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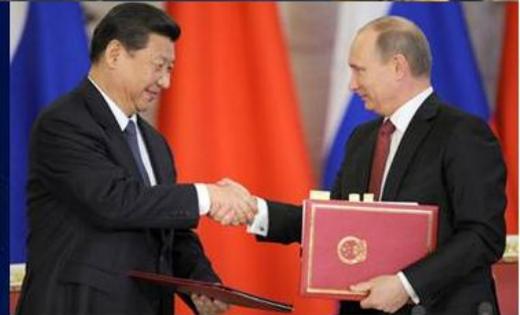
Developments in Unconventional Gas: Challenges and Opportunities for Russia

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Harvard Kennedy School, Master in Public Policy, 2013

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TABLE OF CONTENTS

Executive Summary	3
Overview.....	3
PAE Structure.....	3
Objectives and Methodology.....	4
Sources.....	4
Chapter 1: Global Gas Market and Russia’s Position	6
Highlights.....	6
Global Gas Market.....	6
Russian Gas Market.....	8
Chapter 2: Key Global Gas Trends Impacting Russia	12
Highlights.....	12
Shale Gas Boom.....	12
Europe.....	12
United States.....	15
Increased Competition from LNG.....	16
Europe.....	16
United States.....	18
Long-term Projections.....	20
Growing Opportunities in Asia.....	20
Russian Domestic Market Liberalization.....	23
Chapter 3: Impact of Global and Local Trends on Russia	26
Highlights.....	26
Changing Europe-Russia Relations.....	26
Changing US-Russia Relations.....	30
China-Russia Relations.....	32
Asian Market Opportunities.....	33
Chapter 4: Options and Recommendations for Russia and Gazprom	35
Recommendations Overview.....	35
Russia.....	35
Gazprom.....	35
Gazprom’s Evolving Business Model.....	36
Growth of LNG.....	39
Competing with Independent Producers.....	40
Move toward an Aggregator Model.....	40
Russian Gas Market Liberalization.....	42
OPEC for Gas.....	43
Leveraging Bilateral Relations.....	43
Europe – Need for Future Stability.....	43
Central Asia – Enhance Soft Power in Near Abroad.....	45
Far East – New Partners for Russia.....	46
United States – Make Space for Cooperation.....	48
Bibliography	50

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EXECUTIVE SUMMARY

Overview

The global energy market is undergoing a period of great change. The increasing production of shale gas and use of liquefied natural gas (LNG) for export/import are affecting gas markets globally. As a country whose economic and often political lifeblood is dependent on oil and gas economic rents, these market changes have real implications for Russia. Traditional economic and business strategies of Russia's Open Joint Stock Company Gazprom (Gazprom), the largest extractor of natural gas, are coming under tremendous pressure from a number of sources. Shifting LNG trade patterns are impacting spot markets in Europe and Asia, partly as a result of the shale gas boom in the US, lack of investment in new fields are depleting Russia's gas supply, all while the Russian domestic gas market is facing market liberalization pressures. In this context, our Policy Analysis Exercise (PAE) assesses the current global and local trends and analyzes their impact on Russia from an economic and geopolitical perspective.

PAE Structure

The PAE is divided into four chapters: Chapter 1 discusses the current global gas market and Russia's global market position; Chapter 2 analyzes current trends and developments in global and local gas markets that are or could impact Russia and thereby Gazprom; Chapter 3 further examines the effects of these developments on Russia and Gazprom, vis-a-vis Russia's relations with Europe, the United States (US), and China; finally, Chapter 4 offers recommendations and options for Russia and Gazprom.

Objectives and Methodology

The PAE takes the perspective that unconventional gas and LNG will play an increasingly important role in the global energy market. Per the EIA, the US produced 7,994 billion cubic feet of shale gas in 2011, an increase of over 500% since 2007. Currently, the US government is reviewing requests for shale gas export licenses, which would have increase the impact of the US shale gas revolution beyond national borders. However, despite the physical abundance of shale and unconventional gas sources, there are structural, technical and political challenges to fully utilizing these resources. These challenges are related to industry regulations, the process and technologies needed for extraction, production and transportation, as well as the political and economic decisions to import and export LNG. In assessing the impact of unconventional gas on Russian natural gas markets, two general assumptions are made in the PAE: (1) Russia's energy sector is instrumental to the nation's wellbeing and many would argue serves as a tool in achieving foreign and domestic objectives (for instance, in 2009 Russia cut of Ukraine's natural gas supply to allegedly send a political message to Europe in an effort to stifle EU and NATO expansion into Eastern Europe), (2) with changing global and domestic realities in the energy sector, Russia must adapt and innovate now to continue its advantageous position in the global energy industry.

The methodology of the PAE is twofold. We conducted qualitative interviews across Russia, Europe, the United States and China. Then we have analyzed open data and information from established sources such as the Energy Information Administration (EIA) and the International Energy Agency (IEA) while creating our own industry models given the guidance and advice of oil and gas research analysts based in Moscow and New York.

Sources

A literature review on the subject has provided a good overview of the global energy market, as well as how energy has and continues to shape foreign policy. Substantive interviews with government officials, industry experts, academics, and private sector professionals have provided insights into the current state of affairs, possible directions and potential impacts of current gas developments on key regions, including Europe, North America, Asia, and specifically Russia.

CHAPTER 1: Global Gas Market and Russia's Position

Highlights

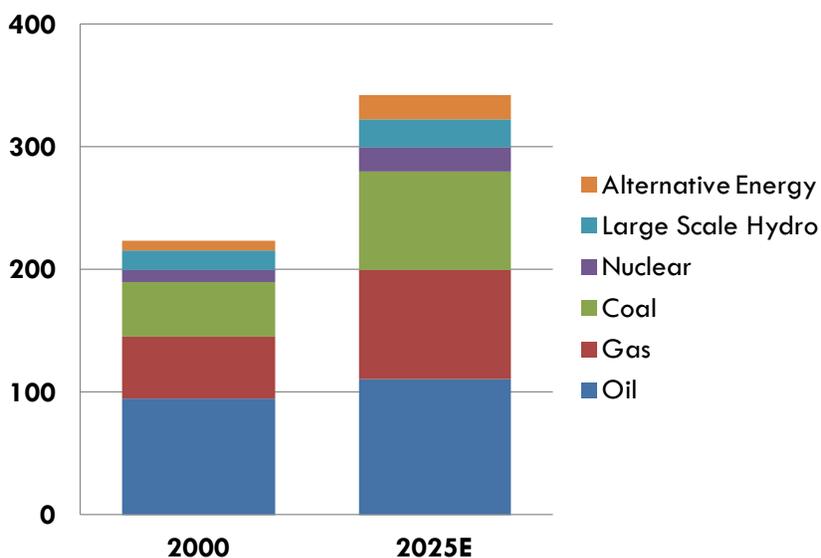
- Natural gas constitutes 21% of total global energy mix, or 21% of the distribution of the consumption of various energy sources
- Largest gas reserves are in Russia, Iran, Qatar and Turkmenistan
- Biggest exporters are Russia, Canada, Algeria, and Norway, while biggest importers are Germany, Japan, Italy and the United Kingdom
- Biggest producers are Russia, US, Canada, Iran and Qatar, while biggest consumers are Russia, US, China, and Iran
- Economic crisis greatly decreased European natural gas demand given falling consumption – consumption of natural gas in the European Union in 2011 dropped by around 10% compared to 2010 – though is projected to pick up in 2013
- Gas markets are different from oil markets, with some gas trading in spot markets
- Shale gas discovery in North America has transformed US from an LNG importer to potential LNG exporter
- Gazprom is the single exporter of Russian gas although newer private players are entering the Russian market

Global Gas Market

Rising energy demand, corresponding global shifts, and the discovery of unconventional gas sources have strong implications for energy markets. Gas currently has a 21% share in the global primary energy mix, after oil and coal, but that figure is projected to increase. This report will focus on unconventional gas and liquefied natural gas (as a transport vehicle), specifically shale gas and its economic and geopolitical impact on Russia's energy markets.

