chronicle/2002/>, accessed on April 1st 2011

⁹ Interfax, 16 July 2006, "Legal basis for Gazprom's gas export monopoly is good for state – Khristenko", Moscow

¹⁰ Transcript of Gazprom Press Conference, 17 June 2009, p.1 found at www.gazprom.com

¹¹ Financial Times, 20 September 2006, "TNK-BP gas field development faces suspension", London

As a result of this dispute negotiations between the Kovykta partners and potential Asian customers ceased due to the obvious uncertainty over field ownership. Gazprom, however, continued to pursue its dialogue with China, albeit at a relatively slow rate. In October 2004 it signed a strategic partnership agreement with CNPC in Beijing and started the process of holding regular co-ordinating committee meetings (Paik, 2005 (a), p. 19). By the time of President Putin's visit to the Chinese capital in March 2006 the two companies were ready to sign a protocol on gas supply to China, agreeing that first exports would take place in 2011. Total ultimate volumes were scheduled to reach up to 68 bcma via both a western and an eastern route, although the Russian side continued to have a clear preference for the former.¹² However, by December of the same year it was being reported that the prospects for swift progress were being impeded by significant disagreement over the gas price,¹³ and no real progress was made throughout 2007 as China decided to turn its attention to sourcing gas from Central Asia, and in particular from Turkmenistan.¹⁴ The main difference between the Russian and Chinese negotiators appears to have been that while CNPC was prepared to use European gas prices as a starting point for discussions¹⁵ Gazprom was keen to receive the same margin as on its sales to Europe.¹⁶ Given that Shanghai is more than 3,000 kilometres further than the European border from West Siberia, achieving Gazprom's target effectively implied a price differential of over \$50/mcm at the time.

In June of 2007 a significant milestone appeared to have been reached, however, when Gazprom agreed to buy TNK-BP out of its interest in the Kovykta field for \$700-900 million.¹⁷ This transaction would have removed a key obstacle to the development of the eastern route for Russian gas exports to Asia, but unfortunately the advent of the 2008 economic crisis and the consequent financial constraints faced by Gazprom meant that the deal was not completed in its agreed form. Nevertheless, Gazprom and Russia's focus on its eastern regions was confirmed by the publication of the Eastern Gas Programme in September 2007, which reiterated the company's commitment to developing gas fields in West and East Siberia and in the Russian Far East for domestic use and for export to Asia. The focus of the programme was on LNG exports from Sakhalin, where Gazprom had taken

¹² Interfax, 21 March 2006, "First gas supplies to China may begin in 2011 – Miller", Moscow

¹³ Interfax, 21 Dec 2006, "Russia, China have significant differences on price for Russian gas – Gazprom official", Moscow

¹⁴ Interfax, 12 May 2007, "China-Central Asia cooperation tightens China-Russia gas rivalry – expert", Moscow

¹⁵ Interfax, 12 June 2007, "CNPC would accept gas price Gazprom charges Europe as a starting point – source", Moscow

¹⁶ Interfax, 30 Jan 2008, "Gazprom wants same earnings on gas sales to China as those to Europe", Moscow

¹⁷ Financial Times, March 2011, "Gazprom pays \$770mm for TNK-BP gas field", Moscow

over the operatorship of the Sakhalin 2 project from Shell in 2006, as well as development of the Chayadinskoye field in Sakha for delivery to China via an eastern pipe and the Altai project to take gas from West Siberia to China along a western corridor. Again, the latter remained the preferred pipeline option and the Kovykta field was still not included in export plans.¹⁸

Despite the development of a formal eastern strategy, however, the 2008 crisis led to a reduction in interest in the negotiating process, in particular as lower gas prices in Europe undermined the likely economics of the Altai project. Indeed the project was removed from a draft Gazprom strategy document¹⁹ and CNPC announced that the project had been postponed due to the extremely slow pace of the negotiations.²⁰ However, as the impact of the economic crisis eased during 2009 Gazprom and CNPC re-opened talks, with the result being a framework agreement signed in October that again defined the principle of a two pipeline export plan and outlined the commercial and technical parameters to be used, including an agreement that prices would be linked to the JCC oil price benchmark. As Alexei Miller, Gazprom CEO, announced the agreement he confidently predicted first gas would flow in 2015 because “pricing is the only issue here [to be resolved]”.²¹ Unfortunately pricing has proved to be a more significant issue than anticipated as headlines such as “CNPC, Gazprom yet to agree on gas price”²² and “Talks on Russian gas deliveries to China difficult”²³ testified during 2010. Nevertheless, in September of that year Gazprom and CNPC signed another agreement specifying volumes, dates, take-or-pay levels, the period of increasing deliveries and the level of guaranteed payments, with plans to sign a final export agreement including details on price in mid-2011.²⁴ However, the two sides appeared to continue to differ on their preference for an eastern or western route, with a Chinese delegate quoted as saying “China gets gas along several western pipelines already...while gas shipments via an eastern gas pipeline may solve the problem of gas shortages [in north-eastern China]. However, Russia has assumed a rigorous position and does not want to discuss the issue.”²⁵ Furthermore differences in price expectations appeared to have widened

¹⁸ Gazprom Press Conference, 17 June 2009, “Gazprom in Eastern Russia, Entry into Asia Pacific Markets”, Moscow

¹⁹ Interfax, 2 Feb 2008, “Altai gas pipeline project to China loses appeal – Gazprom strategy”, Moscow

²⁰ Interfax, 10 July 2008, “Altai gas pipeline project delayed over price disagreements – CNPC source”, Moscow

²¹ Interfax, 12 Oct 2009, “Gazprom, CNPC sign frame agreement on gas supply”, Moscow

²² Interfax, 5 March 2010

²³ Interfax, 17 September 2010

²⁴ Interfax, 27 Sept 2011, “Gazprom, CNPC sign expanded terms of gas deliveries to China”, Moscow

²⁵ Interfax, 27 Sept 2011, “Russia, China remain at odds over gas routes”, Moscow

to \$100/mcm, as by October 2010 Russia was reported as proposing a price of \$300/mcm compared to a Chinese proposal of \$200-210/mcm.²⁶

However, despite this difference in negotiating position, active talks continued through the fourth quarter of 2010 and into 2011, including a meeting between Gazprom and CNPC in Moscow in March followed by a high level political gathering in St Petersburg and Moscow in June. Despite the failure of this latter meeting to produce a signed agreement, both sides ostensibly remain keen to continue the talks, with further negotiations to take place during the visit of a delegation from the Russian Energy Ministry to China in September 2011 prior to a possible agreement to be signed by the end of the year.²⁷ Discussions now appear to be focussed on financing issues, with Russian negotiators now requesting a similar \$25 billion credit package to the one provided by China to catalyse oil exports from Russia (see Appendix 1).²⁸ Interestingly too, in light of Gazprom's previous reluctance to prioritise exports from East Siberia, the resolution of the Kovykta ownership issue in Irkutsk now seems to be leading to a new willingness to discuss the eastern pipeline route. The field's previous owner, TNK-BP, had forced Russia Petroleum, its subsidiary responsible for Kovykta, into bankruptcy in 2010, and Gazprom then won the rights to the company in a bankruptcy auction in March 2011, paying \$770 million to buy the company and effectively sealing the deal it had agreed with TNK-BP in 2007.²⁹ Having gained ownership of the field Gazprom is now conducting a review of its sales options,³⁰ and China's negotiators have now apparently won Russian consent for the eastern pipeline route to play a major role in the ongoing negotiations over Russia's export strategy.³¹ Thus, two new potential catalysts for a final agreement have now emerged which can provide the basis for ongoing discussion during the fourth quarter of 2011. However, the price disparity between the two countries remains wide, with Russia reportedly seeking a price of \$350/mcm in July 2011³² and the price gap remaining in the range \$65-100/mcm.³³

²⁶ Interfax, 11 Oct 2010, "Russia, China remain at odds over gas routes", Beijing

²⁷ Interfax, 25 Aug 2011, "Russian Energy Ministry plans talks in China in Sept", Moscow

²⁸ Interfax, 7 July 2011, "Gazprom demands \$25 billion advance from CNPC in 2011", Moscow

²⁹ Financial Times, 1 March 2011, "Gazprom pays \$770mm for TNK-BP gas field", Moscow

³⁰ Interfax, 1 July 2011, "Gazprom to decide on Kovykta supply scheme after local demand analysed", Moscow

³¹ Reuters, 15 June 2011, "China firm on Russia gas price, Hu heads to Gazprom", Moscow

³² Platts, 21 June 2011, "Moscow seeks realistic price of \$350/mcm in China deal", Moscow

³³ Interfax, 20 July 2011, "Gazprom, CNPC to continue gas talks next week", Beijing

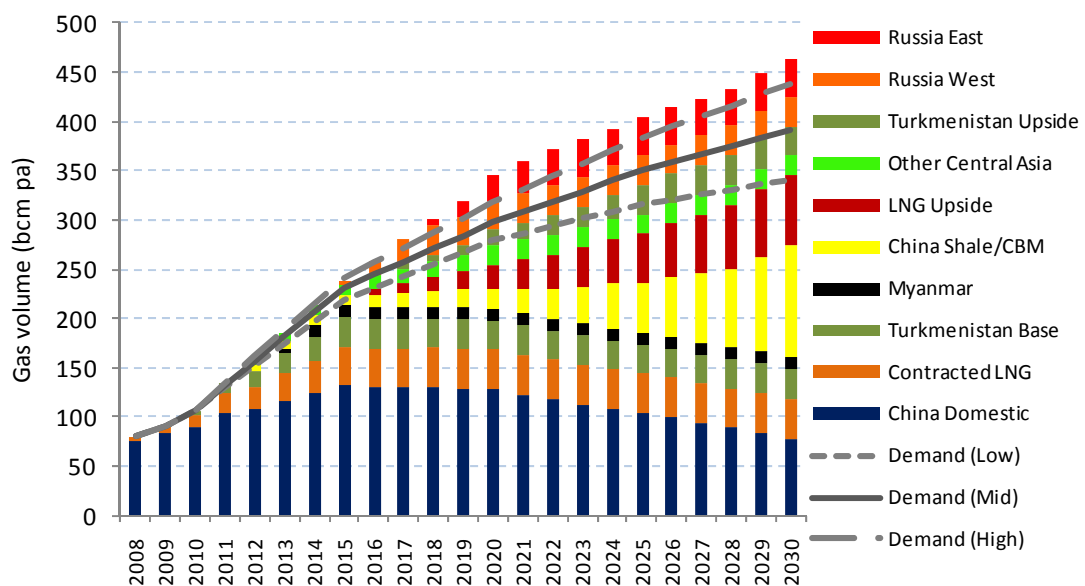
3. Finding Russia's place in the Chinese Gas Supply-Demand Balance

China's Diversified Supply Portfolio

Since becoming a net importer of gas in 2006, China has now put in place the building blocks for a diversified gas import portfolio to meet its rapidly growing demand. From a Russian perspective, this has both positive and negative elements, in as much as Russian gas imports would now be only one part of China's energy supply with a lower implied strategic threat, but nevertheless needing to find their place within the Chinese energy balance before any supply-demand gap is filled. As such, the balance of negotiating power will be driven not only by Russia's demands on price and pipeline route but also by the ongoing availability of China's import and indigenous supply alternatives.

Figure 1 shows three forecasts for China gas demand produced by CNPC in December 2010 (Zhaofang, 2010), and compares these with potential supplies of gas to 2030, including two new pipelines from Russia. Over the next twenty years demand is expected to grow by between 5.6% (in the low case) and 6.4% (in the high case) per annum, with the absolute level rising from approximately 120 bcm in 2010 to between 340-440 bcm by the end of the next decade, an increase of around 220-320 bcm (implying growth of approximately 6% per annum in the mid case).

Figure 1: Forecast of China Gas Supply and Demand



Source: CNPC, Author's estimates

It is clear that China has a potential supply portfolio that could more than meet its mid-case demand outlook, and might even meet high case demand until well into the next decade. As a result, Russia's place as a potential exporter to China would look to be at significant risk, given that its projects are yet to be sanctioned and are therefore towards the back of the supply queue as far as China is concerned. However, the levels of uncertainty surrounding Russia's competing supplies and the commercial logic for the Chinese authorities to build as diverse a supply portfolio as possible mean that there is still scope for Russian gas imports to find a near term place in the Chinese gas balance, if negotiations can be concluded during 2011 or early 2012. It will, however, be vital that agreement is reached prior to key decisions being made about the allocation of capacity in the expanding West-East pipeline in China, as if extra capacity is granted to Central Asian rather than Russian gas then the market for Russian exports into western China could be closed off for some time.

Chinese Indigenous Supply Potential

In addition to the question of available pipeline capacity, a key supply uncertainty that could either strengthen, or dramatically weaken, Russia's bargaining position, surrounds Chinese indigenous gas production. In 2010 China produced just under 97 bcm of conventional natural gas, an increase of more than 3.5 times over the decade since 2000 but not sufficient to meet demand in 2010 of 109 bcm, meaning that net gas imports tripled to over 12 bcm (BP, 2011). However, the fact that China is now a net importer of gas does not mean that its indigenous gas supplies have peaked, with natural gas reserve estimates quoted as high as 56 tcm, of which 22 tcm is proved (Yongfa, 2011), and with ongoing exploration work continuing to add to these numbers.

In addition to these natural gas reserves China is also estimated to have very significant unconventional gas resources. A recent study by the EIA estimated the country's shale gas resource to be as high as 36 tcm in only 2 of 6 possible basins (EIA, 2011, p. 4), while estimates for coal bed methane resources are similarly huge at 36.8 tcm (Yongfa, 2011, p. 3). Much of this reserve and resource base is at an early stage of development, however, and as a result estimates of production potential vary widely. Optimistic assessments for natural gas production from the CNPC Research Institute of Economics and Technology see output rising as high as 150 bcm by 2015, but this contrasts very sharply with an EIA forecast in 2010 which foresaw production of only 77 bcm by 2020 (EIA, 2010b). The range of estimates for unconventional gas production is equally wide, with the uncertainty compounded by the fact that China only conducted its first tender for shale gas licences in

2011.³⁴ More optimistic forecasts suggest unconventional output reaching as much as 200 bcma by 2030 (IEA, 2011, p. 30), while more conservative commentators see figures in the range 80-85 bcm in the same year (EIA, 2010b). The Chinese authorities have now begun to provide incentives to encourage unconventional gas exploration and production, including a special tariff for coal-bed methane,³⁵ and the successful exploitation of this new resource would clearly be a huge boost for a country with rapidly growing energy demand and import requirements. However, the geological, environmental and commercial realities of shale gas and coal-bed methane exploration and production are yet to be fully examined and understood (Xinhua, 2009), with, for example, the vital issue of water availability likely to be a significant concern in a country where water shortages are a frequent problem.

As a result the output figures shown in Figure 1 could be a large over- or under-statement of China's indigenous gas potential, with the range of possible outcomes in 2030 stretching from a low of 160 bcm of combined conventional and unconventional production to a high of up to 250 bcm. What is politically and commercially obvious, though, is that whatever the ultimate outcome for indigenous supply (the graph above estimates production of 195 bcm in 2030) it will be preferred to imported gas unless the cost of its extraction is so high as to make it uneconomic. Therefore potential exporters of gas into China and the Chinese authorities face a negotiating dilemma created by the uncertainty over the indigenous supply situation. China needs to contract enough imported gas to allow its gas market to develop in a low indigenous production scenario without buying so much external gas that high indigenous production would create a gas bubble. Conversely, exporters of gas have the choice to accelerate negotiations and ensure their place in the supply-demand balance, or wait for a possible gas deficit if indigenous output disappoints and charge a higher price for their supplies later.

LNG Imports

The Chinese Administration has already made a number of decisions regarding gas imports, with piped gas from Central Asia and LNG delivered to the east coast of China being the currently established sources. As shown in Figure 1, 13 bcm (9.3mm tonnes) of LNG was imported in 2010, with contracted supplies from Malaysia, Indonesia, Qatar and Australia's North-West Shelf project supplemented by spot cargoes. Current contracts will allow imports of LNG to increase to 40 bcm by 2017, but the potential for further expansion to over 110

³⁴ Financial Times, June 28 2011, "China enters shale gas era with tender offer", Beijing

³⁵ Financial Times, June 27 2011, "China: No need to be unconventional yet", London

bcma by 2020 is demonstrated by the list of current and planned LNG regasification plants shown in Table 1. The initial capacity of plants either in operation or with a firm start date totals almost 60 bcma by as early as 2014, while currently planned expansion projects could increase this figure to over 80 bcma by 2018. Construction of all further planned terminals could allow China to add a further 30 bcma of regasification capacity over the next decade, meaning that there is significant upside from the currently contracted LNG figure. Figure 1 shows a gradual increase in new LNG supplies from 5 bcma in 2016 to 70 bcma in 2030, although in reality the increase could be much more rapid than this depending upon the evolution of gas prices in the Asian and domestic Chinese markets (see below for price discussion).

Table 1: Current and Planned Regasification Terminals in China (bcm)

<i>bcma</i>	Intital	Expansion	Total	Initial Date	Expansion Date	Supplier
Guangdong	9.1	3.1	12.2	2006	2011	Qatar / Australia
Fujian	3.5	3.2	6.7	2009	2012	Indonesia
Shanghai	4.0	4.0	8.1	2009	2012	Malaysia
Dalian	4.0	4.0	8.1	2011	2015	Qatar / Australia
Rudong	4.7	8.7	13.3	2011	2014	Qatar
Shenzhen	4.0	4.0	8.1	2013	na	Australia
Zhejiang	4.0	8.1	12.1	2012	na	na
Zhuhai	4.7	11.4	16.0	2013	na	na
Qingdao	4.0	4.0	8.1	2013	na	Australia
Hainan	2.7	1.3	4.0	2014	2018	na
Tangshan	4.7	4.0	8.7	2013	na	Qatar / Australia
Beihai	4.0	0.0	4.0	na	na	na
Jiangsu	4.0	0.0	4.0	na	na	na
Total	57.4	55.9	113.4			

Source: EIA³⁶, A. Flower

Pipeline Imports from Central Asia

Imports via pipeline from Central Asia began in December 2009 when the first gas flowed from Turkmenistan via the 1,833km Central Asia – China pipe that crosses Uzbekistan and Kazakhstan to end in China’s western province of Xinjiang. The link was first discussed in 2006 at a time when both Turkmenistan and China were becoming increasingly frustrated in their negotiations with Russia concerning gas export and import prices respectively, and has now allowed both countries to establish a level of commercial diversity that has undoubtedly

³⁶ EIA China Country Analysis Brief, May 2011

weakened Russia's bargaining position. The capacity of the pipeline reached 15 bcma by the end of 2010, and is planned to achieve its initial total of 30 bcma by the end of 2011, when all eight compressor stations on both the A and B pipes will have been installed (Petromin Pipeliner, 2011). China and Turkmenistan initially signed a Sales and Purchase Agreement (SPA) for 30 bcma from 2010, but subsequently raised the volume to 40 bcma with the potential to increase it further to 60 bcma if the upstream capacity is available.³⁷ The commitment to these higher volumes is demonstrated by the pipeline construction plans that have subsequently also been confirmed, with the building of a second leg of the main export pipe being agreed in June 2010 to take capacity to 40 bcma.³⁸ A third leg is now also planned to be finished by 2013 and will increase capacity by a further 25 bcma (with this extra gas currently planned to come from both Turkmenistan and Uzbekistan).³⁹

Availability of sufficient gas output in Turkmenistan continues to be a key uncertainty largely due to the ongoing lack of transparency surrounding the country's upstream resource potential (Pirani, 2009, p. 301), and this currently provides the Russian negotiators with a certain amount of leverage focused on the security of China's gas imports. However, the supply risk of Central Asian gas to China does now seem to be reducing thanks to increased investment by the Chinese authorities in the Turkmen upstream industry and also due to new commitments on gas supply from Uzbekistan and Kazakhstan. Initial gas from Turkmenistan is being sourced from the Bagtiyarlyk block, with peak output of 13 bcma due to be achieved by 2013/14. Importantly, in terms of gas negotiations, Chinese company PetroChina has a direct interest in the block via a PSC that it has agreed with Turkmengaz, meaning that it can be more flexible on gas price terms for imports to China as it has an interest in the revenues being generated.

Further gas will then come from the 24 tcm South Yolotan field which Turkmengaz is currently developing with the help of a \$4 billion loan from the China Development Bank, and although concerns have been raised about the pace of field development, a \$4.1 billion loan from China in 2011 is aimed at accelerating first gas towards a start date of late 2013.⁴⁰ Ultimate output capacity is expected to reach 30 bcma, with the majority being exported to China,⁴¹ which will allow Turkmenistan to reach its 40 bcma export target by 2015⁴². Further

³⁷ Reuters, 2 March 2011, "China, Turkmenistan agree on new natural gas supply", Beijing

³⁸ Bloomberg, 4 March 2011, "China turns to Turkmenistan for gas amid Gazprom talks", Singapore

³⁹ Interfax, 16 June 2011, "Construction of third line of Turkmenistan-China gas pipeline to be finished by 2013", Astana

⁴⁰ Bloomberg, 26 May 2011, "Turkmenistan says Yoloten gas field is world's second largest", London

⁴¹ Interfax, 21 April 2011, "China to lend Turkmenistan further \$4.1bn for South Yolotan gas project", Moscow

expansion towards the 60 bcma export target could then be supported by new upstream developments which at this point remain a subject of speculation, but the Turkmen authorities have recently restated their confidence that the current portfolio includes “160 discovered fields, 50 of which are under development”,⁴³ and in reality the staged development should be sufficient to meet a higher export goal.

As mentioned above, plans have also been made to source gas from Uzbekistan and Kazakhstan to be transported into China via the ongoing expansion of the Central Asia – China pipeline, which runs through both countries. Uzbekistan is in fact the largest gas producer in the Central Asia region at present, having produced 59 bcm in 2010 (BP, 2011), but the majority of the country’s current production is consumed internally (46 bcm in 2010) leaving only 13 bcm for export to Russia and neighbouring Central Asian countries. However, in June 2010 Uzbekneftegaz signed a framework agreement with CNPC to export up to 10 bcma to China,⁴⁴ while in October of the same year LUKoil signed a strategic co-operation agreement with CNPC to supply a further 10 bcma of gas from its Uzbek assets to China by 2014.⁴⁵ Doubts have been cast as to whether Uzbekistan will ultimately be able to provide this level of exports given its possible domestic demand requirements (IEA, 2010) and it is also unclear when the Uzbek pipeline system or the Central Asia-China pipeline will be ready to take an additional 20 bcma of exports from Uzbekistan. Nevertheless it appears that the Uzbek authorities are keen to expand the country’s hydrocarbon export revenues⁴⁶ and as such may well be able to offer further long-term potential supply diversity to China over the next two decades.⁴⁷

China’s deep involvement in the Kazakh energy sector provides another potential avenue for Central Asian gas exports to the East.⁴⁸ CNPC is already active in 30 oil and gas licences in the country, including being operator of the 150 bcm Zhanazhol field which has the potential to produce up to 8 bcma at peak output (Petromin Pipeliner, 2011, p. 8). The key to unlocking the country’s export possibilities will be the completion of a west-to-east gas interconnector pipeline that will allow gas from Zhanazhol and other fields in the west of the country to be

⁴² Interfax, 19 June 2010, “Ashgabat, Beijing agree on building 2nd leg of Turkmenistan-China pipeline”, Beijing

⁴³ Bloomberg, 4 March 2011, “China turns to Turkmenistan for gas amid Gazprom talks”, Singapore

⁴⁴ Interfax, 21 April 2011, Uzbekistan, China ink agreement on 3rd line of Turkmenistan-China gas pipeline”, Moscow

⁴⁵ Interfax, 13 Oct 2010, “LUKoil could supply 10bcm gas from Uzbekistan to China – Alekperov”, Moscow

⁴⁶ Financial Times, 22 April 2011, “China-Uzbekistan: Gas Diplomacy”, Moscow

⁴⁷ Jamestown Foundation China Brief, 14 Jan 2011, “Uzbekistan’s growing role in Beijing’s Central Asian Strategy”, Washington

⁴⁸ Eurasia Daily Monitor, Volume 7, Issue 3, 6 Jan 2010, “China tightens grip on Kazakh gas”, Washington

supplied not only to the industrial regions of Kazakhstan but also into the Central Asia-China pipeline. A joint venture between KazTransGaz and Chinese company Trans Asia Gas Pipeline began construction of this new infrastructure, which will stretch from Beyneu on the Caspian coast to Shymkent close to the Chinese border, in December 2010, backed by \$0.5 billion of equity and \$3 billion of debt from the Chinese partner.⁴⁹ Completion is expected in 2012/13, at which point a further 10-15 bcma of gas could be available for domestic Kazakh consumption and for potential export to the Chinese market.⁵⁰ This latter prospect will depend on Kazakh domestic needs and on the continued growth of Kazakh gas production, but the intention of both the Kazakh and Chinese authorities does appear to be to grow the gas export/import business.⁵¹

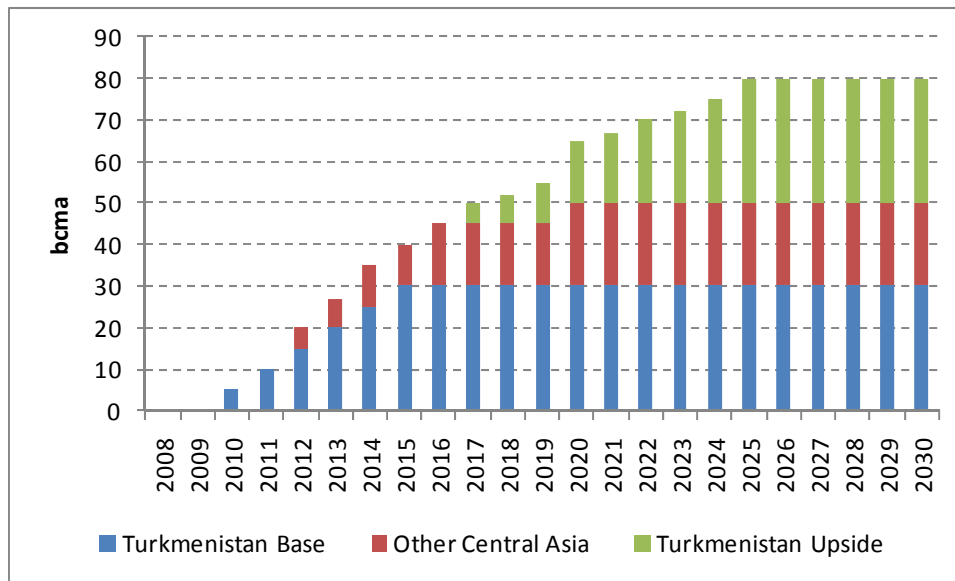
Overall, gas exports from Central Asia to China could reach almost 100 bcma over the next two decades – 60 bcma from Turkmenistan, 20 bcma from Uzbekistan and 10-15 bcma from Kazakhstan. Although the actual figure will depend upon the building and expansion of key pipeline infrastructure, as well as on the development of appropriate upstream assets, the potential for dramatic expansion of gas supplies from Central Asia is a clear threat to Russia's aspirations in China. In Figure 2 we have assumed a base export figure of 30 bcma from Turkmenistan by 2015, supplemented by 20 bcma of Uzbek and Kazakh gas by 2020 and an extra 30 bcma of Turkmen gas by 2025, giving total Central Asian exports to China of 80 bcma by the middle of the next decade. While this is clearly a significant increase from currently contracted levels, it is well below the region's potential output and may also be conservative in terms of timescale, given the rapid growth in Chinese gas demand and import requirement.