Figure 1: Changing Energy Mix

Million Barrels Oil Equivalent per Day



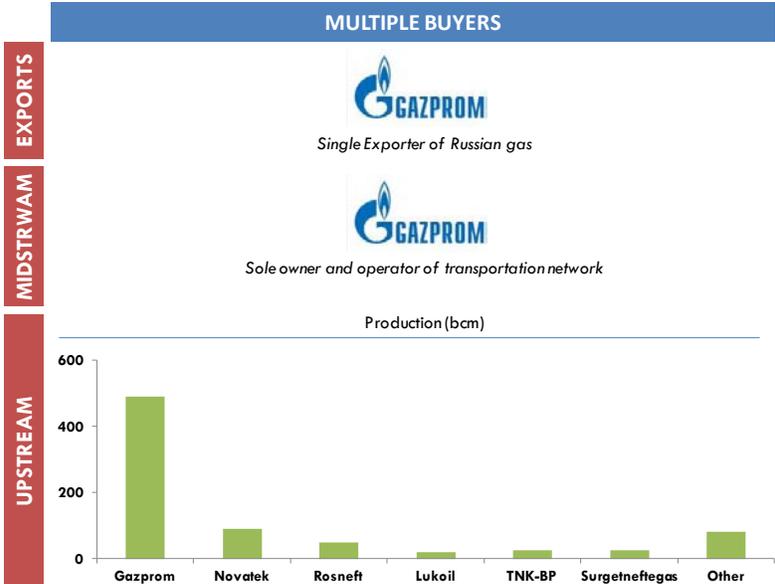
Source: Royal Dutch Shell plc

The end of Perestroika in 1991 allowed the entry of foreign investment into Russia. The Russian government opened up a number of industries including the oil industry to foreign investment, allowing the industry to benefit from capital investment in a context of a cash-strapped industrialized economy. But natural gas for a long time was closed to foreign participation on account of it being a strategic Russian asset. Natural gas is abundant in Russia, is environmentally clean, and is a substitute for oil –freeing it for export. Since then, the natural gas sector has been a priority for Russia, also owing to Russia’s massive domestic consumption and the political influence and economic revenue associated with the sector.²

The lack of competition in the sector meant the growth of a virtual monopoly in Russian natural gas, Gazprom. Since the Cold War, Gazprom has been the largest majority state owned and state controlled company in Russia. A vertically integrated company, Gazprom controls the transmission system through a wholly owned subsidiary Transgaz, about half of Russia’s proved reserves of natural gas, as well as a legal export monopoly.³ The Russian government holds more than 50% of Gazprom’s shares; Gazprom is the largest contributor to Russia’s budget.⁴

Aside from Gazprom, there are a number of independent oil and gas companies active in Russia, including Lukoil, Surgtneftegaz, TNK-BP and Rosneft – all have ambitious near-future plans for natural gas development. Private companies like Novatek own their own reserves but their industry participation is challenged since domestic prices, and export volumes and prices are regulated by the State, which favors larger players.⁵ The figure below shows the Russian gas sector structure with corresponding upstream, midstream and downstream components.

Figure 3: Russian Gas Industry Structure



Source: Artem Kvas⁶

With Russia’s national revenue primarily coming from oil and gas, security and maintaining supply are critical. However, there is recent concern that Russia’s internal production capacities are declining. This puts pressure on the Russian gas sector to invite foreign investment for green-field and brown-field investments, and encourage domestic competition to make the sector more competitive. Current foreign ownership of Gazprom is very limited with German firm E.O.N holding a 6% stake. In spite of primary

state control, Russian firms continue to look for collaborations with foreign companies provided they hold minority stakes (e.g. ENI has 20% stake in Gazprom Neft, while Petronas and Chinese National Petroleum Company (CNPC) hold 7.5% of Rosneft's total capital).⁷

Given changing realities (discussed in the next section), the Russian State is currently struggling with a number of questions regarding its natural gas sector based on interviews with bankers and consultants based in Moscow, including:

- How should Russia move forward in gas sector reform?
- How can Russia balance the political climate swings between attempts at being progressive and market oriented, and conservative and nationalistic?
- What strategy should Russia adapt in regard to domestic independent firms (such as Novatek)? Foreign firms?
- What will define and change the public-private relationships between Gazprom and the Russian state?

CHAPTER 2: Key Global Gas Trends Impacting Russia

Highlights

- Shale gas within Europe will not be a true competitor for Russian gas in the short to medium term
- Domestic debate on US exports could define the volume of LNG exports outside the US
- Asia's growing market opportunities see increases of suppliers for both piped gas and LNG
- Liberalization of Russian gas markets is unavoidable

The Shale Gas Boom

Europe

After the collapse of the Soviet Union, the European Union (EU)-Russia relationship was fruitful in regard to natural gas before the first Russia-Ukraine gas dispute in 2006. The dispute served as a wake-up call, causing the European Union to question its high import-dependency on Gazprom and assess its own energy security. The Third Energy Package was proposed by the European Commission in September 2007 to create a single, open, and competitive gas market in Europe. Russia however prefers a traditional contractual organization of the gas market. More problematically for Gazprom, a core element of the third package is ownership unbundling, which stipulates the separation of companies' generation and sales operations from its transmission networks. Although the package has been adopted, it has not yet been implemented by 11 of 27 member states, including Germany.⁸ This may be due to the fact that Russia has openly spoken against the package, and ultimately it is still in Europe's best interest to engage with Russia, especially in regard to energy.

If shale gas were to reach Europe, the EU would have substantially more leverage in dealing with Russia. However, the shale gas boom is currently primarily in North America, and while some argue that it will spread to Europe, there are key differences between the two regions that need to be highlighted:⁹

- *Drilling rigs and fracture stimulation equipment availability is limited.* Unconventional gas requires a high density of wells per land area, and as a result is produced economically when an area has a sufficient quantity of land rigs and labor. As of 2011, the state of Texas had more land rigs than all of Western Europe.
- *Drilling, production, and service costs are higher in Europe.*
- *Policy and regulatory uncertainty associated with dense onshore drilling.* Approval at the government level can be challenging when the high density of wells per land area is an issue, which would be the case in Europe.
- *Landowner incentives – property rights limit access.* The US has a system for leasing land from individual owners, simplifying land-access rights in the US.
- *Europe has smaller fragmented shale plays with limited data and few existing wells.* Scalability and attractiveness for operators may be an issue.
- *Demographics.* Population density is high in some areas of Europe.
- *Access to midstream infrastructure is difficult.* The US has had an open-access pipeline system with traded markets that are highly liquid. Europe has had a system of utility oligopolies, which may complicate the terms of marketing potential gas deposits.

Additionally, shale gas exploration is in its early stages in Europe, and will face challenges. France and Scandinavia hold the greatest resources. However, France banned hydraulic fracturing in horizontal wells in 2011, meaning shale gas cannot be produced effectively there.

Several basins in the Baltic States and Ukraine appear promising according to interviews conducted. Chevron has leased acreage in Western Ukraine with a recent US\$10billion deal signed to explore shale reserves. However, the key basin there, the Carpathian-Balkanian, has not been assessed in enough detail to provide resource estimates.

The alum shale (a variety of shale containing pyrites) in central and southern Sweden has attracted the attention of international operators. A preliminary estimate from Shell of the unrisks resource endowment for the leased acreage is 60 tcf, with a recoverable resource of about 10 tcf. If produced successfully, this will displace some amount of Norwegian gas.¹⁰

Advanced Resources International estimates that Poland has 792 tcf of risked shale gas – this amounts to a risked technically recoverable resource of 187 tcf. Lane Energy, EurEnergy, BNK, ConocoPhillips, and Marathon (among others) have leased land and are exploring for shale in Poland.¹¹ However, of note, ExxonMobil pulled out of Poland earlier this year, citing geology and difficult to navigate red tape. It is believed that Poland will eventually produce shale gas, but volumes may be limited and costs will likely be high. It will be competitive against higher-priced imports, but given volume, profitability, and logistical difficulties in production, Poland shale gas will not be a threat to Gazprom in the near to medium term.

In the near to medium term, shale gas production will not be a true competitor for Russian gas. Per our conversations with energy experts in Europe, it is likely that at least some shale will be developed in the Ukraine, Poland, and Sweden. Other shale basins in Europe are unlikely to be developed in the medium term due to high cost and environmental regulation. Therefore, unconventional gas production volumes will be low in Europe, presenting a minor irritation but likely no great threat to Gazprom's market share.¹²

However, shale gas still represents a lost opportunity for Russia. Given the growth in US shale exploration, the use of natural gas in industrialization, lower power prices for utilities to generate electricity means Russia will not be exporting LNG to the US.

United States

Although in production for decades, shale gas production began to expand rapidly in the mid-2000s, with a compounded annual growth rate of 45% between 2005 and 2010. By 2010, unconventional gas comprised over 60% of total gas production in the United States, and that figure is expected to grow. Of the 74 trillion cubic meters (tcm) of remaining recoverable resources of natural gas at end-2011, 50% are unconventional. US gas resources represent 110 years of production at 2011 production rates.¹³

The shale gas boom in the United States has created 30 mn tpa (44 bcm pa) of LNG diversions from the United States. This is approximately 80% of the amount originally destined for the United States under long-term contracts signed pre-2009 with Qatar, Trinidad, Egypt, Equatorial Guinea, Nigeria, and Yemen (and when Angola LNG ramps up, some of those cargos will be added). It is likely that the US will be diverting cargos for several years, as LNG is unable to compete with Henry Hub at prices that have crashed since the proliferation of US shale gas production.¹⁴ This in turn may have positive consequences for the European Union if the excess LNG is diverted to Europe. This could potentially mean a decrease

in oil dependence for Europe, providing a better economic alternative against rising oil prices. However, Europe will have to compete with potentially more lucrative Asian and Latin American markets.