⁴⁹ Interfax, 21 Dec 2010, "Kazakh-Chinese JV starts building \$4bn gas pipeline", Shymkent

⁵⁰ Eurasia Daily Monitor, Volume 6, Issue 320, 15 Dec 2009, "Three Central Asian countries inaugurate gas export pipeline to China", Washington

⁵¹ China Daily, 20 June 2010, "China, Kazakhstan sign new gas pipeline deal", Beijing

Figure 2: Potential Central Asian Gas Exports to China



Source: Author's estimates

Piped Gas from Myanmar

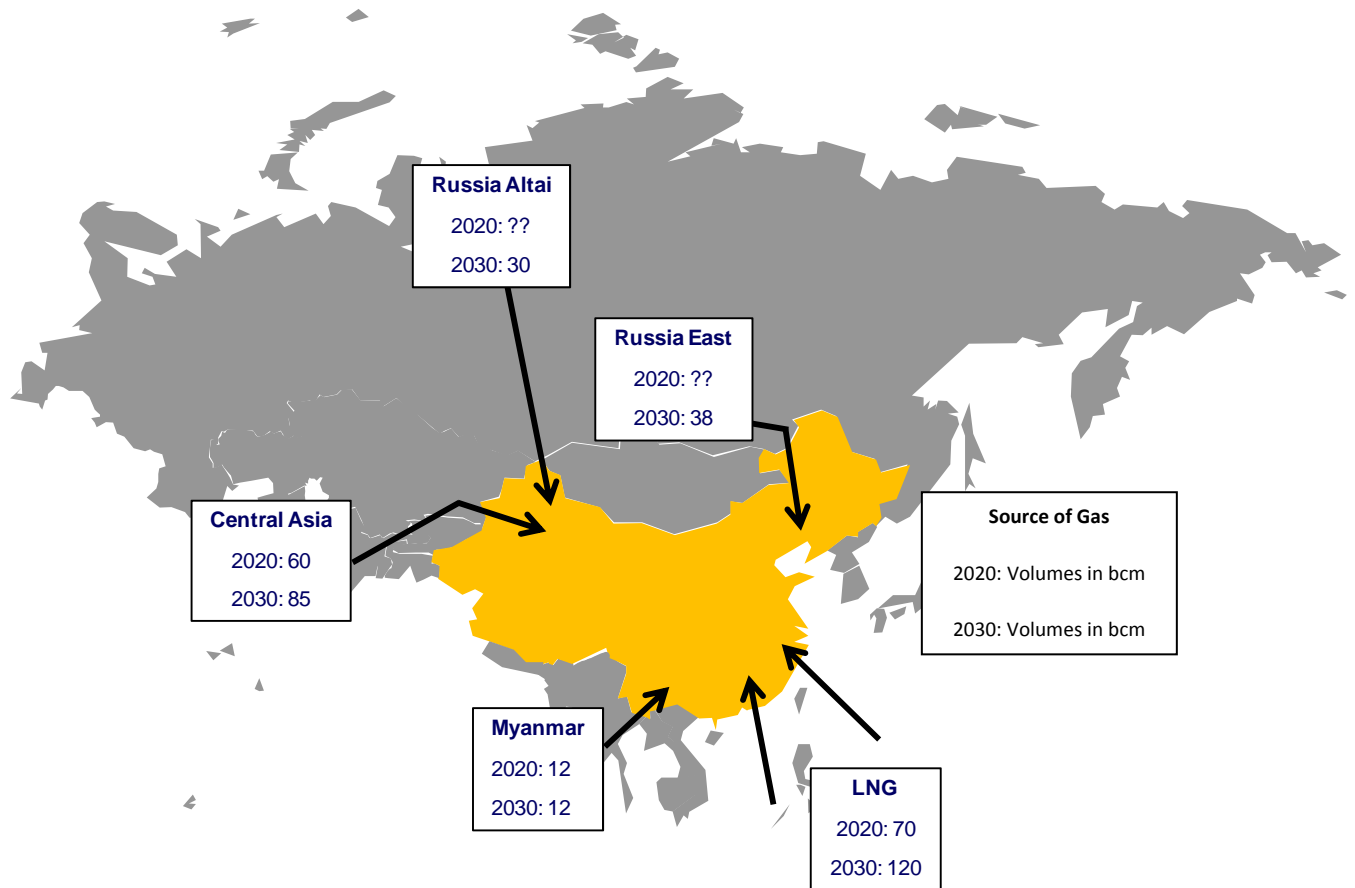
Supply diversity for China is also being established in the south via a connection to the gas resources located offshore Myanmar. Construction of a 12 bcma capacity pipeline began in June 2010, with the route running from the port of Kyaukpyu, on Myanmar's west coast, 900 kilometres to the Chinese border at Kunming and then a further 1,700 kilometres to the Guangxi region in southern China.⁵² The gas pipeline is being built in tandem with an oil line that will have the capacity to carry 440 kbpd of crude oil into southern China and thus avoiding transit through the increasingly crowded Straits of Malacca. As a result, both pipelines have the same strategic goal of increasing China's security of energy supply, with the oil pipeline significantly shortening the journey time for Middle East crude to China and the gas pipeline providing another element of diversification for the Chinese gas market. The gas is due to be sourced from the A-1 and A-3 developments in the Bay of Bengal, offshore Myanmar, and first gas is expected to flow in 2013,⁵³ with CNPC having signed an MoU for a 20-30 year supply contract with the Daewoo consortium developing the fields to purchase an initial 5 bcma rising to 12 bcma at peak output (Petromin Pipeliner, 2011, p. 10).

⁵² China Daily, 4 June 2010, "China starts building oil, gas pipelines to Myanmar", Xinhua

⁵³ Reuters, 3 Feb 2010, "Factbox: Pipelines from Myanmar to China", sourced from Reuters.com on 8 March 2011

Conclusions on China's Gas Supply Options

Map 1: Chinese Gas Import Options (volume estimates in bcm)



Source: Author's estimates

As shown in Map 1, China is therefore well advanced in the creation of gas import options from West, East and South, and by 2030 could be buying a combined total of almost 220 bcma from Central Asia, Myanmar and various sources of LNG. In this sense the last remaining point of the compass is North, and Russia is clearly the source of a further potential 30-70 bcma of piped gas plus additional LNG supplies from Sakhalin Island. While the latter is already underway, albeit with China as only one of many potential markets in the Pacific Rim, gas via Russia's two possible pipeline routes is clearly now in competition with a much greater variety of piped and LNG competition than might have seemed imaginable when negotiations on gas exports began in earnest a decade ago.

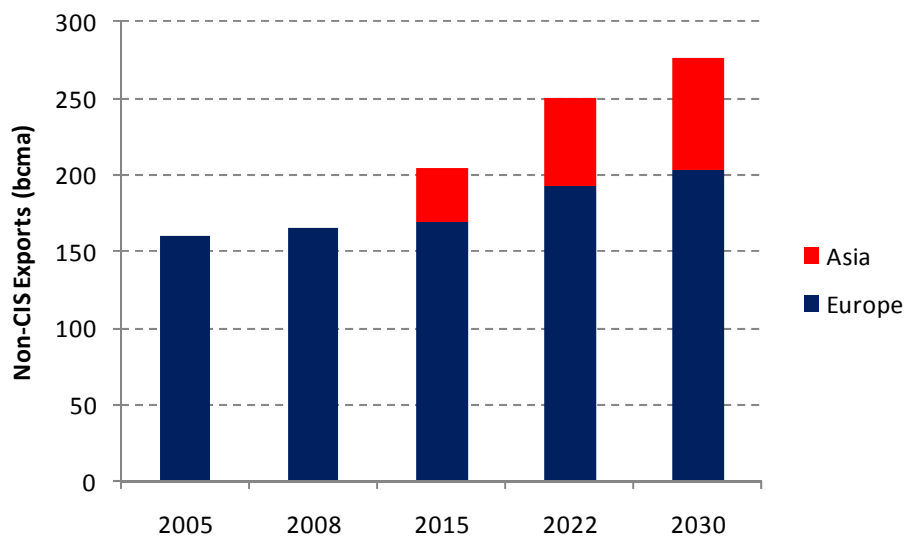
4. Eastern Gas Markets from a Russian Perspective

However, this new diversity of supply options for China is both good and bad news for Russia. On the positive side, Russian gas supplies are now less likely to be viewed as a potential strategic threat, as China will clearly not be overly dependent on its northern neighbour for gas imports. Indeed, China may even be keen to avoid becoming excessively reliant on Central Asian gas, given the uncertainty of the politics of the region, and therefore could welcome Russian imports as a further source of diversification. Russian imports can also provide some security in the face of the uncertainty surrounding China's own indigenous resources, although if the full potential of China's unconventional resources can be exploited then the impact on all gas import suppliers will be significantly negative. Furthermore, Figure 1 clearly demonstrates that Russia is now in competition with a number of projects that are currently making progress, while its own negotiations have yet to reach any concrete conclusion. Further extensive delay or uncertainty about pipeline routes could lead to Russia missing a major opportunity to access one of the world's fastest growing gas markets and could potentially undermine its chances to establish itself as a core gas exporter to eastern as well as western markets.

Such a delay could be particularly damaging for Gazprom at a time when its west-facing business is under increasing competition both in the export and domestic markets. Although gas prices in Europe have recovered since the 2008/09 crisis, the impact of the price collapse then and the consequent focus on potential change in the structure of export contracts to include a greater spot gas element has led to a strategic re-assessment of Russia's west-facing supply options (Henderson, 2010). Gazprom's existing core West Siberian fields are in decline and its remote new fields are more expensive than the alternative supplies that could be provided by non-Gazprom players, which are now accounting for a rising share of Russian gas output (22% in 2010). Gazprom is also facing the threat of increased competition from alternative supplies into Europe, with the further prospect that the entire basis of the pricing mechanism for its long-term contracts could be called into question in an increasingly competitive market (Stern & Rogers, 2011). Although, as Stern and Rogers point out, this need not necessarily be negative for long-term export prices to Europe, the opportunity to expand export sales in an easterly direction can provide important risk diversification for Gazprom. In addition, Gazprom has much more control over Russia's gas assets in the East thanks to the preferential access to licences it has been granted due to its status as a state-controlled company. Potential production there is also vital to the company's growth

prospects as well as being a key part of Russia’s strategic goal to expand its role in Asia and to support the development of the East Siberian economy. This is emphasized by the latest Russian Energy Strategy to 2030, which outlines not only a target for non-CIS export sales which would see Asia account for more than a quarter by 2030 (Figure 3) but also implies that the bulk of Gazprom’s production growth is likely to come from its eastern, rather than its western, resources (Figure 4).

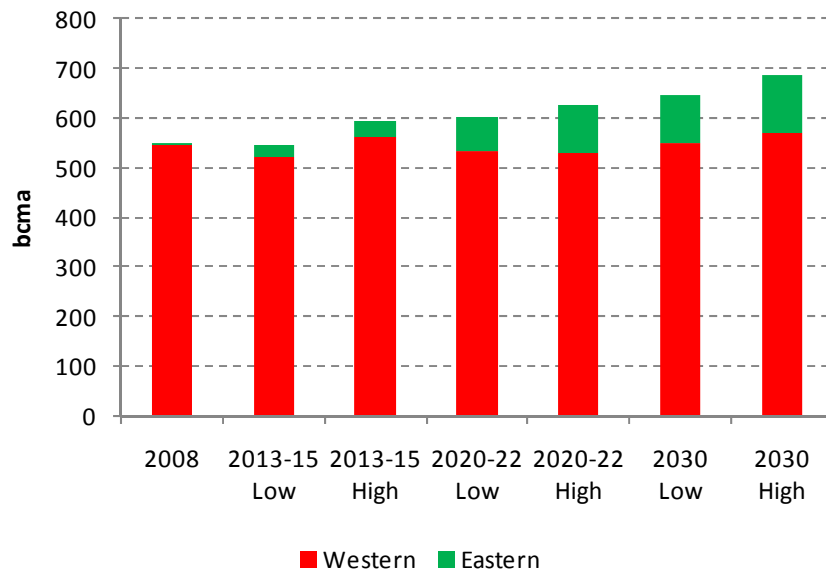
Figure 3: Forecast Gas Exports from Russia to Non-CIS Markets



Source: Russian Energy Strategy to 2030

Therefore, it would appear that the key parties in the Sino-Russian gas negotiation should be motivated to reach an agreement in the short-term to satisfy both the needs of Chinese consumers for a further source of gas supply and the desire of the Russian Administration and Gazprom to diversify their sales portfolio towards Asia. As a result, in 2011 the use of price as an excuse to mask broader reasons for delay in the agreement of a firm contract is less likely to have validity as a strong negotiating tactic, especially as the diversity of current supply options mentioned above has begun to provide a more definitive pricing benchmark for Russian gas imports.

Figure 4: Estimate of Gazprom Production Profile to 2030



Source: Author's estimates derived from Russian Energy Strategy to 2030

5. The Negotiation over Gas Price : Clear signals are now being given by the market

Although a number of issues have undermined gas price negotiations between Russia and China over the past decade, one of the key issues has been a failure to date to establish a pricing principle to act as a foundation for any debate. Throughout the period of genuine discussions since 2003 Russia has based its strategy on linking any price from China with the prices that it receives from its European customers, but it has been unclear whether its intention has been to receive a competitive price in actual terms or a competitive netback price taking into account relative differences in variables such as transport distances. At times it has appeared that Gazprom is looking for equivalence in profitability (i.e. netback parity),⁵⁴ although an objective of direct price competition has also been mooted as when, for example, Gazprom Deputy CEO Alexander Ananikov suggested that gas from the Kovykta field will be sold to “those who pay best”.⁵⁵ As Chinese negotiators have pointed out, a gas price for China based on prices in Gazprom’s European export contracts is perhaps unrealistic, given the shorter distance to the Chinese border, meaning that a netback parity price would be a better starting point for a negotiation, but a further historical complication has also been created by the issue of competing fuels used in any price escalation formula.

⁵⁴ Reuters, 16 June 2011, “No agreement in China-Russia gas talks as Hu visits”, Beijing

⁵⁵ Interfax, 21 June 2011, “Europe and China to vie for Kovykta gas – Gazprom, Moscow

As Gazprom's export gas price to Europe is heavily geared to the oil price, this stance has left the negotiations subject to the whims of the global oil market, meaning that at times of low oil prices China has been ready to negotiate while Russia has been reluctant, while at times of high oil prices the reverse has been true (Downs, 2010, p. 154). This issue was initially exacerbated by the fact that China's opening position on gas prices was based on the price of the main competing fuel in its domestic energy market, namely coal. In the early 2000s, for example, the cost of coal was around \$2/mmbtu (equivalent to approximately \$75/mcm) (Ahn & Jones, 2008, p. 128), and although China was prepared to pay a premium to this by offering Russia around \$100/mcm for gas, the price of oil-linked European gas exports from Russia was at that time already above \$120/mcm.⁵⁶ By 2007 the price which CNPC was prepared to offer Gazprom had risen to \$5.28/mmbtu (approx. \$195/mcm), but by mid-2008 the price that Gazprom was receiving in Europe in a \$140 oil price world had reached \$13-14/mmbtu (almost \$500/mcm), leaving the two parties as far apart as ever (Downs, 2010, p. 156).