Pending government approval, the United States may be increasingly exporting indigenously produced gas. According to the IEA, in a “strong” unconventional gas case scenario (assuming the environmental issues related to shale gas production will be minimized) the United States will overtake Russia as the largest global gas producer by 2035. The United States will produce about 820 bcm of gas in 2035, compared to the 785 bcm Russia will produce. However, while North America dominates unconventional gas production in 2010, that figure will decrease over time – in 2020 the North American share of global unconventional gas production is projected to fall to 70%, and then again in 2035 to 45%.¹⁵

Increased Competition from LNG

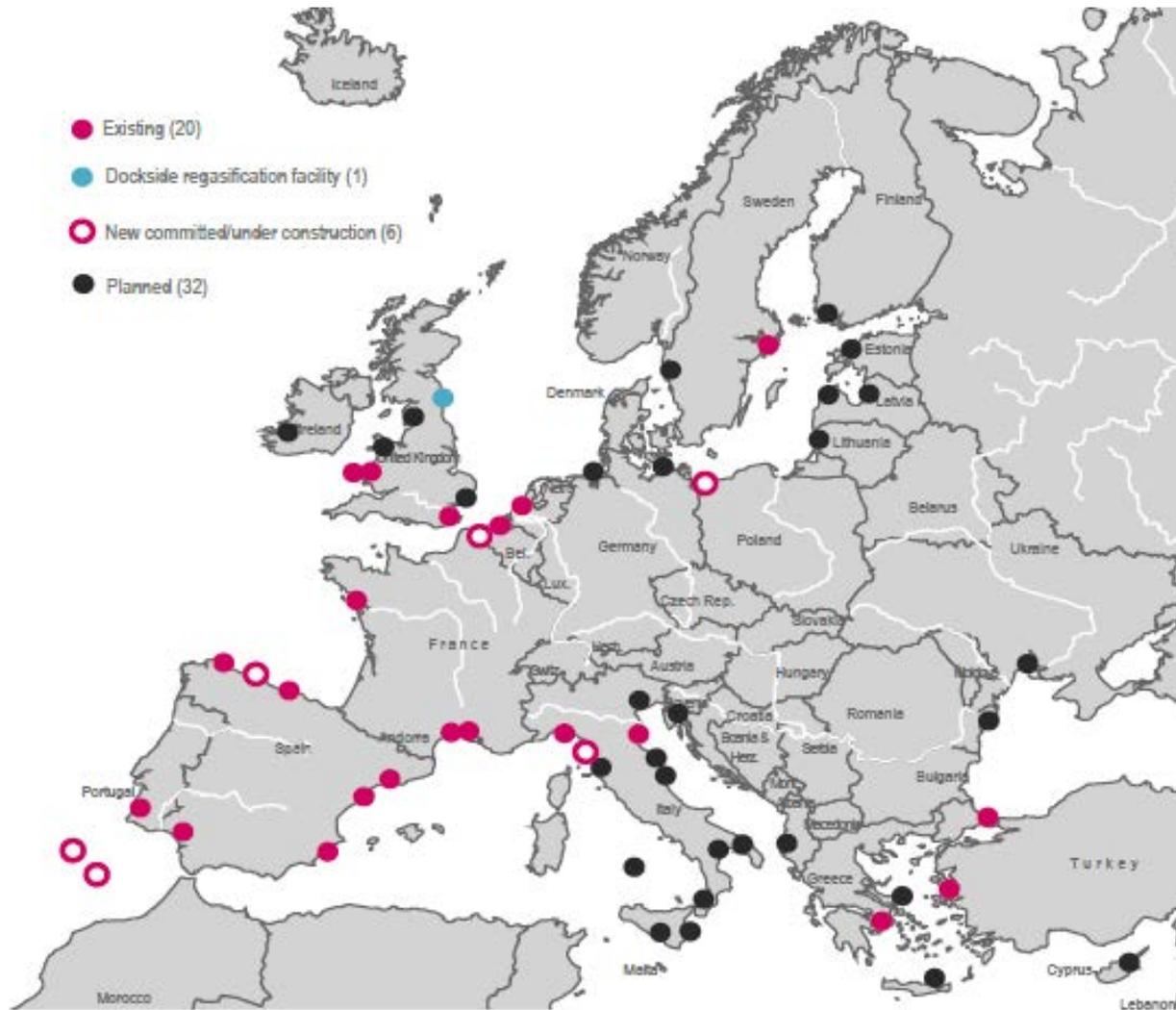
Europe

Annual European LNG re-gasification capacity exceeds 185 bcm annually, and further 24 bcm per year is under construction, with a further 244 bcm/year proposed. This far exceeds LNG imports of just a few years back, at nearly 70 bcm of imports in 2009.¹⁶ This does not just mark new competition for Gazprom in volume terms. LNG availability, both in receiving terminals and in available cargos is essentially a form of storage, which gives it a competitive advantage over Russian gas. However, Europe meeting its energy demands via LNG is very much dependent on trade routes, as it competes with Asia for LNG imports. Although re-exports offer the US an opportunity to turn a profit by sending surplus LNG to higher-paying markets in Asia or South America, shipping constraints have made Europe the next best alternative. Additionally, Qatar is already shipping 12 million tons of LNG to the UK, 6 million tons to Italy, 3.2 million tons to France, and 4.8 million tons to Spain, as well as other European countries.¹⁷

Around 150 bcm, or 40% of the European Union’s gas imports, are currently supplied by Russia; while 80% of Gazprom’s revenues come from European customers. Gazprom sells gas to European countries under separate contracts, the price usually pegged to the oil basket and fluctuating with world oil prices at a 6-month lag. Initial prices are set on a country-by-country basis, but countries with no alternative suppliers pay the highest prices. Gazprom has never officially disclosed prices for Europe. However, according to an Izvestia News insider source, the average price of Gazprom gas for European countries at the end of the first six months of 2012 was \$413.10 for 1,000 cubic meters, and exceeded \$500.00 for five countries. Speaking with experts, the issue of Gazprom’s pricing in the EU will likely re-emerge in the next few years when new gas sources become available as imports to Europe.¹⁸ Gazprom is seeking to expand its storage and trading presence in Europe to combat this. Gazprom will likely maintain its position with expanded storage and trading capabilities, but will still likely make volume-for-price concessions as traded gas hubs increase in liquidity, helped largely by LNG.

In addition to providing liquidity to gas hubs, new re-gasification facilities in Europe will have a short-term storage in LNG form, which would help in sudden cold weather as discharge from these facilities is faster than from underground supplies. So LNG in Europe is providing competing supply, volume to traded hubs, and is softening price spikes as it can also function as storage in LNG form.

Figure 4: LNG Terminals in Europe



Source: GLE, Artem Kvas

United States and Canada

As of 2013, Cheniere Energy (and its Sabine Pass Liquefaction plant) is the only company with a 20-year US Energy Department license to export continental liquefied gas to nations without US free-trade agreements.¹⁹ Those with free-trade agreements are Canada and Mexico. The US Department of Energy is currently reviewing the impact of exporting shale gas (in the form of LNG) for the purpose of granting export licenses. Experts at the Department of Energy believe that at least a number of the licenses will be granted in the near to medium term, with some to be decided later this year.²⁰ The DOE determined last year that exporting gas is not against the interests of the US – it could bolster US exports, help trade balances, and strengthen foreign relations. Exportation opponents argue that doing so will increase gas prices in the United States, but based on the amount of supply available in the US, Mark Papa, CEO of EOG Resources, believes the merit of that argument is questionable.