The \$300/mcm discrepancy between Gazprom and CNPC price proposals seen in 2007/08 had been reduced to only \$100/mcm by the end of 2010,⁵⁷ reflecting the fact that China has now accepted that there must be some link to oil prices and also some relation to the price that Gazprom is receiving for its gas in Europe.⁵⁸ The key question, though, is how that link should be established. CNPC is seemingly aware that Gazprom and Russia have a number of goals in mind as they seek to enter the Chinese gas market. One is clearly to demonstrate to Gazprom's European customers that Russia has an alternative customer base in the East to which it can divert gas originally intended for Europe if the terms of trade in the West become unattractive. Ideally for Russia, Gazprom would establish a direct link between the two markets via its West Siberian resource base (the strategic concept behind the western Altai pipeline route), thus allowing it to argue for price competition between Europe and Asia. However, even if this were not physically possible, Russia is clearly keen to demonstrate that it may soon no longer be reliant on one major export market and that it will prioritise its investments on a commercial basis. This argument may or may not be justifiable, given the increasing competitive pressure Gazprom is experiencing in Europe, but it would certainly appear to be an argument that Russia is pushing strongly and which China is trying to resist.

⁵⁶ Gazprom's Management Discussion and Analysis of Financial Condition and Results of Operations (2003), p.4

⁵⁷ Interfax Russia & CIS Oil and Gas News, 11 Oct 2010, "Russia, China remain at odds over gas routes"

⁵⁸ Eurasia Daily Monitor, 28 Oct 2009, "Russia and China clinch gas supply deal", Washington

A second and more double-sided objective concerns the direction of gas exports from Central Asia and Russia's influence in that region. On the one hand it would appear that Russia is keen to provide some competitive pressure for Central Asian gas entering China at its western border. Having effectively lost the significant influence it enjoyed over Central Asian energy exports that it enjoyed in the 1990s and the early 2000s, Russia now seems to be keen to limit Chinese influence and Central Asian supply options where possible.⁵⁹ An obvious option is to try to supply gas into the same hub in western China where Central Asian gas is received, and potentially even to fill capacity in the West-East pipeline that had been intended for expanding Turkmen supplies.⁶⁰ Conversely though, and perhaps even more importantly, Russia is also keen to avoid Central Asian gas being sent to Europe via new transport routes such as Nabucco, and one way of facilitating this is to encourage exports to go east rather than west. As a number of commentators have noted "Russia would prefer to see Central Asian gas going to China rather than to Europe where it would erode its share of export markets"⁶¹ and the recent export agreements clearly "deal a blow to the European Union's plans to win Turkmen supplies for the Nabucco pipeline".⁶² Therefore the Sino-Russian gas negotiations are further complicated by the fact that, in the short term at least, Russia may not be too concerned if it loses out to Central Asian imports into China while still retaining longer term ambitions for its own access to the Chinese market for itself. This possible willingness to "give up" the Chinese market to Turkmen gas in particular may be reinforced by the fact that since 2008 Russia itself has not had any need for Turkmen gas, given that it is now priced at European netback levels. As a result Russia has lost one means of keeping Turkmen gas out of Europe (namely by buying it itself) and may therefore be prepared to forego competition over the Chinese market as an indirect means of influencing gas export policy in Ashgabat.

Nevertheless, a third more definite goal for Russia is to exploit its undeveloped east-facing resource base for the highest possible margin in order to bolster the eastern Russian regional economy and provide a boost to the country's balance of payments by taking advantage of the rapidly expanding energy demand in China's fast-growing economy. The exact timing of this objective will clearly need to be balanced with Russia's other geo-political and strategic

⁵⁹ Jamestown Foundation, 18 Dec 2009, "Strategic Implications of the Central Asia – China gas pipeline", Washington

⁶⁰ Eurasia Daily Monitor, 4 Feb 2010, "The Strategic Implications of the Turkmenistan-China Pipeline Project", Washington

⁶¹ Financial Times, 14 Dec 2009, "Pipeline brings Asian gas to China", Moscow

⁶² Ibid

goals, but the Russian Energy Strategy makes it very clear that over the next two decades the development of East Siberia is a high priority, and state-controlled companies such as Rosneft and Gazprom are tasked with achieving this, funded by future exports to Asian markets. As such, Chinese negotiators clearly understand that they control the key market that will underpin the attainment of this fundamental Russian objective.

Given these three goals a price solution clearly needs to be found that allows Russia to achieve some of its objectives without undermining China's commercial and geo-political position. China is already facing a cost dilemma because the price of its imported gas from all sources is significantly higher than the price being paid for indigenous gas supply, meaning that importers (i.e. CNPC) are effectively subsidising the use of imported gas for industrial, commercial and residential users (Higashi, 2009, p. 28). As a result it is keen to limit the price of imported gas where possible and/or to take a stake in the upstream projects where its imports are sourced in order to share in any revenue streams to offset its downstream costs. As this is currently the case in Turkmenistan and Kazakhstan, and could also potentially occur in Uzbekistan, China is therefore reluctant to see Central Asian gas displaced on its western border, hence its preference for the "Eastern Route" for Russian gas from the Irkutsk region.⁶³ It is also reluctant to pay what it would regard as an uncompetitive gas price based on Gazprom's European prices in order to secure an alternative source of gas imports, preferring to base any price negotiations on a more cost-plus basis for delivery to the Chinese border.⁶⁴ On the other hand, it needs to accept that Russia has to be able to justify the multi-billion dollar investment in upstream and pipeline projects that will be required to develop the necessary infrastructure in a remote region with difficult geological and geographical conditions. Further Russia will also want the opportunity to access international, rather than accept heavily regulated domestic, prices.

The lengthy negotiations between Russia and China to date and the failure to reach a definitive agreement again in St. Petersburg in June 2011 demonstrate the difficult balancing act that needs to be achieved, although discussions are at least now taking place against the background of the competitively priced portfolio of gas supply that China has acquired to date. As Map 1 above demonstrates, Russian supplies would complete a N-S-E-W compass of diversity for China, with the prices of at least two of the other points of the compass providing sound benchmarks for a Russian import price. Furthermore, as will be argued in

⁶³ Interfax Russia & CIS Oil and Gas Report, 11 Oct 2010, "Gas sector development plans see production up 50% through 2030", Moscow

⁶⁴ Interfax Russia & CIS Oil and Gas Report, 11 Oct 2010, , "Russia, China remain at odds over gas routes"

more detail below, these prices also provide Russia with the opportunity to generate an equivalent netback to its sales in Europe, although not necessarily from the source which is its current priority.

Comparative Gas Prices for China

As much as Gazprom may seek to link the price of gas exports to China to an equivalent European export price, it also must anticipate the reaction of Chinese buyers who can source gas both domestically and from three other sources of imports. In addition, any gas imported into western or north-eastern China needs to be transported a considerable distance (up to 4,000 kilometres in the case of the western link) to main demand centres on the east coast of China. Therefore it is important to try and understand the relative price competition that already exists in the Chinese gas market and to compare this with Russia's price expectations. As will be shown below, it would appear that the gap need not be that large.

Chinese Domestic Gas Prices

Natural gas prices in China remain under the control of the government, being regulated by the NDRC (National Development and Reform Commission). While China was self-sufficient in gas, prices were set on a cost-plus basis comprising three elements: an upstream, or ex-plant, price; a transport tariff; and an end-user price to include the costs of local distribution companies (although in the following analysis the third element is ignored as I consider only prices at the city-gate). Prices are also set by end-user category, with the main components being the fertilizer, industrial, residential and power sectors (Higashi, 2009, p. 24). For simplicity I consider only industrial prices in the analysis below. One further nuance is that customers have flexibility to negotiate specific prices within a 10% range of the regulated price, depending on customer and producer requirements.

Until 2007, average ex-plant prices for the industrial sector did not rise above \$3/mmbtu (approx. \$110/mcm), but the introduction of imported gas for the first time in the form of LNG in 2006 changed the pricing landscape dramatically, with the price of imports peaking at over \$21/mmbtu (\$750/mcm) for spot LNG in 2008. In response to the huge discrepancy in indigenous and imported gas prices the NDRC increased ex-plant prices by 50% in November 2007, and then followed with a further 25% price rise in June 2010.⁶⁵ As a result, the current wellhead price of gas to industrial users in Shanghai from fields at the western end of the West-East pipeline is \$180/mcm (\$5/mmbtu) (Tsoi, 2010).

⁶⁵ Reuters, 1 June 2010, "China's gas price hike a small step towards reform", Beijing

To this wellhead price must be added the cost of transportation through the West-East pipeline to the Shanghai city-gate, which in 2009 was \$3.16/mmbtu (equivalent to approximately \$113/mcm) for the first West-East pipeline (WEP I) (Higashi, 2009, p. 26), but which has subsequently risen to \$4.3/mmbtu (\$154/mcm) for the second West-East pipeline (WEP II) (Petromin Pipeliner, 2011, p. 8). Using the higher WEP II tariff this gives a city-gate price in Shanghai of \$338/mcm, the same level that Gazprom received for its exports to Europe in 2010.⁶⁶ However, as will be discussed in more detail below, this clearly implies a much lower price at the border of Russia and western China due to the 4,400 kilometre pipeline distance, with the transportation cost carried by the Chinese gas purchasers.

Another key issue concerning indigenous gas prices is their low relative level compared to existing imported gas. At the \$105 per barrel oil price prevalent in August 2011, for example, spot cargoes of LNG arriving in Shanghai would be priced at approximately \$575/mcm (\$16.3/mmbtu), implying that domestic customers would be paying over \$200/mcm less for their gas than the import price, a cost that must be borne by the importing companies. Oil prices of course vary over time, and other factors such as the Fukushima disaster also play a significant role in LNG pricing, but the key point is that unless indigenous gas prices rise substantially over time they are likely to stay at a discount to the cost of imported gas. It is anticipated that this subsidy will gradually be removed over time, with indigenous well-head price increases of 10% per annum expected over the next five years.⁶⁷ On this basis the factory gate price of indigenous gas in Shanghai in 2015/16 could have reached \$450/mcm (assuming a further 5% p.a. increase in transport costs), still below the spot LNG price at a \$105 per barrel oil price but providing a much higher benchmark price for potential imports of pipeline gas under long-term contracts.

The Turkmen Price Benchmark

The clear comparison for Russian piped imports is gas from Turkmenistan, which arrives at a Chinese border point close to Russia's proposed western pipeline route and is already being transported through the West-East pipeline that would carry future Russian gas supplies through China. The relevant price details of CNPC's gas supply agreement with Turkmenistan were announced in January 2008 when, in answer to a question at an industry

⁶⁶ Interfax Russia and CIS Oil & Gas Report, 11 Feb 2011, "Export price for Europe could be \$352/mc in 2011 compared to \$306/mcm in 2010", Moscow

⁶⁷ Platts, 8 Dec 2010, "China wellhead gas prices seen rising 10%/year for next 5 years – analyst", Singapore

seminar, Hou Chuangye, a vice general manager in CNPC's gas division announced that the company would be paying \$195/mcm for Turkmen gas.⁶⁸ He also apparently added that China would be paying a further \$50/mcm in transit fees, implying that the \$195/mcm price was at the Turkmen border and that the price at the Chinese border would therefore be \$245/mcm. However, there is still some confusion as to whether this is a correct assumption, with other authors (for example Higashi, 2009, p. 21) suggesting that the price of \$195/mcm is at the Chinese border, implying a \$145/mcm Turkmen border price (see also Pirani, 2009, p.297). This lower suggestion is given some credence by the fact that Turkmenistan had just agreed a price of \$150/mcm at the Turkmen border for gas sold to Russia, but it would also not be surprising if CNPC decided to pay the higher premium price in order to compete as a first-time buyer of Central Asian gas, with the higher level being further mitigated by its involvement in the upstream business in Turkmenistan. As a result I have shown both potential Turkmen benchmark prices in the analysis below, using Turkmen Low and Turkmen High scenarios.

The Turkmen export price is also believed to be linked to oil prices,⁶⁹ which were approximately \$90 per barrel in January 2008 when the contract terms were agreed.⁷⁰ As such the Turkmen High benchmark import price at the Chinese border at a \$90 oil price would be \$245/mcm, while at \$100 this would rise to \$267/mcm. After transportation through the West-East pipeline this would equate to a city-gate price in Shanghai of \$422/mcm. The Turkmen Low scenario produces a Chinese border price of approximately \$200/mcm and a city-gate price in Shanghai of \$365/mcm. However, although these prices provide a clear benchmark range for the price which China may be prepared to pay for Russian gas, it is also pertinent to note that PetroChina, the gas importer, is losing money on every mcm purchased from Turkmenistan. The company's CFO Zhou Mingchun was quoted in March 2011 as stating that the company had lost 3.7 billion yuan marketing 4.3 bcm of imported gas in 2010, suggesting that the company was making a loss of \$130 for every mcm of imported gas sold. Some of this loss is due to high transport costs driven by the current low utilisation of the import pipelines from Turkmenistan, which will be mitigated over time, but it is also caused by the low regulated price and the unwillingness of Chinese consumers to pay higher prices. It is therefore also clear that, although the Turkmen import price provides an obvious

⁶⁸ IHS Global Insight, 22 Jan 2008, "Revelation of Turkmen Gas Export Price to China Will Reverberate in Russia, Iran, Central Asia", Moscow

⁶⁹ Hydrocarbon Asia, Jan-Mar 2010, "How much Turkmen gas in Middle East and Asian markets?" Singapore

⁷⁰ Gazprom Management Report for Fully Year 2008, page 79, shows a Urals Blend oil price for January 2008 of \$89.37 per barrel and a Brent oil price of \$92.02 per barrel

benchmark for Russian gas imports there is also a very obvious incentive for PetroChina to do its best to reduce the base price and the oil linkage if at all possible, while also encouraging the Chinese government to increase the regulated indigenous gas price.

Imported LNG Prices

The formula linking gas prices to the JCC (Japanese Crude Cocktail) oil price is the key pricing element underpinning LNG contracts in Asia, and it is therefore no surprise that Gazprom, with its desire to maintain an oil-price linkage for long-term gas contracts, is keen to use LNG contracts as a benchmark for its negotiations with CNPC.⁷¹ China currently has established medium to long-term contracts for approximately 40 bcma (30 mmtpa) of LNG, signed by its three main oil companies CNOOC, CNPC and Sinopec, and all have some link to oil prices. The contracts are listed in Table 2, and have been signed over a period of years since 2003, with the result that the base price in each contract varies widely.