Table 1: North American Liquefaction Projects

Country	Plant	Target Start-up Date	Capacity, mmtpa	Note
Canada	Kitimat	2013	5.3	
US	Sabine Pass Liquefaction	End-2015	17.7	FTA/non-FTA applications approved
US	Cameron LNG	4Q 2016 (first train)	12.9	FTA approved/non-FTA under DoE review
US	Freeport LNG Expansion	1Q 2017	21.3	FTA approved/non-FTA under DoE review
US	Dominion Cove Energy	3Q 2017	7.6	FTA approved/non-FTA under DoE review
US	Jordan Cove Energy	2017	9.1	FTA approved/non-FTA under DoE review
US	LNG Development Company (Oregon)	2017	9.5	FTA approved/non-FTA under DoE review
US	Excelerate Liquefaction Solutions	2018	10.5	Pending application
US	Lake Charles	2020	15.2	FTA approved/non-FTA under DoE review
Canada	Shell Canada	TBA	15.2	
Canada	BC LNG Export Cooperatives	TBA	1.9	
US	Gluf Coast LNG Export	TBA	21.3	Under DoE review
US	Cambridge Energy	TBA	2.1	Pending application
US	Gulf LNG Liquefaction Company	TBA	11.4	FTA approved
US	SB Power Solutions	TBA	0.5	FTA approved
US	Southern LNG Company	TBA	3.8	FTA approved
US	Carib Energy	TBA	0.2	FTA approved/non-FTA under DoE review
Total			164.6	

Source: DoE, FERC, Company Data, *Interfax*

Aside from Cheniere’s Sabine Pass Louisiana project, there are two other proposed export plants pending before the Federal Energy Regulatory Commission: a second Cheniere project, planned for Corpus Christi, Texas, and Freeport LNG Development’s proposal for Freeport, Texas. Seven companies, including Freeport, are seeking Department of Energy permission to export to non-free trade agreement nations.²¹

North American exports will likely target Asia. If Asian markets can absorb the supply, and if Asian oil-linked LNG prices stay high, this gas may not reach Europe, so might not interfere with Russia’s position there. However, two issues could prevent this: (1) if the Asian market becomes crowded, (2) if crude prices decline, bringing down oil-linked gas prices in Asia below gas prices at Europe’s hubs, which move with a softer correlation to crude prices.

Long-term Projections

The LNG share of international trade of total gas mix was 10% in 2010, and is expected to grow to 15% by 2025. LNG exports are also supposed to more than double from about 30 billion cubic feet per day in 2010 to over 70 billion cubic feet per day in 2030.²² This may even be an underestimate given technological advances such as Shell’s floating LNG – the world’s largest floating offshore facility for gas extraction and LNG processing. Essentially the FLNG will allow offshore gas fields to become accessible, and will include both gas extraction, and on board liquefaction, which will shrink the gas by 600x, allowing it to be shipped globally. The first facility is currently being built in South Korea, and will be deployed first 200 km off shore in Australian waters. It appears this technology is not exclusive to Shell, and other companies are also developing similar floating vessels.²³

Growing Opportunities in Asia

As previously discussed, natural gas use is expected to increase by more than 700 bcm from 2010 to 2020, and then again by 1.1 tcm from 2020 to 2035, reaching a total of 5.1 tcm in 2035. Eighty percent of demand for gas will come from outside the OECD – a Compound Annual Growth Rate (CAGR) of 2.5% versus 0.9% for Organization for Economic Cooperation and Development (OECD) countries.²⁴ China and India will be the greatest contributors to that growth – China’s demand compounded averaged annual growth rate alone is projected to be 7.0% between 2010 and 2035, and India’s is expected to be 4.7%. Projections and data indicate that demand markets for oil and gas are clearly shifting towards Asia.

Of note, although there may be potential for shale gas development in China, it is still in the nascent states of development. Per oil and gas analysts, shale gas production in the United States was aided by competition among operators and service companies, inducing the low prices that were instrumental to the volumes currently being produced.²⁵ This level of innovation and competition is not projected in China. Although single-digit bcm of shale gas may be produced in the near term, greater production could only potentially be assumed in the longer-term. Reserve estimates for other countries in Asia (aside from Australia), including India have not been fully determined.

Although Russia and China have discussed a 70 bcm pipeline from Altai to China, a Russia-China gas pipeline is unlikely to happen in the near and medium term.²⁶ Firstly, although China will need more gas over time, it can get gas from an LNG exporter, especially as LNG arrives along China’s coast, closer to the core population and industrial sector versus the proposed pipeline. Crude oil is more important to China – China would like to co-develop Eastern Siberian crude with a Russian partner, and would therefore agree to a pipeline in exchange for exploration in Siberia. Russia however would not agree to this, likely for geopolitical reasons and for the precedent it would set. Secondly, the power sector in China is facing difficulties. For the past eight years, the sector has seen on/off negative spark spreads as coal prices have risen while Beijing has been reluctant to raise the cost of power in its manufacturing-heavy economy. Thirdly, as the power sector cannot buy gas for power generation right now due to lower tariffs and high gas prices, imported gas requires significant downstream investment to market it to a large number of small buyers, rather than a small number of large buyers – power plants. Currently, this infrastructure is not in place, and is causing supply to be in excess of what infrastructure can get to market. Fourthly, China, rightly or wrongly, has believes that it has other supply opportunities. China is being wooed by international oil companies (IOCs); who want to make Chinese leaders believe the size of their shale gas resources in an effort to gain access to exploration. However, during a recent visit to Moscow, President Xi Jinping and President Vladimir Putin are said to have discussed a gas pipeline.²⁷ Although China can get gas from an LNG exporter, a pipeline would mean that gas can be delivered overland to China at less risk than supplies of LNG delivered from as far away as Africa, Australia, or the United States (if and when it starts exporting).

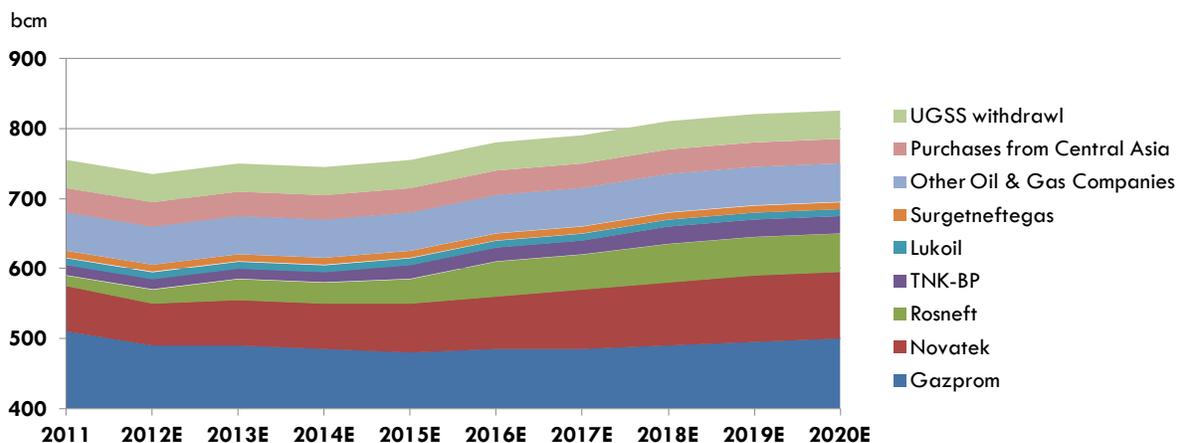
Aside from a Russia-China pipeline, there are two key opportunities for Russia in Asia: (1) LNG offers Russia flexibility in terms of whom to sell to, and can be implemented by expanding existing facilities and building new facilities; and (2) Gazprom, by looking to Asia, will be able to diversify and become more global by offering gas to clients as far as India. Although Gazprom will not be the only company vying for the Asian markets, its geographic proximity, and therefore potentially lower transportation costs, can serve to its advantage.

Russian Domestic Market Liberalization

Gas sector reforms in Russia are inevitable according to oil and gas analysts in Russia, but timing will be dependent on three factors. Firstly, gas export margins will likely decline in the future, as the arbitrage in prices between North America and Europe begin to narrow. For the Russian government, it is critical to maintain stable tax revenue from the oil and gas sector (Gazprom alone comprises about 10% of Russia's GDP). Hence, the Russian government will want to support exports to new markets which may be difficult given the number of new projects scheduled to start from 2016 onwards. Declining export margins also put at risk future development of pipeline networks, which continues to be funded by Gazprom, largely from export revenue. Secondly, professionals believe the sector's current structure does not allow for timely and efficient development of new gas projects.²⁸ Gazprom uses export proceeds to fund the transportation network, which is why it is reluctant to share export margins with other producers. Simultaneously, independents are not ready to share the costs of maintaining the transportation system with Gazprom – not only do they not own it, but they also have limited access to it. Market-based transportation costs, with full access to all parties could solve this issue. Thirdly, market signals have to replace government directives. As long as the government tries to find consensus among different parties, it increases the risk of decreased export revenue.

However, there are encouraging signs in support of liberalization. The government has made a decision to reduce internal subsidies, and increase gas prices in the future, but this must be taken further. Additionally, most changes in the sector have been launched by Gazprom itself, including raising domestic tariffs, introducing cash settlements, removing subsidies provided to former Soviet countries). Although some may argue that gas market reform has been ongoing since the 1990s, professionals believe this time is different for a key reason: there are a number of aggressive players achieving critical size and positioning themselves to take the next step (particularly Rosneft and Novatek).