The earliest contract signed between CNOOC and the Australian North-West Shelf consortium was negotiated at a time when the Brent crude price was in the range of \$25-30 per barrel and was capped at an oil price of \$25 per barrel. As a result it is priced at a comparatively low level of about \$3/mmbtu, compared with later contracts signed at prices more than twice this level, (Findley, 2008, p. 36), and has very little price volatility even amidst the current high level of oil prices. However, subsequent deals, although they were also set in a period of low prices and therefore may have had a low base price initially, now have a higher correlation with oil prices because the base price has been re-set. For example the Indonesia Tangguh contract was agreed at the same time as the original North-West Shelf contract and had an original base price of \$2.40/mmbtu, but subsequently this was revised up to a cap of \$4/mmbtu (FOB) in 2007, reflecting an oil price of \$39 per barrel.

⁷¹ Marina Suzchenko, GazpromExport Head of Business Development, quoted in Argus LNG Daily in Feb 2011, "LNG contracts serve as a benchmark for our talks with CNPC"

Table 2: China's currently contracted volumes of LNG

Buyer	Source	Volume (mmtpa)	Term	Signing Date	First Cargo
CNOOC	Australia NWS	3.3	25	Dec-03	Jun-06
	Indonesia Tangguh	2.6	25	Sep-06	May-09
	Malaysia Tiga	3.0	25	Jul-06	2009
	QatarGas 2	2.0	25	Jun-08	2009
	Total (Portfolio)	1.0	15	Jan-09	2010
	Australia QC LNG	3.6	20	May-09	2014
	GdF Suez (Portfolio)	0.65	4	Oct-10	2013
	<i>Sub-Total</i>		<u>16.15</u>		
CNPC	QatarGas 4	3.0	25	Apr-08	2011
	Shell (Gorgon)	2.0	20	Nov-08	2011
	ExxonMobil (Gorgon)	2.25	20	Mar-09	2014
	<i>Sub-Total</i>		<u>7.25</u>		
Sinopec	Australia Pacific LNG	4.3	20	Apr-11	2015
<i>Sub-Total</i>		<u>4.3</u>			
Total Contracted volumes		27.7			
Total Contracted (bcma)		38.2			

Sources: Stern (2008), Higashi (2009), EIA, Goldman Sachs

However, even this higher Tangguh price no longer reflects the reality of the LNG spot price in Asia now that oil prices are in a \$100-120 per barrel range. Contracts signed since 2008 (when the oil price peaked at \$147 per barrel) are much less favourable for the buyer and have a formula that is close to oil price parity. The relationship between the LNG price and the oil price is often set in reference to the gradient of a “slope” between the price of oil in US\$/barrel and the LNG price in US\$/mmbtu. At oil price parity the slope would be at a gradient of 17.2%, implying that at an oil price of US\$100/bbl the LNG price would be US\$17.20/mmbtu. The range of the slope in the majority of LNG contracts is 12-16%, in

other words just below full oil price parity, and most of the contracts also contain a constant which gives the slope the appearance of an “S curve” and reduces the linkage between the LNG price and the crude oil price at times of very low and very high oil prices. Therefore at a \$100/barrel oil price the majority of contracts signed since 2008 would have an LNG price in the range \$12-16/mmbtu plus whatever constant had been agreed in the contract (in most cases in the range \$0.50-\$1.00 per mmbtu).

(Flower, 2008) describes an average formula in the latest contracts as being related to the oil price with a constant, such that the LNG price is calculated as:

$$P(\text{LNG}) = (0.1485 * \text{JCC Oil Price}) + \text{Constant}$$

implying a slope of just under 15%. The LNG prices generated by this formula (using a constant of 0.7)⁷² at various oil prices are shown in Table 3, although it should be noted that the multiple of the oil price has varied between 0.1395 and 0.154 while the constant has varied between \$0.5 and \$1.0.

Table 3: LNG prices under current contract terms at various oil price levels

Oil Price <i>US\$/bbl</i>	LNG Price <i>US\$/mmbtu</i>
60	9.61
70	11.10
80	12.58
90	14.07
100	15.55
110	17.04
120	18.52
130	20.01
140	21.49

Source: Author’s calculations based on formula quoted by Flower, with constant estimated at \$0.7/mmbtu

A concrete example of an LNG contract priced in this way is quoted by Higashi (2009), who sees the QatarGas 4 contract priced at US\$12.8/mmbtu at an oil price of US\$80 per barrel, implying a price of close to US\$16/mmbtu at a US\$100/barrel oil price. As a result, although a number of earlier contracts offer more favourable terms to the Chinese importing companies, the current LNG market is clearly favouring the sellers, in particular in light of the likely increase in demand following the Fukushima tragedy in Japan in early 2011. It is

⁷² Constant taken from a presentation by A.Flower at the Oxford Institute for Energy Studies, May 2011

therefore unlikely that China will be able to break the link between LNG prices and the oil price in the near future and may also face increasing competition for LNG supplies as demand increases, again potentially pushing up prices.

The Price of Gas from Myanmar

Although the details of the gas contract that will underpin Myanmar's exports to China from 2013 are unclear, some tentative assumptions can be made from existing export arrangements that have largely been focussed on supplies to Thailand since 1998. Although the exact price of Myanmar's gas exports to Thailand is not disclosed, the country's Ministry of Planning and Economic Development does produce data on total gas export volumes and revenues that are shown in Table 4. This shows gas export revenues fluctuating between \$2-3 billion per annum over the five year period from 2006 to 2011, with export volumes in a range between 11 and 15 bcma.⁷³ The implied gas prices that can be derived from this data show an increase from \$4.33/mmbtu in 2006/07 to \$6.02/mmbtu in 2010/11, with the price for March 2011 jumping to \$6.37/mmbtu.

Table 4: Gas Export Statistics for Myanmar, 2006-2011

Year to March 31st	Gas Exports		Revenues		Implied Export Gas Price		
	bcf*	bcm	Kyat bn*	US\$bn	US\$/mcm	US\$/mmbtu	US\$1=Kyat
2006-07	460	13.0	11.7	2.03	155.8	4.33	5.75
2007-08	516	14.6	13.9	2.53	173.5	4.82	5.50
2008-09	377	10.7	13.0	2.38	223.3	6.20	5.45
2009-10	498	14.1	15.9	2.91	206.0	5.72	5.45
2010-11	410	11.6	13.9	2.52	216.6	6.02	5.54
January 2011	33	0.9	1.2	0.21	227.2	6.31	5.54
March 2011	80	2.3	2.8	0.52	229.2	6.37	5.45

*Source: Central Statistical Organisation of the Myanmar Ministry of National Planning and Economic Development, sourced from www.csostat.gov.mm on July 20th 2011. Further calculations by the author.

The price formula for gas exports to Thailand is believed to contain links to high sulphur fuel oil and US inflation (Petromin Pipeliner, 2011, p. 10), and the fluctuations in the prices shown above, with a peak in 2008, suggest that this is indeed a realistic assumption. Table 5 shows a fairly close link between the average export gas price and the average oil price over the past five years, while Table 6 shows the implied gas prices at various oil prices using the

⁷³ China Daily, 6 June 2011, "Myanmar gas export revenues fall in 2010", Beijing

average 7% slope that is seen in the years 2006-2011. As a result an estimate of the gas price at a \$100 per barrel oil price would be approximately \$7.0/mmbtu.

Table 5: Link between Myanmar Export Price and Oil Price

	Export Gas		Gas as %
	Price <i>US\$/mmbtu</i>	Oil Price <i>US\$/bbl</i>	Oil <i>%</i>
2006-07	4.33	66.96	6.5%
2007-08	4.82	78.61	6.1%
2008-09	6.20	88.36	7.0%
2009-10	5.72	66.13	8.7%
2010-11	6.02	85.86	7.0%
Average	5.42	77.18	7.0%

Source: BP Statistical Review of World Energy 2011, Author's Calculations

Given that the gas is priced at the wellhead prior to export via subsea pipeline to Thailand, while exports to China would be priced at the Myanmar-China border following transportation through a 770km pipeline onshore Myanmar, an equivalent price at the Chinese border would include an additional \$0.9/mmbtu transport cost assuming a tariff of \$4/mcm/100km. This would imply a final estimate of an export price to China of approximately \$7.90/mmbtu at a \$100 per barrel oil price, as shown in Table 6.

Table 6: Implied Myanmar Gas Export Prices at Various Oil Prices

Oil Price <i>US\$/bbl</i>	Gas Price <i>US\$/mmbtu</i>	Transport to	Estimate of China
		Border <i>US\$/mmbtu</i>	Export Price <i>US\$/mmbtu</i>
70	4.91	0.87	5.79
80	5.62	0.87	6.49
90	6.32	0.87	7.19
100	7.02	0.87	7.89
110	7.72	0.87	8.59
120	8.42	0.87	9.30

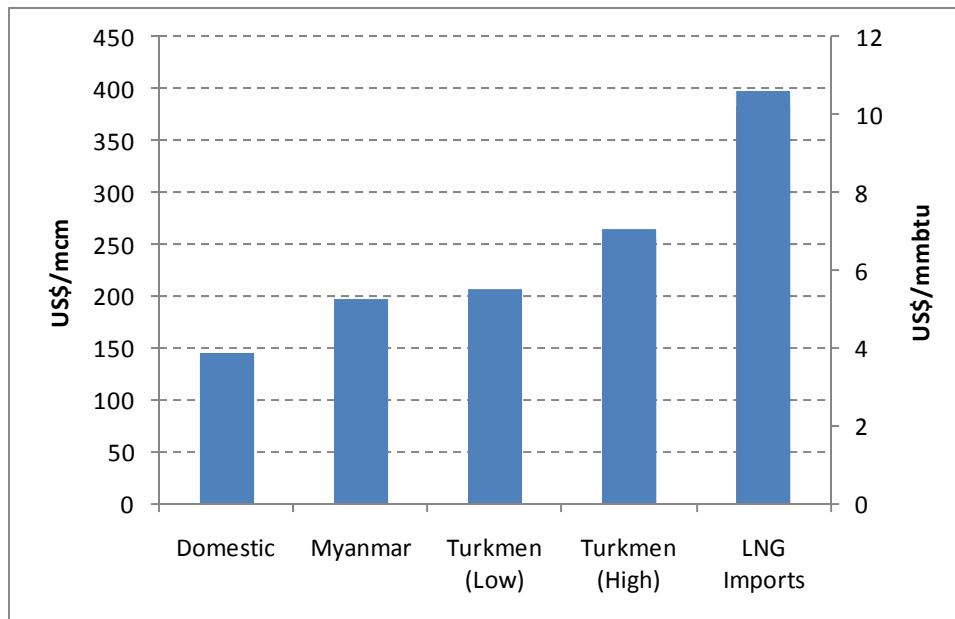
Source: Author's calculations

Conclusions – The Benchmarks for a Potential Russian Gas Export Price to China

In the negotiations over potential gas exports from Russia to China there are four key price benchmarks: the Chinese indigenous price set at the wellhead and then delivered to the city-gate; imported Turkmen gas arriving at the western end of the West-East pipeline; imported gas from Myanmar arriving in South-West China; and LNG arriving on the east coast of the country. At the present time Russia is emphasizing its desire to prioritise gas exports from West Siberia into western China to connect with the western end of the West-East pipeline in direct competition with Turkmen imports. The relevant benchmark price for Russia's gas exports is therefore the price of the gas from its competitors netted back to the western Russian – Chinese border between the Russian region of Altai and the Chinese province of Xinjiang, and Figure 5 below shows the various netback prices to the China-Russia border there. The key issue that becomes clear from the analysis is that the huge distance between the western Russia-China border and Shanghai has a significant effect on the netback price for Russia (reducing any comparative city-gate price in the east by the cost of transporting the gas 4,400km through the West-East pipeline).

For comparative purposes the netback prices are calculated for deliveries to Shanghai, although this may not be the ultimate destination for Myanmar gas imports in particular, and assume a \$100 per barrel oil price. In all cases it is assumed that each source of gas is produced or imported and transported to Shanghai via the relevant pipeline route, before transport via the West-East pipeline to the Altai – Xinjiang border is deducted to calculate the netback price for comparison with imports from Russia. Not surprisingly the regulated indigenous gas price provides a very low netback of only \$139/mcm (\$3.85/mmbtu) on the Russian border, although this could rise to \$285/mcm (\$7.90/mmbtu) by 2016 if the indigenous gas price rises discussed above (10% per annum for five years) were to be implemented. The imported gas from Myanmar also produces a relatively low netback price to Russia of \$190/mcm (\$5.30/mmbtu), due to the fact that the current price for Myanmar gas exports is only just over \$250/mcm (\$7/mmbtu). Myanmar's gas volumes are relatively small and will be delivered into the Guangxi region rather than to Shanghai, but the netback price on the Russian border creates a strong incentive for the Chinese Administration to keep the price of all imports in the west of the country at levels which allow them to be competitive in the east of the country where the majority of gas demand is currently located.