Figure 5: Russian Gas Supply by Company, 2011 – 2020 (Expected)



Source: Company data, CDU TEK, Industry estimates

Given a relatively strong outlook for future gas production in Russia and no evidence of an increasing demand for Russian gas, oil and gas analysts in Russia believe that the Russian government will move more quickly towards a fully liberalized market. In a normal market driven sector, prices would be determined by supply and demand, rather than by top-level decisions on the amount of subsidy transfer to consumers, or by a simply pursuit of a netback parity concept. If the government decides to transition

towards such a model, then this should arguably bring more transparency and reduce regulatory risks in the industry – with Gazprom being one of the biggest potential beneficiaries from these changes. If no other changes take place (i.e. the fiscal and export regime regimes stay the same), Gazprom would focus solely on export markets, taking advantage of the arbitrage between domestic and export price netbacks as the sole owner and operator of the gas transportation infrastructure. While a focus on price arbitrage might not lead to the highest growth in absolute earnings, it would reduce capital expenditure requirements related to the upstream division, and would improve overall returns.

CHAPTER 3: Impact of Global and Local Trends on Russia

Highlights

- In spite of the Third Energy Package, there is no united Eurozone energy policy towards Russia
- Europe may be less dependent on Russian gas in the longer term, but it looks to be status quo in the short and medium term
- Whether or not US decides to export LNG to Europe and Asia, US and Russia continue to share bilateral interests, including foreign policy towards North Korea, Afghanistan and Iran
- Russia and China have the potential to become true energy partners, developing the capacity to cooperate in other areas outside of energy

Changing Europe-Russia Relations

Europe is Russia's dominant export base and Russia is Europe's main energy supplier, making Russia and Europe co-dependent on each other for energy and revenue respectively. However, recent changes in the energy markets might force Gazprom to reconsider its business strategy with regard to European clients.

The European market has varying degrees of dependence on Russia. Western European countries import less than 50% of their gas needs from Russia, while the Baltics states are heavily dependent on Russian natural gas. However, given that Eastern European markets are smaller in size compared to Western Europe, Western European exports remain attractive to Russia. As a result, Western European-Russian ties have been solidified via the construction of strategic pipelines (such as the Nord Stream) and joint development of energy projects (for instance the August 2013 strategic agreement between Exxon Mobil and Rosneft to jointly develop potential reserves in the Kara Sea and the Black Sea)²⁹. The third group of Russian natural gas consumers in Europe is the Commonwealth of Independent States (CIS) nations that have enjoyed Russian gas deliveries at preferential prices, causing these nations to remain economically and politically dependent on Russia, which exerts economic and political influence over them. These include Eastern European countries like Ukraine, Belarus and Moldova, as well as Central Asian countries like Azerbaijan, Kyrgyzstan and Kazakhstan.

European gas markets have been characterized by long-term contracts that provide risk-sharing agreements between buyer and producer. The intention is to enable new investment for production and gas infrastructure projects that would mutually benefit buyer and seller. Traditionally, this has worked well within Europe as long-term contracts have ensured steady supplies of gas while creating barriers to entry for new entrants. The 2006 Gas Export Law legalized Gazprom's monopoly when the exclusive right to export natural gas was granted to the gas owner or its subsidiary. Europe was aware that if gas was supplied only through spot markets, gas suppliers including Gazprom would not take the high risk of long payback periods and billion-dollar investments for new fields. European importers thus far have been committed to medium to long-term agreements with Gazprom. For instance, Gaz de France has renewed its gas contract till 2015.³⁰ Gazprom has also been able to acquire downstream assets through debt-by equity swaps. Additionally, Russia and specifically Gazprom might get concessions from the 3rd Energy Package and continue to be allowed to have holding companies and sustain vertical integration with European energy and utilities companies.

However, two concerns have always dominated Europe-Russia gas relations: (1) Russia, to varying degrees uses its natural resources as political leveraging tool against European nations (for instance charging pro-Western countries like the Baltic states market prices over \$300 per thousand cubic meters

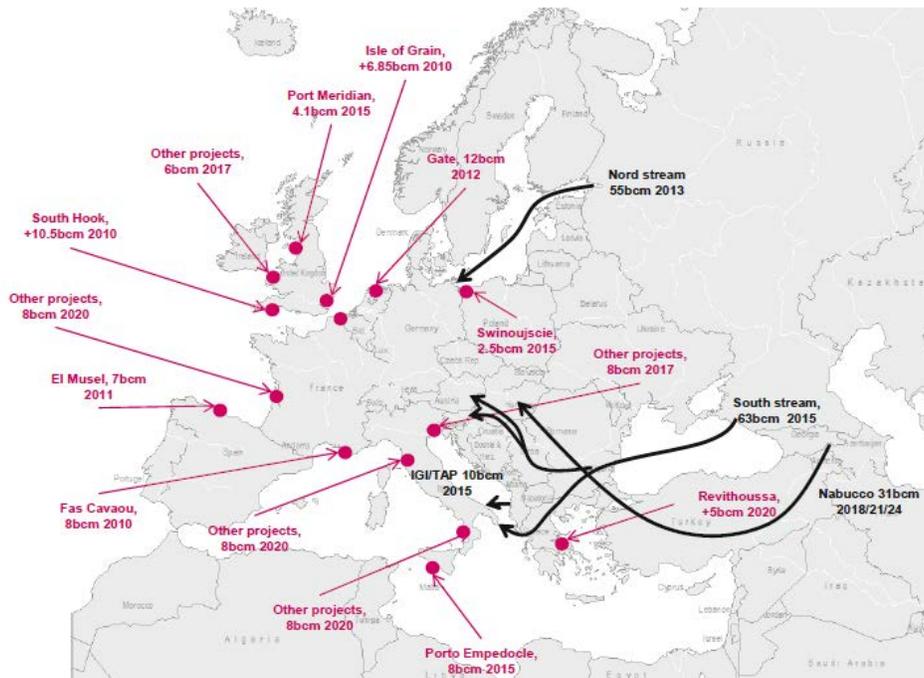
for natural gas, while charging states that are closer to Russia like Armenia just over a \$100 per thousand cubic meters), and (2) Russia's lack of upstream investment and inefficient domestic use of gas could lead to gas shortages for Europe.³¹ An instance of Russia's use of energy resources as a political tool is the quadrupling of natural gas prices by Gazprom as a counter to the 2005 Orange Revolution in Ukraine. Such concerns are valid. Rising gas prices in Europe over recent years indicate that Gazprom has arguably used its market power to artificially increase prices. A key turning point for Europe was in 2008 when Russia switched off the supply to Ukraine, affecting European homes in the middle of winter.

Yet current market trends are providing Europe with an opportunity to re-imagine the relationship with Russia. Given the shale gas boom in North America and subsequent potential for US LNG exports, the Qatari LNG supply to Europe, and an economic crisis that has led to decreased gas demand, Europe has gained leverage in order to (1) push the decoupling of gas to oil pricing, and move away from long-term contracts, and (2) increase liberalization of gas markets through the EU's Third Energy Package, which envisions the creation of functioning, physically connected, wholesale markets structured as entry-exit zones to facilitate the development of liquid and transparent virtual trading hubs across Europe. At the same time, the process of fracking needed to extract shale gas is not politically popular in Europe with a number of countries already banning it. This means home grown European shale gas is a very distant possibility and does not pose an immediate concern to Russia and Gazprom.

If Europe as a whole is successful in putting pressure on Russia, the result may be limited. Europe is still primarily dependent on pipeline gas from Russia. Moreover, it is difficult to have a united European approach to energy relations with Russia. This is especially complicated as Gazprom has strong business relations with Germany's E.ON and BASF, Italy's ENI and Enel, French Gaz de France and Dutch Gasunie.³² Ultimately it benefits both parties to engage in bilateral commercial contracts by which Europeans acquire stakes in Gazprom's upstream investments while Gazprom acquires stake in European assets (such as utilities). In 2007, the EU, similarly to the Third Energy Package, had proposed the Third Gas Directive that would disallow companies that controlled both the upstream and downstream process to invest in the transportation sector. While this caused a temporary decline in Euro-Russian relations, the status quo eventually prevailed. Europe's Third Energy Package should thus be viewed within the context of a negotiating tool. Last year the European Commission announced the initiation of an antitrust investigation against Gazprom. The primary complaint relates to Gazprom's alleged abuse of its dominant gas position in Central Europe, by (1) limiting the free movement of gas between EU member states, (2) preventing attempts to diversify gas supplies to EU countries, and (3) imposing unfair prices on contractors. Experts in Europe and Russia believe the long appeal process and Europe's existing dependence on Russian gas supplies will make it difficult to force Gazprom to change its current practices.