Figure 5: Benchmark Prices for Russian Gas Exports into Western China



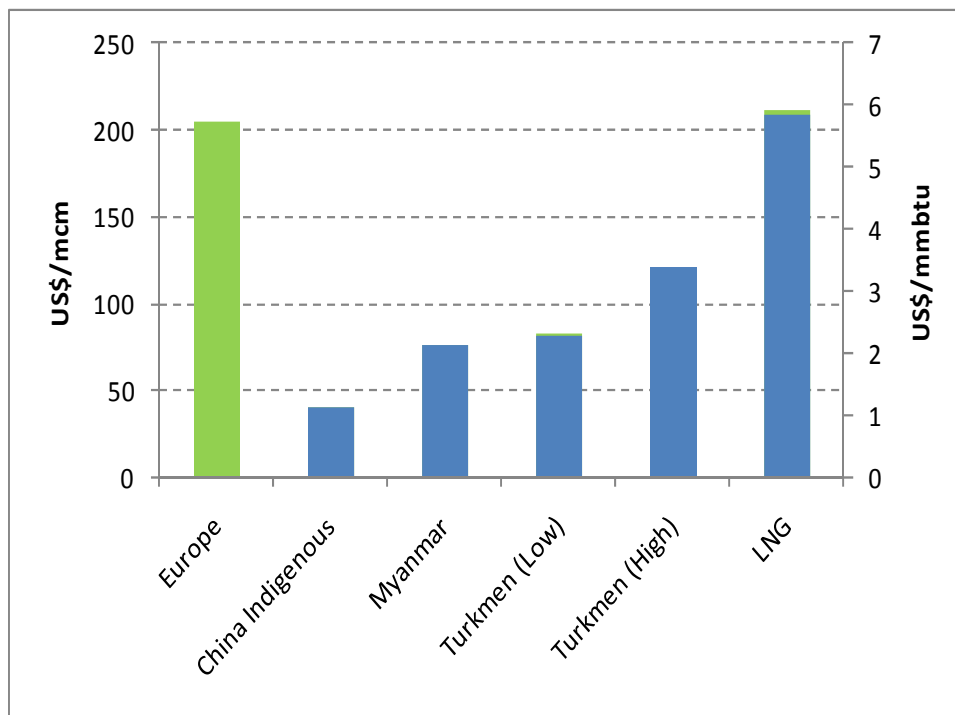
Source: Author's calculations based on IEA, EIA, CNPC and Myanmar government data

The most relevant netback comparison is with imported Turkmen gas, which will arrive in China close to the entry point of Russian gas from West Siberia. As highlighted above, at an oil price of \$100 per barrel the border price of this gas in Western China is in the range of \$200-260/mcm, which is now, perhaps not surprisingly, close to the price of \$250/mcm which the Chinese Administration also seem to be prepared to offer Russia for its gas in the same location. Following transport through the West-East pipeline this would imply a gas price at the city-gate in Shanghai of approximately \$365-420/mcm (\$10.2-11.7/mmbtu), significantly above the indigenous gas price but well below the cost of new imported LNG. This latter source of gas imports provides by far the highest netback comparison for Russia, being based on a very close correlation with oil prices. The formula for current LNG pricing generates a city-gate price in Shanghai of \$550/mcm (\$15.25/mmbtu) at a \$100 per barrel oil price, giving a netback on the Altai border of over \$380/mcm. Although it might seem anomalous to compare a border price in western China with a delivered LNG price 4,400km away in the east, the relevance of this comparison is precisely because it is the driver for Russia's current negotiating stance and is providing the logic for its demand for an export price of close to \$350/mcm.⁷⁴

⁷⁴ United Press, June 21 2011, "China-Russia optimistic about gas deal", Beijing

An interesting alternative perspective is to compare these benchmark Chinese import prices with the European price that Gazprom currently receives, all netted back to West Siberia, as this appears to be another criterion that Russia is using in its negotiations.⁷⁵ Figure 6 compares the netback price in West Siberia for gas sales to Europe at a \$100 per barrel oil price with the implied netbacks for Russian gas sales to China using the various benchmarks discussed above. The European netback is calculated assuming a \$410/mcm price at the European (German) border⁷⁶ and then removing transport costs in Europe and Russia as well as Russian export and mineral taxes to arrive at a wellhead netback price in West Siberia of \$205/mcm.

Figure 6: Comparison of Netback Prices in West Siberia



Source: Author's estimates and calculations

Figure 6 re-emphasizes why Russian negotiators are focussed on a gas sales price of around \$350/mcm at the Chinese border, as only the LNG benchmark price (\$550/mcm in Shanghai and \$380/mcm on the Russia-China border) provides a netback price in Siberia which can compare with the profitability of Gazprom's exports to Europe. Using the Turkmen

⁷⁵ Interfax, 19 Feb 2008, "Gazprom wants same earnings on sales to China as those to Europe", Moscow

⁷⁶ The price of \$410/mcm at a \$100 per barrel oil price is calculated from the average ratio of oil prices to Gazprom's export price to Europe over the past 5 years of 4.1x – i.e. the gas price in mcm is 4.1x the oil price in US\$/bbl. The \$400 level is also confirmed via recent quotes from Russian sources who expect a gas price above \$400/mcm in H2 2011 (Platts, 21 June 2011, "Moscow seeks realistic gas price of \$350/mcm in China deal", Moscow

benchmark price in the range \$200-260/mcm at the Russian border provides a netback in West Siberia 40-60% below the European netback equivalent, while the Myanmar and China indigenous price benchmarks provide more than 60% and 75% below the European netback respectively.

6. Bridging the Price Gap

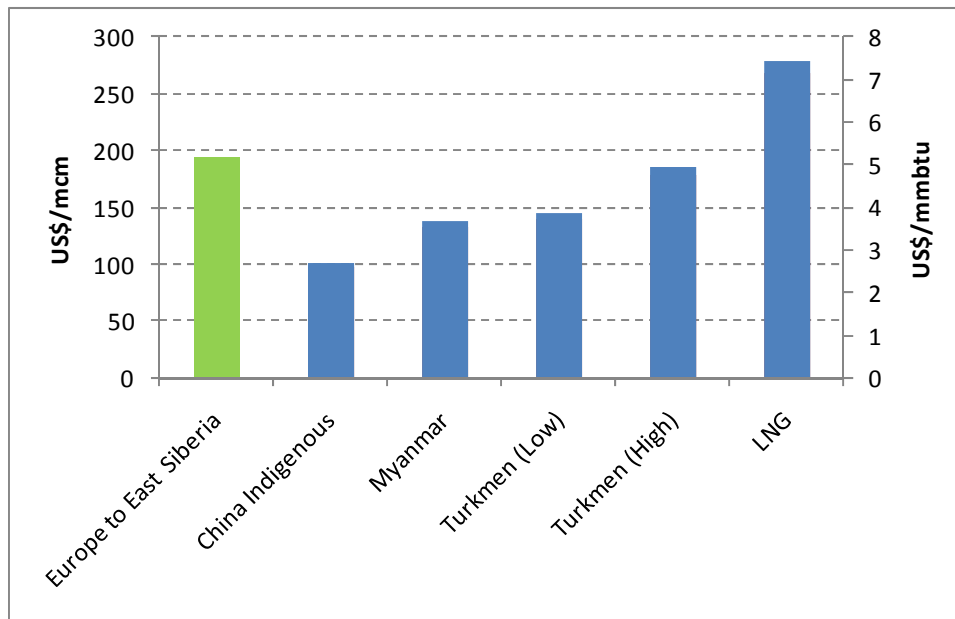
The clear dilemma, then, is the geography of the pricing argument. If Russia is focused on netback price equivalence in West Siberia for its sales to Europe and China, then a price of \$350/mcm at the Altai/Xinjiang border appears to be needed when an oil price benchmark of \$100 per barrel is used. However, if Chinese negotiators accepted this price they would effectively be agreeing to pay \$100/mcm more for Russian gas than for Turkmen gas delivered to the same effective border, and would also be committing the importing companies and ultimately end-consumers to purchasing gas at prices equivalent to the top end of the range for imported LNG. It is precisely this price differential of \$100/mcm which continues to be the main stumbling block in negotiations between the two countries.⁷⁷

The obvious solution to this problem, and one which the Chinese negotiators have been encouraging for some time, is to change the geography of the debate and to focus on the sale of gas from East Siberia into North-West China. This would not only reduce the transport distance in Russia (from 2,600km to just under 2000km) but would also bring the gas into China much closer to the relevant markets, again reducing transport costs.⁷⁸ Figure 7 shows the netback comparisons for European gas exports and the Chinese benchmarks to the Kovykta field in Irkutsk to illustrate this point. Although there is no direct link from Kovykta to the European market, the field is approximately 1,000 kilometres further away from the Russia-Europe border than Gazprom's core fields in West Siberia, reducing the implied netback price by the extra transport cost. Conversely, Kovykta is closer to the Chinese market than the West Siberian fields,, increasing the netback price to the point of production. The net effect is that the netback price for exports to Europe and China can be equalised from East Siberia using the lower Turkmen import price benchmark as opposed to the LNG price.

⁷⁷ UPI, 21 June 2011, "China-Russia optimistic about gas deal", Beijing

⁷⁸ The distance from the Russian border at Altai via the West-East pipeline to Shanghai is approximately 4,400km. The distance from Manzhouli on the Chinese border in the East where a pipeline from Russia would arrive to Shanghai is approximately 3,200km

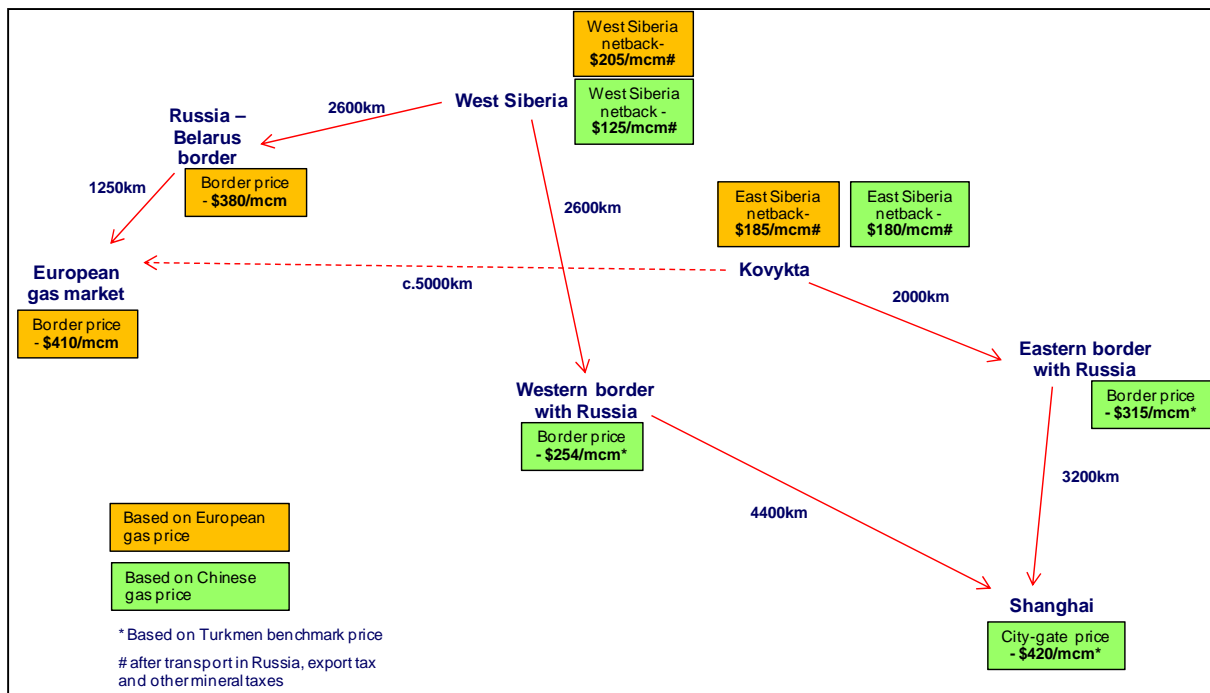
Figure 7: Comparison of Netback Prices in East Siberia



Source: Author's calculations (assuming \$100 per barrel oil price)

The consequences of this change in geography on the price dynamics are illustrated in Figure 8, which shows a schematic of the netback price calculations from the European and Chinese markets to West and East Siberia. As can be seen, if the city-gate price in Shanghai implied by the top end of the Turkmen import price range is used as a benchmark then the Chinese importing companies can afford to pay Russia just over \$250/mcm for gas via the western route but can increase this price to \$315/mcm for gas from East Siberia, thanks to the lower transport distance and cost. Conversely, Gazprom and Russia cannot afford to accept the \$250/mcm price in the west, as the netback in West Siberia would be well below the netback they can achieve for sales in Europe. Accepting \$250/mcm in the East would also produce a netback lower than the European level theoretically achievable at the Kovykta field, but the Russian negotiators no longer need to argue for a level of \$350/mcm or above to achieve their goals, as a price of \$315/mcm, that should be acceptable to the Chinese importers, would provide a suitable netback price. As a result, it would appear possible to bridge the \$100/mcm gap between the Chinese and Russian negotiating positions to date, if both sides accept that Russian gas imports should be initiated via the eastern rather than the western route.

Figure 8: Schematic of European and Chinese Netback Prices to East and West Siberia



NB: Prices based on an oil price of \$100 per barrel in 2011

7. When will agreement on Russian gas exports to China be reached?

As long ago as 1997 the Kovykta gas field in Irkutsk was discussed as a primary source of potential gas exports from Russia to China, and as the above analysis has attempted to demonstrate the commercial logic for an agreement between the two countries based on supplies from this field seems sound. This therefore begs a clear question as to why agreement cannot be reached and why the Russian negotiators continue to focus on a preference for a western route that appears to make it much more difficult to close the fairly wide disparity of price expectations.

Thoughts on the Russian perspective

It is clear from the Russian Energy Strategy that the China and the Asian gas markets are seen as a significant growth opportunity over the next twenty years. At the same time, however, Gazprom and the Russian Administration understand that opportunities in their core European market have been curtailed, at least in the short term, by the arrival of relatively low cost competitive gas that has encouraged customers to begin to re-think their contractual arrangements with Russia. The link between gas and oil prices in Europe has been challenged by a number of Gazprom’s key customers, and although Gazprom CEO Alexei Miller has

been robust in his defence of the status quo⁷⁹ the company is nevertheless under pressure to make initial concessions towards the introduction of spot gas prices.⁸⁰

As a result Gazprom is keen not only to demonstrate to its European customers that it can achieve high, oil-linked prices (and netbacks) in Asia, but if possible would also like to create a physical link between the two markets in order to be able to use the threat of supply-switching to keep European prices high. Conversely, it is also loath to concede a low price to China, which would yield a lower netback price in West Siberia, for fear that this would be used by its European customers as another reason to change the current price and contract arrangements. Therefore Gazprom has been especially focused on using the price for LNG delivered on China's east coast as a benchmark for its export sales to China, as it not only offers a direct oil link to the Japanese Crude Cocktail but would also allow it (at current prices) to achieve a netback price in West Siberia at the same level, or even higher, than the netback it achieves for its European sales.