However, this dependence on Russia will likely ease over time assuming favorable conditions for shale gas production and exportation from other regions. Dependence on Russia will therefore unlikely ease in the near to medium-term.

Figure 6: New Gas Flows into Europe



Source: Enel

Changing US-Russia Relations

The effect of shale gas revolution in the US will have consequences on Russia. Chapter II discusses the effect of changing energy trade patterns on account of the discovery and production of shale gas in the US. As Europe diversifies its supply sources, its demand for Russian gas will decrease, thereby decreasing Russia's revenues from Europe. Given that Gazprom accounts for about 25% of Russia's tax revenues, the implications for Russia are substantial.³³

America's immediate foreign policy concerns lie in three regions: Afghanistan, Iran and Syria. America's recent efforts to engage Russia on these issues have not been very successful. From the US perspective, the failure was a result of three issues: (1) the decreasing geopolitical relevance of Russia; given the impending withdrawal of US troops from Afghanistan by 2014 means the US may need Russia less. (2) Russia has been inconsistent with its mediator role in Iran and Syria. With regard to Iran, Russia recently indicated an end to its support for any kind of Western led resolution in the UN Security Council. On Syria, Russia has gone a step further. Russia thrice vetoed US led UNSC sanctions and instead continues to supply weapons and technology to President Bashar Assad. However, recent cooperation between the US and Russia on the process of elimination of chemical arms in Syria is a positive signal of further potential collaboration between the two countries. On one hand, the agreement indicates Russia's continued influence and stake in the region; while reasserting America's need for Russia's support especially in the Middle East. At a time when the US is vulnerable at home, Russia's leadership on Syria can be seen Russian soft power leverage on regional and global issues. (3) Russian domestic rhetoric assumes an anti-American rhetoric, as when Putin labeled America a country that legalized torture.³⁴ Given American energy independence through shale gas, a potential argument would then be that the

United States could consider LNG exports without an analysis of the implications for Russia. However, doing so would be a mistake in both key scenarios of US LNG exports:

- *US Exports LNG to Europe and Asia.* In doing so, Russia will clearly be impacted, especially as Europe (Russia's key market) will be able to diversify away from Russian natural gas. This could potentially lead to Russia asserting itself on the global stage in unpredictable ways. According to the Federation of American Scientists, Russia possesses the largest stockpile of weapons of mass destruction, and may potentially rely on this for leverage.
- *US Does Not Export LNG to Europe and Asia.* In this instance, the US would still need a strong relationship with Russia, to counterbalance China's growing global influence as well as need Russia to jointly resolve global issues – as is seen in the recent case of Syria. Additionally, the United States still needs Russian cooperation for national security given the need for nuclear nonproliferation and cyber security. At the same time, Russia needs the US as a strategic partner as it aspires for enhanced geopolitical status and is vulnerable to US exports of LNG to Europe and Asia.

China-Russia Relations

Within Gazprom's strategy of looking East, the most complex component is the bilateral relationship between Russia and China. Russia's desire to gain a foothold in the East for supply markets is long standing. In 2006, Gazprom attempted to enter the Chinese and South Korean energy markets via contracts with CNPC and Kogas, respectively. This "Eastern Program" suffered disagreements over pricing strategies as well as lack of heavy investment and capital requirements for Russia to develop its Siberian gas fields.³⁵

President Dmitry Medvedev's inaugural visit to Beijing in May 2008 was followed by two ambitious undertakings, the East Siberia Pacific Ocean (ESPO) pipeline and Altai pipeline. Transneft opened the final branch of the EPSO pipeline, while the future of the Altai pipeline remains uncertain given an inability to agree on gas pricing. In September 2012, both Prime Minister Medvedev and one of Russia's most prominent oligarchs, Oleg Deripaska, advocated for Russia's need to "pivot to Asia".³⁶

Although there is still uncertainty around a gas pipeline from Russia to China, and it is our belief that it is unlikely, the China Russia Energy Cooperation Committee reached an agreement this year by which Russia will provide annual supply of 38 bcm of natural gas to China with further potential for collaboration in oil.³⁷ President Xi Jinping's recent visit to Russia produced a crude oil agreement, and the gas pipeline was once again discussed. Beyond energy, bilateral trade has more than doubled in the past five years, reaching \$83 billion in 2012. This is smaller than Russia's trade with the EU, and China's trade with the US, but trade in energy is a growth market for both nations. Gazprom has said it is aiming to sign a gas deal with China by the end of this year, and oil and gas analysts believe this is realistic if Russia moves quickly and shows willingness to compromise.

Russia is the world's largest energy producer, and China is its largest consumer – a partnership seems inevitable. However, there is also a level of mistrust between the two nations that causes a level of uncertainty about China-Russia ongoing relations.

Asian Market Opportunities

There are two major opportunities for Gazprom in Asia:

- *LNG Focus in Asia.* Gazprom's near and medium-term Asia strategy will be primarily LNG focused. In spite of increased global LNG competition, current supply and demand in Asia drives high prices. LNG offers Russia flexibility in terms of whom to sell to, and can be implemented by expanding existing facilities and building new facilities.
- *Expansion across Asia.* Gazprom's LNG strategy will enable the firm to increase its geographical reach and influence by reaching countries as far as India.

Gazprom has already begun exploring these opportunities via numerous projects:³⁸

- *Sakhalin LNG Project Expansion.* Sakhalin II is Russia's only current LNG project in the Far East. The primary buyer is Japan (65%) with the rest slated for South Korea. In June 2012, Gazprom and Shell announced a FEED study to possibly expand the Sakhalin II LNG project from 9.6 mn tpa to 15 mn tpa.
- *Vladivostok LNG Project.* This project signals cooperation between Russia and Japan. In June 2012, Russia and Japan signed a memorandum of understand to cooperate on possible LNG projects in Vladivostok. Japan would prefer a pipeline, which would lower cost and feed more directly to end-users. Also, construction of a gas pipeline to Japan may be difficult given the high level of seismic activity in the area. However, Gazprom has indicated that it would consider construction of a gas pipeline to Japan after the Vladivostok LNG plant is built. Given that Russia faces competition from Australia and potentially the US, developing ties with Japan would be a strategic move.
- *Northern Sea Route.* Gazprom is also in the process of testing LNG shipments by the Northern Sea Route (through a joint-venture with Sovcomflot), which would reduce transportation costs and make Russian LNG more competitive in high-priced Asian markets. Gazprom also has a Russian competitor Novatek for Southeast Asian markets where increasing prices of Australian LNG has led to interest in Arctic gas.³⁹
- *Interest in South Asia.* Russia is looking to diversify away from Europe and towards Asia. In an attempt to control 15% of the LNG market, Gazprom is considering opportunities in India and South Asia. Gazprom has agreed to a long-term LNG supply deal with India, broadening Russia's gas trade and reducing Russia's dependence on the European market. Gazprom Global LNG signed a memorandum of understanding with Gail, Gujarat State Petroleum Company and Petronet to supply up to 10 bcm of LNG over 25 years. Additionally, in April 2012 Gazprom announced that it would drill 10 wells to produce gas in Bangladesh. Bangladesh Oil, Gas and Mineral Corporation will bear the cost of the project. Gazprom plans to launch a large LNG plant capable of processing 15 million cubic tons annually near the Far Eastern port of Vladivostok and another with a capacity of 10 million cubic tons in the Leningrad Region by 2018. A third project of 6 million cubic tons on the Baltic Sea may be in the works; Gazprom would hold a 49 percent stake. Both reserves and production numbers indicate that Russia and Gazprom will be able to deliver on the export promises to Asia.