One consequence of this aggressive stance on pricing is that Russia is clearly making its gas uncompetitive with China's direct alternative on its western border, namely imports from Turkmenistan and other Central Asian countries. The Russian Administration claims that it is not a rival with Turkmenistan for access to the Chinese gas market,⁸¹ but this is clearly not how the Chinese authorities view the situation as they have already doubled their potential purchases of Turkmen gas while negotiations with Russia have been delayed. However, it would seem to be the case that Gazprom and Russia may be prepared to countenance extra Central Asian gas entering China, even at the expense of a further delay in Russian exports, because it views this as a lesser evil than the risk of the gas going west to Europe via the Nabucco pipeline or other potential alternative routes. Gazprom has always made it clear that it would prefer to see Central Asian gas going east than west (Chow & Hendrix, 2010, p. 38), even at the expense of conceding geo-political influence in the region to China, and its current non-competitive pricing strategy on China's western border would seem to provide further evidence of this view. Conveniently for Russia it would also appear that the Chinese are somewhat keener than their potential European competitors to entice Central Asian gas into their market by providing financial investment, manpower and solid demand for the gas, in contrast to the less concrete European support for a Trans-Caspian pipeline (which could in

⁷⁹ For example in his speech to shareholders at the Gazprom AGM, 30 June 2011

⁸⁰ Interfax, 21 Feb 2011, "E.ON asked Gazprom for 100% spot indexing in gas contracts; Gazprom opposed", Moscow

⁸¹ Interfax, 22 Oct 2010, "Turkmenistan, Russia not rivals on Chinese gas market – Sechin", Turkmenbashi

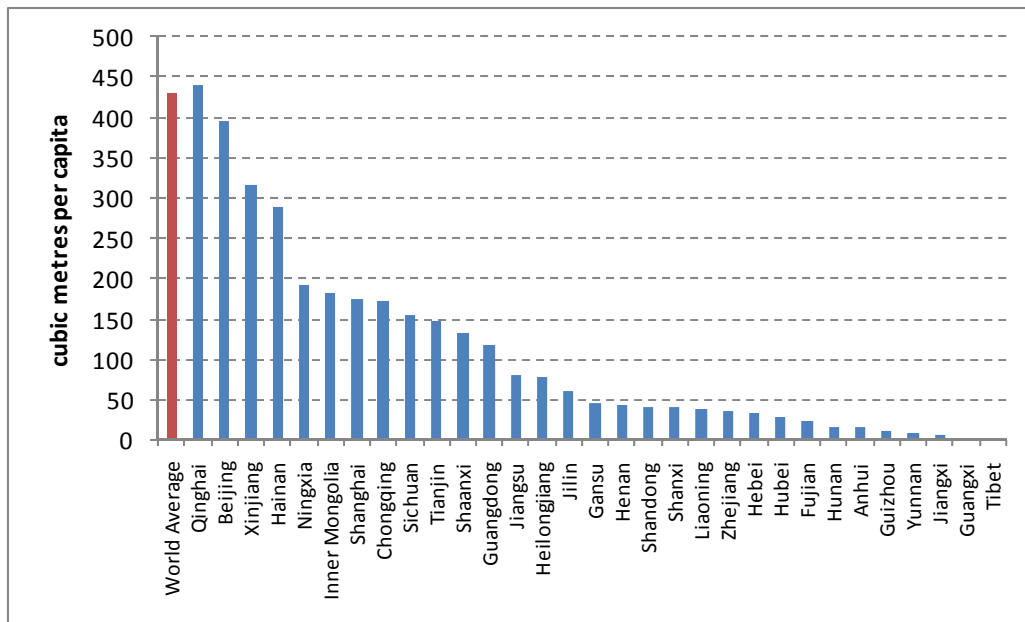
any case be vetoed by Russia using its status as a littoral country).⁸² As a result, Russia's uncompetitive pricing stance is in reality serving to reinforce the incentive for Central Asian gas to flow east rather than west.

A further consequence of this stance is that Russia may have to accept that its entry into the Chinese gas market could be delayed, but again the uncertainties surrounding this possibility are significant especially in light of the rapid expansion of Chinese gas demand growth. As has been noted by a number of commentators⁸³ demand growth over the past decade has been so rapid (average annual growth of 20% since 2004) that it has essentially been supply constrained, and that going forward to 2020 forecasts of demand growth will continue to be led by available supply as well as by the construction of new transportation and power generation infrastructure. As a result Gazprom not surprisingly feels that it is in a strong negotiating position, which is reinforced by the potential for demand growth in many areas close to the western border of China and Russia. Figure 9 shows the level of consumption per capita across China's main provinces, clearly demonstrating that only one has a level of demand above the global average while the majority have a level more than 50% below. As a result, although the current Russian negotiating position appears to risk a significantly delayed entry into the Chinese market in favour of cheaper alternatives from Central Asia, this may not be the case if the drive for greater gas usage continues.

⁸² The EU has recently appointed itself as the negotiator for the intergovernmental agreement on the pipeline, demonstrating some commitment to the project, but it has yet to show that it is prepared to offer specific commercial support or how it plans to counter the likelihood of significant Russian opposition

⁸³ Higashi (2009), EIA China Energy Brief (May 2011), Deutsche Bank "China Steps on the Gas" (June 2011), Goldman Sachs, China:Energy:Gas (May 2011)

Figure 9: Gas Consumption Per Capita across China’s Provinces (2009)



Source: CEIC

Russia is also clearly trying to establish a competitive position for its gas in the broader Asian market, either via LNG or pipelines to markets other than China. The recent construction of the Sakhalin-Khabarovsk-Vladivostok pipeline and the ongoing plans for an LNG liquefaction plant at Vladivostok clearly demonstrate this objective, which has taken on a much more realistic hue in the aftermath of the Fukushima nuclear disaster in January 2011. Japan is an obviously growing potential market for Russian LNG, and now offers direct competition to China for Russian gas as well as for Russian oil (which it is buying through the expanding ESPO pipeline). Russian LNG could also find a market in the rest of Asia, while the possibility of piped gas sales to Korea is also now being discussed.⁸⁴ Although both political and commercial difficulties make the outcome of the current negotiations uncertain, to say the least, they are a clear demonstration of Russia’s intention to demonstrate that China is not the only potential market for its eastern gas.

Thoughts on the Chinese Perspective

The Chinese negotiators clearly understand Russia’s motivations, but have their own set of ambitions and constraints within which they can find an acceptable price. Perhaps the major constraint at present is the differential between indigenous and imported gas prices, which is forcing companies such as CNPC to make huge losses on domestic sales as they provide an

⁸⁴ Interfax, 19 Sept 2011, “Building gas pipeline from Russia through North Korea being discussed in Seoul”, Seoul

effective subsidy to residential and industrial consumers (Berdikeeva, 2011). One way that this price differential can be offset is through the granting of equity stakes in relevant upstream projects to Chinese companies, as has already happened in Turkmenistan and Kazakhstan, allowing the importer to share in revenues generated from high export prices. However, although Chinese companies currently have equity participation in Russian oil ventures⁸⁵ and have indicated that they would be keen to own a share of the upstream projects that will provide exports to China, Gazprom has to date been reluctant to countenance any foreign participation in fields which could supply eastern gas markets.

A further constraint is that China will not be keen to be used as a pawn in Russia's negotiations with its European customers, both for security of supply and price reasons. As China looks to establish security of supply for its growing gas market, the threat of having long-term imports withdrawn or the price renegotiated due to factors such as a cold winter in a distant continent will clearly act as a deterrent to the signing of a strategically vital energy contract with Russia. Furthermore, China is unlikely to want to see Russia establishing a dominant role between the western and eastern gas markets that could also impact its major trading partners in Central Asia. At present China has established itself as the major new energy partner for Turkmenistan, Uzbekistan and Kazakhstan and will not want to see this position disturbed by a resurgent Russia, strengthened by its potential control over physically connected links to Europe, Asia, Central Asia and the global gas market.

Perhaps more important, though, is the simple geography of the negotiations for China. While Russia is arguing that the distance from its border with Europe (at Belarus) and the border with China (at the Altai-Xinjiang crossing) is the same at 2,600km and therefore that the border prices should be equivalent, China has the very significant problem of internal transportation costs. From Belarus to the European market at the German border is approximately 1,250km, while the pipeline from Altai to Shanghai and the other markets in eastern China is more than 3,000km further than this, meaning that Chinese importers are not keen to pay a European border price for gas as it would imply a much higher end-consumer price (or a much higher subsidy to be underwritten by the Chinese importing companies). As such the eastern route bringing gas from East Siberia into North-East China makes more sense for the Chinese buyers, both from a price and a strategic perspective, as the transport costs will be lower and gas fields supplying the imports will not be linked to the main

⁸⁵ CNPC is a 49% partner with Rosneft in Vostok Energy, while Sinopec has a 49% stake in Udmurtneft, again with Rosneft as its 51% partner

Gazprom network. As a result, until 2010 China could argue that it would provide a market for otherwise stranded gas, although this position has been somewhat undermined by the increase in demand for gas following the Fukushima disaster and Russia's plans to build an LNG plant in Vladivostok at the end of the Sakhalin-Vladivostok pipeline. Nevertheless, China does still provide a key potential market for Russia's East Siberian resources, even if Russia is now creating additional options for itself in an expanding Asian market.

Geography is also an important factor in another consideration for the Chinese authorities, namely where will demand for imported gas be greatest. At present the main demand centres are on the east coast of the country, and as identified by Zhaofang (2010, p.22) this picture is unlikely to have changed significantly by 2030, with the the regions around Beijing, the Yangtse River Delta (Shanghai) and the South-East remaining the largest gas consumers. However, the development of new demand areas, particularly in the south of the country, and the uncertainty over the pace of demand growth means that the Chinese authorities are unlikely to be in a hurry to sign up relatively expensive gas that may not be delivered in the most convenient location, especially as it already has a ready source of pipeline imports from Central Asia over which it can exercise much greater influence.

China's growing use of Central Asian gas and its expanding influence in the region is clearly key to its negotiating position. As Zhang Guobao, vice chairman of the State Committee of the NDRC, succinctly underlined: "China receives gas from several western pipelines already...including pipelines from Turkmenistan and Kazakhstan. Therefore an increase in gas deliveries to Xinjiang is not so important [for China]".⁸⁶ Furthermore, as described above, Chinese companies have equity participation in gas fields in both Turkmenistan and Kazakhstan and have provided significant financing for the development of new fields that will guarantee import supplies for decades to come. As a result, when the decision about how to allocate capacity in West-East pipelines 3 and 4 is made it is hard to believe that Central Asian gas will not take priority unless significant flexibility on price is shown by Russian negotiators if they continue to insist on the use of the western route.

Finally the whole question of the gas supply-demand balance in China would appear to suggest that there is no urgency for the Chinese authorities to sign up expensive new supplies. Demand is growing fast, and is supply constrained, but the emergence of potential unconventional sources of indigenous gas production could change the picture dramatically

⁸⁶ Interfax, 13 Oct 2010, "Russia, China remain at odds over gas pipeline routes", Beijing

and at a potentially lower cost than any imported gas. Although future production from both conventional and unconventional sources remains highly uncertain, the possibility of significant growth combined with the potential for planned increases in imports from Central Asia, Myanmar and via LNG means that the Chinese authorities can afford to be relaxed about the exact timing of Russian imports, if the current terms are not deemed satisfactory. Furthermore, the option to slow gas demand growth by reducing the near-term displacement of coal by gas in the power generation sector is also available to the Chinese if they decide that the prices being demanded by Russia are too high. Although this is clearly not the optimal long-term outcome from an environmental or energy diversification perspective, China has already demonstrated that it is prepared to increase coal imports at times of high oil and gas prices, with a 31% increase reported in 2010⁸⁷ and a 63% increase estimated for 2011.⁸⁸ This relaxed view over the timing of Russian gas imports could of course change rapidly if environmental concerns over coal use become more acute, if energy demand grows faster than expected or if indigenous production of conventional or unconventional gas significantly disappoints, but for the time being at least, the Chinese authorities appear to be feeling only limited pressure to sign up Russian supplies that would in any case only arrive in the second half of the current decade.

8. Conclusions – Are there any keys to unlock the current impasse?

Without a seminal shift in the negotiating positions of one of the parties it is therefore difficult to see how an early agreement on Russian gas exports to China can be reached. Russia prefers its western route and is looking for a price that can give it the same profitability that it achieves for its European sales, in the belief that Chinese gas demand is growing so fast that Russian gas is an essential part of the supply mix. It is also fearful of giving any price signals to its core European customers that might indicate a willingness to reduce prices or break the oil price link. China, on the other hand, has a clear preference for the eastern route on commercial and strategic grounds, is uncertain how much imported gas is really needed given existing options and the potential for indigenous supplies, and prefers to source its western imports from countries where it has equity interests in upstream fields and over which it exerts significant influence. Furthermore, the uncertainties over the extent and the geography of demand growth point to the adoption of a cautious attitude towards a commitment to high-priced, oil-linked, relatively inflexible piped gas contracts.

⁸⁷ China Daily, 27 Jan 2011, "China's coal imports up 31% in 2010", Beijing

⁸⁸ Reuters, 30 Nov 2010, "China's coal imports set to surge 63% in 2011", Shanghai

The differences between the two countries therefore seem rather intractable, but there are some potential keys that could perhaps unlock the stalled negotiation process.

1. *An indication that China would provide financing to help with the development of Eastern Siberian assets, and that Russia would be prepared to countenance Chinese equity participation.* The \$25 billion credit against future oil deliveries provided by China to Rosneft and Transneft in 2008⁸⁹ was the key to the expansion of oil exports via the ESPO pipeline, and Gazprom has now requested a \$25 billion advance payment for gas sales from CNPC to catalyse a gas agreement.⁹⁰ If this advance were to be invested in China's preferred eastern route, then an agreement could be much closer.
2. *An offer to Chinese companies of equity in upstream Russian gas projects might also facilitate Chinese acquiescence to the western route and/or a higher price.* However, the likelihood of this occurring appears very low as it would require a very significant change in attitude by both Gazprom and the Russian government. Nevertheless, the example of oil exports and the development of the ESPO does provide a precedent both for Chinese financing of Russian projects and Chinese equity participation in upstream assets in Russia. (Appendix 1 describes the ESPO example in detail and draws some conclusions on possible implications for the gas sector).
3. *Government support is also likely to be vital.* In Russia, Gazprom has already asked for tax breaks for its eastern assets,⁹¹ and this would provide an obvious route to allowing Gazprom to achieve a European netback price while charging a lower export price to China. On the Chinese side, a commitment to further increases in indigenous gas prices would clearly help to reduce the effective subsidy which Chinese importing companies currently provide (at a significant loss) to their customers, and would allow CNPC in particular to countenance a commitment to higher cost Russian gas.
4. *A future understanding that Central Asian gas is unlikely to be directed towards Europe might also change Gazprom's negotiating stance.* At present it seems possible that Gazprom would prefer to delay its own entry into the Chinese market and to see Central Asian gas fill any supply gap in the East in preference to the threat of Central Asian gas continuing to seek a place in the European market. However, if potential access to Europe from Central Asia became less likely, for example if it became

⁸⁹ Interfax, 13 April 2008, "Transneft, Rosneft sign bilateral agreement on oil deliveries to China", Moscow

⁹⁰ Interfax, 7 July 2011, "Gazprom demands \$25bn advance from CNPC in 2011", Moscow

⁹¹ Interfax, 4 July 2011, "Gazprom requests tax breaks for Eastern Russia gas projects", Moscow

apparent that the Nabucco project would not be proceeding in the near future, then Gazprom might offer a more competitive pricing signal at the western China border. With the threat of Central Asian competition in Europe reduced, there would be less need for Russia to be so apparently uncompetitive in the East.