Not just energy demand, other factors contribute to a growing Asian market. For instance, there is interest from Indian and Japanese financiers to work with Russian public and private sector entities to develop the stagnant exploration of the Yamal and Shtokman fields. This presents an opportunity for Russian private entities to enter new markets and/or get financing for their own investments. An important development is the possible end of Gazprom's monopoly to export LNG as Russian competitors like Novatek that is involved in building a LNG plant in the Yamal peninsula.⁴⁰

CHAPTER 4: Options and Recommendations for Russia and Gazprom

Recommendations Overview

Russia

Russia must also adapt to a world in which its energy hold over other nations may not be as strong as it once was, and therefore Russia should:

- Use soft power strategies, multilateral and bilateral forums to build a stronger relationship with Europe
- Enhance its credibility via soft power strategies in Central Asia (leveraging the Shanghai Cooperation Organization to start)
- Maintain control over transportation pipelines
- Ensure domestic political stability
- Work with US to leverage bilateral areas of cooperation (such as Arctic, Afghanistan, nuclear nonproliferation, cyber security)
- Work with China to establish energy trade and foreign policy cooperation as counterweights to the US and its allies, and shared interests in Central Asia
- Focus on Japan and South Korea as well as Southeast Asia

Gazprom

Gazprom is at a critical point given the rise of unconventional gas in other parts of the world and its exportation via LNG, and in order to sustain itself and ensure its global standing, it should:

- Ensure secure piped gas to Europe, especially as Europe will remain Gazprom's core market in the next five to 10 years
- Strengthen LNG position in Asia
- Continue to build its aggregator model by partnering with European independent oil companies and utilities
- Maintain strategic alliances with Eni, Total and Statoil to develop upstream infrastructure
- Access higher-priced markets in Asia to balance and diversify Gazprom's export portfolio away from Europe and grow sales volumes

Gazprom's Evolving Business Model

Gazprom experienced a difficult 2012 with net profits declining by 33% in the first half of the year.⁴¹ This comes in the wake of slowly declining demand from Europe with the inset of the economic crisis, given LNG imports. While some predict dire consequences for Gazprom, there in fact are substantial opportunities that the gas giant can leverage to maintain its standing in the industry. To understand these potential opportunities, it is critical to analyze Gazprom's strategy.

In 2003, recognizing the need for major investment in Gazprom, the Putin government proposed a three stage plan to increase production volumes and combat distortions in the gas industry. Per the plan, by 2010, gas transportation would be separated from production, domestic prices would be set at market prices, and independent production would increase by 27% as a share of total production.⁴²

However, asset divestitures were opposed by Gazprom's management, on grounds that this would jeopardize Russia's economic and energy security, forcing the company to adopt a global strategy based on diversification. This involved (1) looking for new markets in Asia and the US, (2) supplementing wholesale customers in Europe with retail customers, (3) diversifying methods of distribution by supplementing existing pipelines with new pipelines and LNG, and (4) adding oil production and power generation as part of Gazprom's core business strategy. Gazprom carried out certain aspects of this new strategy; the full strategy was never implemented as a result of pressures within Gazprom and lack of sufficient external pressure on Gazprom. The changes that were incorporated included:

- *Short Term.* Gazprom developed small fields close to existing infrastructure rather than invest in super giant fields. It also entered the European natural gas retail market through acquisitions and joint ventures.
- *Long Term.* Gazprom had plans to develop the Yamal peninsula whose fields in Bovanenkovskoe, Kharasaveiskoe and Novoportovskoe held 60% of all Russian natural gas reserves. The Yamal fields presented the challenge of permafrost and harsh environmental conditions. Gazprom's strategy for future production at this time also included developing the Shtockman fields in the Barents Sea, the Arctic, East Siberia and the Far East.
- *Expansion from Gas to Oil.* In 2005, Gazprom acquired Sibneft renaming it Gazprom Neft, while the state owned oil company Rosneft acquired Yukos.
- *Looking East.* In 2006, Gazprom completed an agreement with Chinese National Petroleum Corporation (CNPC) and Korea Gas Corporation (Kogas) to enter the Chinese and Korean gas markets respectively. Gazprom's export strategy to the East has always been linked to required green-field investment, technology for production, and transportation infrastructure.

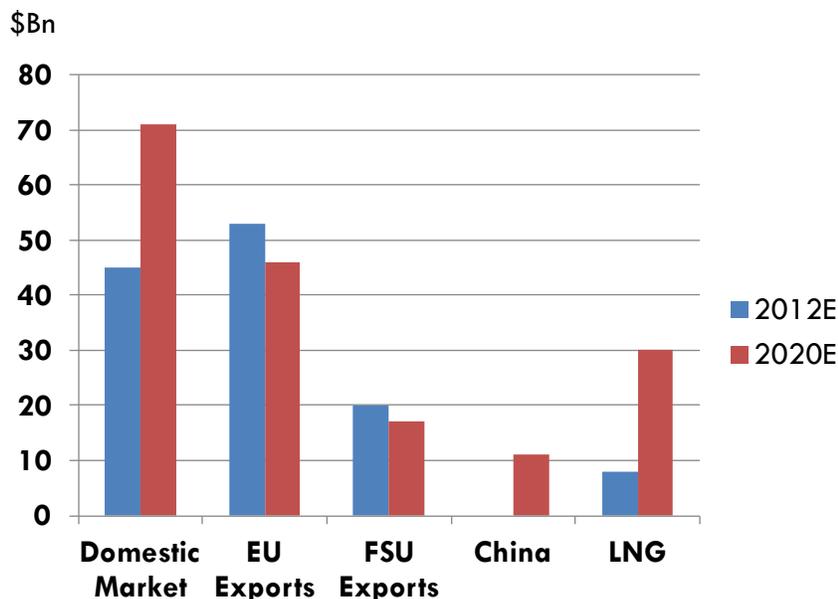
Today, a very similar debate looms over Gazprom's business strategy going forward. While a number of the same challenges remain today, Gazprom is positioned to take advantage of, rather than suffer from, rapid changes in the energy industry. While the EU probe into Gazprom pricing strategy and challenge to its aggregator model will continue, per professional opinion⁴³, these are just EU ploys to gain leverage against Gazprom. Looking East, Sakhalin II saw the first Russian LNG plant deliver gas to Tokyo Gas. Gazprom's LNG will mostly reach Asia, whose demand is only increasing. There is also great opportunity, as Asian financiers from India and Japan are interested in developing the stagnant exploration of the Yamal and Shtokman fields.

At the same time, it cannot be denied that domestic changes within Russia's national energy sector are posing challenges for Gazprom. The old prevailing model of Gazprom subsidizing domestic gas at the cost of charging higher export prices is outdated and not sustainable for Gazprom's long-term competitiveness. Russian professionals interviewed have disclosed that the gas sector model will soon resemble the oil sector model with co-existence between state and private producers. The same debate as before has surfaced – discussing the benefits of a separate government owned entity to run transportation while gas prices are driven by demand and supply economics.

Looking forward, a number of analysts believe that a more nimble and lean Gazprom, one that can quickly adapt to changes in the gas market, will be needed to sustain itself. This may require splitting Gazprom's pipeline business from production and sale of gas, essentially splitting the company into three smaller units. This would also likely mean the existence of smaller and separate gas producers that would compete to extract, produce and market smaller 'corridor' gas fields closer to existing gas fields or pipelines.

Gazprom’s short and medium term strategy will see an increase in revenues from LNG, China, and the domestic market (through price increases) by 2020 as compared to 2012.

Figure 7: Gazprom’s Revenue Breakdown, 2012E vs. 2020E



Source: Research analysts

Growth of LNG

Global gas demand projections and a move to LNG imports indicate that LNG could be the most important growth driver for Russia. Additional LNG volume is expected to come from Novatek’s Yamal LNG project (20 bcm), Gazprom’s Vladivostok LNG project (14bcm), and a likely expansion of the Sakhalin LNG plant. Russia should capitalize on LNG through a first mover advantage before the US DOE issues additional export licenses, export terminals are finalized, and indigenous shale gas is exported. Additionally, given Russia’s Far East proximity to Asia, Russia should capitalize on its lower transportation costs to gain LNG market share in Asia.

Competing with Independent Producers

Gazprom’s main competitor in Russia is Novatek. According to Russian financial analysts, Gazprom has lower market expectations than Novatek. Financial analysts⁴⁴ argue that Gazprom valuation is already at historic lows while Novatek’s growth stock status means higher market expectations for the company. Novatek has been slowly gaining market share in Russia through finalizing deals such as the sale of gas to Magnitogorsk Steel Mill and the regional government of Chelyabinsk. It is also exporting its gas from the Yamal LNG project via Gazprom’s export subsidiary – a reminder that Gazprom still has legal monopoly on exports.

Gazprom still has a clear advantage over independent producers. Gazprom can shut down wells during weak demand periods (especially during the summer), allowing Gazprom to offer better contract terms to gas consumers as compared to independent producers. However, Gazprom also has to ensure security of

its spare capacity. Currently the company has 100 bcm of spare capacity and is losing 20 bcm of annual production from brownfields. This spare capacity will deplete within 5 years without additional investment. Greenfield investments are therefore crucial for Gazprom to maintain its spare capacity advantage over independent producers.

Move toward an Aggregator Model

Gazprom has started expanding partnerships with European IOCs and should continue to do so – this is of mutual benefit. Russian exploration and production (E&P) projects increasingly need new technologies while Europe continues to rely on Russia’s natural gas. This situation is ripe for partnership, enabling Gazprom to obtain E&P technology, establish relations with utilities for long-term take off agreements, and ensure access to Europe’s gas and power infrastructure. Partnering with utilities and IOCs will help Gazprom invest in high capital expenditure projects. The two most promising partners for Gazprom, in order to obtain upstream technology, include Total and Statoil.