5. *The underperformance of China's indigenous sources of gas supply, and in particular any perceived failure of unconventional gas, would also dramatically change the negotiating picture, although this may not have a significant bearing in the short-term.* However, although it is unlikely to be clear for a number of years whether Chinese unconventional gas will become an important force in the domestic gas market and at what cost, the uncertainties over what could potentially be a huge resource base are large, meaning that the upside potential could equally provide significant downside disappointment. A number of commentators remain sceptical both about the geology of the resource base and the operational issues involved in extracting it (in particular concerning water usage) and any sense that China's indigenous supplies may underperform would increase the pressure on signing up new imports in the second half of this decade.
6. *A perceived shortage of long-term LNG supplies in Asia following the increased demand for gas due to the Fukushima nuclear disaster would also provide a clear incentive to sign up new long-term piped gas, even at a relatively high cost.* It is currently too early to say exactly how Asian gas demand will shift and whether future LNG supplies will be sufficient to meet any upsurge, but it is clearly a factor that the Russian negotiators are already hoping to exploit to their advantage⁹² and to which China may have to respond in the near future. Indeed the building of the Sakhalin-Vladivostok pipeline to a planned new LNG terminal on the Russian Pacific coast is a clear demonstration of Russia's belief that this can offer an alternative, or additional, market for its eastern gas. Indeed, the Fukushima disaster in early 2011 has reinforced Russia's negotiating position and allowed it to make a stronger case for directing its gas towards the east coast for liquefaction and export to Asia rather than via a pipeline to a single market. It can now argue with more credibility that if China is not prepared to pay Russia's asking price for piped gas then it will just have to compete for Russian volumes in the Asian LNG market. Although this is not entirely persuasive from a commercial perspective, as piped gas will almost certainly be cheaper and more profitable than LNG for Russia as well as a better option for China, it is nevertheless

⁹² Gazprom Press Service, 26 April 2011, "Alexander Medvedev – Profit is our priority", Moscow

the case that China may feel more pressure to secure Russian supplies now than it did prior to January 2011

7. *Significant progress in Russian negotiations with Korea over piped gas exports may also increase the pressure on China to secure its own piped export agreement.* The Sakhalin-Kharampur-Vladivostok pipeline has been touted not only as a source of gas for the Vladivostok LNG project but also as the foundation for gas exports to South Korea. Although the project has a number of obstacles to overcome, not least the political tension between North and South Korea, the prospect of a pipeline to the Korean peninsula by-passing China may also increase the pressure on China to negotiate an agreement to secure its own supplies from Russia as well as to transit gas to Korea. Negotiations between Russia and South Korea are at an early stage, but Russian president Dmitry Medvedev has already been in discussion with North Korean leader Kim Jong Il about transit arrangements,⁹³ further increasing the pressure on China.

Overall, then, although it would appear that China and Russia both currently feel that they have the stronger bargaining position, with each seeing themselves as vital to the other's strategic needs, there are a number of catalysts that could shift the status quo and lead to ultimate agreement. However, despite the commercial logic of, in particular, exporting gas supplies from East Siberia to north-east China the negotiating positions of both parties in 2011 would suggest that each believes it can afford to wait for the position of the other side to worsen. Russia appears confident that Chinese gas demand will grow fast enough to ensure demand for Russian gas imports, which in any case may also find a home in the expanding Asian LNG market (in particular in the aftermath of the Fukushima disaster) and potentially via pipeline to the Korean peninsula. Furthermore, it may also benefit from any disappointment in China's indigenous supply options, especially if unconventional gas resources do not deliver the anticipated volumes. On the other hand, China appears adamant that it provides Russia with an outlet for gas that would otherwise struggle to find a market, and in any case it now has enough supply options to allow it to disregard any overpriced offer of Russian gas for the foreseeable future. However, many of these issues will only become clear in years, rather than months, suggesting that an agreement is unlikely to be reached in 2011 or even 2012, with the implication that Russian gas exports may not have a significant impact in the Chinese gas market much before 2020.

⁹³ Interfax, 15 Sept 2011, "Gazprom kicks of pipeline talks with North and South Korea", Moscow

Appendix 1 - East-Siberia Pacific Ocean (ESPO) Provides Clear Analogies for Gas Exports to Asia

The history of oil exports from Russia to China and the Asia-Pacific markets, which are now a reality thanks to the successful construction and ongoing expansion of the ESPO pipeline, provides some interesting analogies with the gas export question and potentially some pointers to the possible future outcome of the current negotiations. Discussion about exports of oil and gas from Eastern Russia to the countries of the Asia-Pacific region has been ongoing since the 1970s, when the Soviet authorities recognised the potential for its eastern territories to provide a significant supplement to the country's West Siberian output (Poussenkova, 2007, p. 7). However, the catalyst for action did not occur until the late 1990s when a privately-owned oil company, Yukos, which was then controlled and run by Mikhail Khodorkovsky, first anticipated the opportunity to initiate an eastern export programme (Olcott & Petrov, 2009, p. 18). Despite disagreements on the exact direction of a pipeline route, by 2001 the development of a feasibility study on a Russia–China pipeline had been sanctioned by Yukos, Transneft and CNPC, although Transneft was also keen to consider a pipe stretching the entire distance to Russia's Pacific coast. The debate was finally concluded by then Prime Minister Kasyanov, who in 2003 opted to effectively do both projects, approving the construction of a pipeline from Angarsk in Irkutsk to Nakhodka on the Pacific Coast (see Map 1), with a branch line built to the Chinese border as a spur. However, the subsequent fall of the Kasyanov government and the arrest of Khodorkovsky combined with the bankruptcy of Yukos almost immediately undermined any implementation plans (Henderson, 2011).

Following the fall of Yukos, Transneft was handed responsibility for the construction and management of the project. However, this confirmation of state control over the pipeline did not end the controversy over its routing, with the debate focused on two issues – environmental and market access. The environmental issue, which concerned the proximity of the original route to Lake Baikal, was resolved in 2006 when then President Putin ordered the pipe to be moved 400 km to the north (Olcott & Petrov, 2009, p. 20), reducing the contamination risk to the region's key source of fresh water. The question of market access and the priority of pipeline routing continued to hang over the project, however. Transneft had generally favoured a route to the far eastern coast of Russia, with an initial terminating point at Perevoznaia Bay, based on the logical argument that this would provide access to competing Asia-Pacific markets. Japan announced its support for this route as early as

January 2003 (Itoh, 2010, p. 10), but Moscow's uncertain relationship with the Japanese authorities led to constant prevarication and a refusal to commit to a confirmed construction timetable. In the meantime, China's expanding oil import requirement, the growing reliance of Russian state oil company Rosneft on an expensive rail link for its Chinese exports, the increasing warmth of political relations between China and Russia and the attraction for Transneft of a shorter pipeline route all pointed towards a growing acceptance that China would need to be part of any export solution. This realisation was crystallised during the economic crisis of 2008/09 when the Chinese Administration provided a total of \$25 billion of loans to Russia (\$15 billion to Rosneft and \$10 billion to Transneft) to help alleviate short-term financial concerns and to help fund long-term investments in oil infrastructure to supply eastern markets. Indeed the commitment to eastern exports was underwritten in the loan agreement, which Rosneft and Transneft agreed to repay in oil supply over a 20-year period from 2011.⁹⁴ It was agreed that an average of 15 million tonnes per annum (mmtpa) would be supplied over two decades, with 9 mmtpa being provided by Rosneft and 6 mmtpa coming from Transneft.⁹⁵ It was also agreed that, in order to ensure secure delivery of this crude, a spur of the ESPO would be built by Transneft from Skovorodino to the Russia–China border, and then China would finance the further extension of the line from the border to Daqing.

Once this agreement had been signed the routing of and commitment to the ESPO was essentially set in stone. As can be seen in Map 1, the pipeline starts from Taishet as an offshoot from the existing pipe from West Siberia via Tomsk to Angarsk. Phase 1, which was completed in December 2009, travels 2757 km as far as Skovorodino in the Amur region of Russia, and currently has a capacity of 600 kbpd (Platts, 2009, p. 2). From Skovorodino a 64 km spur line to the Russian border was completed in mid 2010, with a 960 km line inside China then completing the route to Daqing with a capacity at present of 300 kbpd.⁹⁶ The line was tested in November 2010 and received first deliveries under the contract between CNPC and Rosneft as of January 1st 2011.

Phase 2 of the pipeline is already under construction with a plan to extend the pipeline a further 2100 km from Skovorodino to the Pacific Coast and to expand the total capacity of the line to 1 mmbpd (Platts, 2009). As of December 2010 half the pipeline had been laid, and

⁹⁴ Interfax Russia and CIS Oil & Gas Weekly, 23 Feb 2009, "Russia, China sign \$25bn loans-for-crude deal", Moscow

⁹⁵ Interfax China Weekly, 21 Sept 2010, "China not mulling changes to ESPO branch oil deliveries from 2011", Tianjin

⁹⁶ Interfax Russia and CIS Oil & Gas Weekly, 27 Oct 2010, "Transneft ready to pump processed oil to China through ESPO", Moscow

the expectation is that by 2013 the full expansion of the new and existing line will have been completed.⁹⁷ At the same time the option to expand the spur line into China is also available, with a doubling of throughput capacity to 600 kbpd having been planned, although the Chinese authorities have stated that they are not yet ready to sanction any firm increase in their import commitment in the near term.⁹⁸ Beyond 2013 the potential also exists to further expand the capacity of the entire system to 1.6 mmbpd, although this will be subject both to the availability of sufficient Russian production and to the levels of demand in China and the rest of the Asia-Pacific market

Map A1: The Route of the East Siberia–Pacific Ocean (ESPO) Pipeline



Source: Platts, ERINA

⁹⁷ Interfax Russia and CIS Oil & Gas Weekly, 3 Dec 2010, “ESPO-2 pipeline nears half-way mark”, Moscow

⁹⁸ Interfax Russia and CIS Oil & Gas Weekly, 9 Sept 2010, “China not yet planning to take full 30mmtpa of ESPO branch oil”, Moscow

Analogies and Implications for Gas Exports

The history of the development of oil exports from Russia to the Asia-Pacific region provides some clear analogies with the gas export situation and some indicators of possible outcomes in the current gas negotiations. The first key point is geo-political, in that although China became an oil importer in 1993, its first purchase of Russian crude (by rail) only came in 2001 and it did not commit to a pipeline link until it had already established a fully diversified range of supply sources. Russia is now part of a Chinese import portfolio that includes the Middle East, Central Asia, a planned pipeline from Myanmar and a number of regional Asian suppliers, as well as its own indigenous fields. On the gas front, China became an importer in 2006 and has gradually built a portfolio of supply that now includes LNG from multiple sources, Central Asian piped gas, a planned line from Myanmar and its own indigenous sources of conventional and unconventional gas. Russia can now fit into this portfolio as it no longer poses a geo-political threat of energy dependence, and indeed could now be argued to have an important role in offering further diversity.

A second important point is that state control over key assets is vital if progress is to be made. When Yukos first initiated the idea of pipeline exports to China there was clear discomfort in the Russian Administration about a private company being a catalyst for a move with such strategic geo-political consequences. Despite the fact that Transneft was involved in the negotiations and that oil exports from Russia had already been deregulated, the presence of Yukos leadership in the negotiations clearly confused the negotiating process with China. Once Transneft had been given full control of the pipeline and state-owned Rosneft had become the key upstream player, progress became easier and a resolution was found within three to four years. An immediate conclusion from the gas perspective is that change of ownership at the vital Kovykta field from TNK-BP to Gazprom is likely to be a key catalyst for an eastern gas pipeline, and may even change the priority of this project relative to the western Altai route.

Thirdly, this debate over pipeline routes also has a precedent in the ESPO debate over sending oil to China or the Pacific coast of Russia. While Yukos initially preferred the China route, Transneft pushed for the Pacific route that would offer a greater diversity of customers. The potential buyers of the oil were also competing, with Japan and China offering various incentives to encourage the prioritisation of their markets. Eventually both were satisfied, with Chinese loans playing a vital role in the early construction of the ESPO and the directing of a spur line to the Chinese border. In a gas context the debate is currently about two lines to

China, one which Russia prefers in the west and one which China prefers in the east. However, given the recent nuclear tragedy in Japan and the likely increase in gas demand which this could cause, a further draw for an eastern route could be a pipeline to an LNG plant on the Pacific coast of Russia which is already part of Gazprom's strategic thinking. The outcome, as with the ESPO, may well come down to financial support, with a loan to Gazprom from either China or Japan likely to create significant influence over any decision to prioritise one route. Nevertheless, in the long term it is likely that all the markets will be satisfied given the commercial logic of Russia supplying the Asia-Pacific as well as the Chinese markets.

Fourthly, Chinese companies have become involved in the upstream oil business in Russia in tandem with the country's provision of financing for midstream pipeline construction. Sinopec is a joint 49% owner of Udmurtneft with Rosneft (51%) and is also a partner at a Sakhalin 3 block, while CNPC has formed an exploration joint venture with Rosneft called Vostok Energy. Although none of these ventures are large, they nevertheless indicate the desire of China's oil industry to be involved in the sources of supply as well as providing a market. The same is likely to be true in the gas sector, and although Gazprom has not offered any joint venture possibilities to date it is very likely to be demanded by the Chinese negotiators as part of an overall gas export/import deal.

Finally, pricing continues to be an issue for ESPO crude, demonstrating that the debate over gas prices, although fundamental to the initiation of any export project, is likely to continue for some time but may not ultimately hinder the development of export sales. Rosneft and CNPC agreed a confidential oil price formula under the terms of the "loan for oil" agreement signed in 2006, but recently the Chinese have complained that they are being overcharged for ESPO crude and have reduced their payments in 2011 to reflect what they see as excessive transport charges.⁹⁹ The gas price negotiations between Gazprom and CNPC are clearly at an earlier stage than this, but nevertheless the two sides do appear to be relatively close on structure and commercial terms, with only a base price to be agreed. As a result, it is possible to see a final agreement being reached in the relatively near term, but with the potential for renegotiation as export sales begin and global prices adjust.

⁹⁹ Interfax, 18 March 2011, "CNPC trying to negotiate oil price reduction with Rosneft", Moscow

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