As gas is less fungible than oil and has more constraints on trade, arbitrage opportunities, though profitable, are difficult to pursue. The aggregator model is a way by which Gazprom will be able to capture profits from this. Aggregators attempt to mix and match LNG buyers and sellers. Aggregators base sales on their own credit risk and portfolio sources and do not dedicate all their capacity and reserves to particular customers. To optimize the model, both contractual and technical flexibility is required along the LNG supply chain.

Figure 8: Portfolio Player / Merchant Model



In this model, aggregators can sign supply contracts with buyers, but not specify where the cargo will come from – this will be decided close to the time of delivery in order to optimize the economics. Due to the constraints in the storage and movement of gas, price disconnects and arbitrage opportunities can be substantial.

Gazprom essentially has accumulated many of the necessary elements to achieve this business model. Gazprom’s interests abroad, its trading presence in the US and Singapore, its LNG projects, and positions in storage and traded hubs in Europe are helping Gazprom achieve the aggregator model. Operating as an aggregator will drastically change Russia’s position in the global gas markets:

- Gazprom will be able to manage a portfolio as an aggregator with the ability to trade gas in markets rather than managing simpler buyer-seller relationships. Ownership at multiple parts of the supply chain would help in arbitrage pricing, balance demand and supply volumes, reduce market risk, and increase scale of the gas business.
- This global portfolio in turn will enable Gazprom to invest in infrastructure and integrate with key European suppliers.

Russian Gas Market Liberalization

Assuming a strong outlook for short and medium term gas production in Russia and no substantial increases in domestic gas demand, Russian professionals believe that the Russian government could move towards an increasingly liberalized market with prices determined by supply-demand rather than subsidy amounts and export volumes. This model would increase transparency and reduce regulatory risk. Russia may actually not have a choice but to liberalize. With shrinking export margins, Gazprom is currently losing income that could be directed to infrastructure investment. In view of current realities, the Russian government should move towards an open market model for the gas industry including parity between domestic and export prices and longer term liberalization of gas exports. Interviews further indicate that the Russian gas market does not seem to be overcrowded. This means there will not be a threat of undertaking prices by competing companies within Russia.

OPEC for Gas

The idea of a gas OPEC is not a new one. It is an attempt to formalize the Gas Exporting Countries Forum (GECF), a loosely defined group of the world's largest gas producers. Members of a gas OPEC would potentially include Russia, Qatar, Australia, Algeria, Venezuela, and in the future potentially the US.

If political realities do not challenge the formal organization of a gas OPEC, Russia will have an opportunity to use this forum to start a dialogue regarding gas prices. Russia could also take the lead in developing a dialogue with potential international energy partners such as Canada, Azerbaijan, Indonesia, Malaysia, and Iraq.

However scholars like Amy Myers Jaffe believe that the discovery of shale will prevent a natural gas cartel from forming.⁴⁵ Consumers, especially those in America and China, can increasingly rely on cheaper fuels at home rather than rely on more expensive imports from abroad. The growing scalability and low cost of drilling technology ensures that it is a matter of time that countries with shale reserves will begin to produce their own shale gas. This is bad news for petro-states that arguably no longer have the monopoly on natural. With LNG directed towards the US being diverted towards Europe, declining demand for Russian gas has already compelled Gazprom to slash prices to Ukraine by 30%.

Leveraging Bilateral Relations

Europe – Need for Future Flexibility

Europe is and will be Gazprom's core business. In the next five to 10 years, Gazprom's primary strategy will continue to be driven by long-term contracts for pipeline gas. Gazprom has to ensure its European supply market by connecting gas pipelines to Europe. In November 2012, there was approval for two additional strings of the Nord Stream pipeline, one of which will run to the UK, with an overall intention to increase capacity to 100 bcm – almost the same amount of gas that Russia currently pumps through Ukraine. The South Stream project going overland through Hungary, Serbia and Slovenia to Italy with four strings, while controversial will have a total capacity of 63.3 bcm. The two pipelines are intended to break Russia's dependency on Ukraine for a supply route to European markets.

Gazprom and Russia's energy sector face many challenges in regard to Europe. Price risk could come from a number of sources: (1) continued global conservatism post financial crisis and sustained low

energy demand, (2) possible US export, and (3) downward pressure on oil prices and subsequently gas prices (especially if gas prices remain pegged to oil prices).⁴⁶ Additionally, increased LNG supplies in Europe from Qatar, downward pressures on “spot” prices, possibility of US LNG exports to Europe and European investments in LNG terminals all imply a decrease of European reliance on Russian gas and decreased vulnerability to Russian political pressures. Moreover, there are signs of a more integrated EU policy towards energy security. For instance, there is a push to integrate Europe’s energy grids with a focus on renewable energy, which is indicative of Europe’s hedge against Russia. Finally, the anti-trust probe launched by the European Commission accusing Gazprom of using its dominant position in Eastern and Central Europe to increase prices and restrict competition sends a strong message, though many view it just as such. A lawsuit lose would result in a \$14 billion fine for Gazprom, but more importantly would further erode Russia’s leverage in Europe and its ability to price discriminate across European nations.

Russia therefore has to follow a two-pronged strategy:

- A shorter-term strategy of conceding to European price demands; and
- A longer-term adaptive strategy by which Russia focuses on the other recommendations in this section while developing stronger ties to Europe via soft power tactics.

Europe and Russia can leverage the platform of the EU-Russia Energy Dialogue. Initiated in 2000, this was the first real energy dialogue aimed to build a trusting long- term relationship between Russia and Europe. This has arguably contributed to Russia’s ratification of the Kyoto Protocol, and enhancing marine safety for heavy oil tanker transportation.⁴⁷ Yet another recent initiative is the EU-Russia Gas Advisory Council (GAC) to discuss implications of the Third Energy Package for Russia.

Additionally, Russia should realize and leverage the fact that Europe could suffer from America’s shale boom. Reports indicate that fuelled by cheaper manufacturing costs (as a result of low cost shale gas), petrochemical, fuel, and fertilizer companies are investing in the US. For example, the steelmaking industry is gradually shifting from Europe to the United States.⁴⁸

Central Asia – Enhance Soft Power in Near Abroad

Russia has to enhance soft power strategies in Central Asia. Post Soviet collapse, foreign policies within Central Asian nations have varied, from intermittent Uzbek hostility towards Russia and the US, to Turkmenistan’s push for isolationist foreign policy, to Kazakhstan’s pragmatic multi-vector strategy of maintaining good relations with multiple nations.

The region is important to Russia for three key reasons: (1) ensure energy supply from Central Asia to European customers, (2) maintain geopolitical influence over its immediate neighbors, and (3) control Central Asian energy resources to access strategically important countries including Iran, Afghanistan and Pakistan. Central Asia today represents the “great game” diplomacy of Cold War Russia and US. Except now there are three main players interested in the region – China has joined Russia and the US.

Russia has certain advantages in the region. A shared history, energy demand from the region, and dependence on Russia for energy transportation provides Russia the upper hand in its sphere of influence in region for the short and medium terms. At the same time, Russian-Central Asian relations need to move away from this old paradigm dominated by physical control of energy transportation routes.

Additionally, Russia cannot afford to continue to be perceived as the “neighborhood bully” and project military or hard power. To its merit, Russia has institutionalized its relations via regional organizations such as the Commonwealth of Independent States (CIS), Collective Security Treaty Organization (CSTO), and the Eurasian Economic Community (EEC). Also, Russian companies, including Gazprom, Rosneft and Lukoil have long-term contracts with regional oil and gas producers ensuring dependence of these countries on Russia. Russia needs to move beyond current relations to (1) improve bilateral relations with Central Asian countries – using the SCO and other regional forums, (2) ensure internal political stability within Central Asia, and (3) maintain control of pipeline networks in Central Asia.

Far East – New Partners for Russia

Gazprom’s Asia strategy intends to access higher-priced markets, balance and diversify Gazprom’s export portfolio, and grow sales volumes. However, there are certain challenges to this, as Russia missed earlier opportunities to establish long-term contracts with China, South Korea, and Japan. These countries have sought other suppliers – Qatar imports LNG to Japan – thereby decreasing Russia’s leverage in the region. To rebuild trust and gain position in China, Gazprom should focus on China’s transportation sector, which, based on projections, will be increasingly using gas instead of oil. Russian oil and gas analysts suggest that Gazprom has the potential to sell gas at a 75% to 80% discount to Asian diesel, but still well above the European gas price, a win for both parties.

The second area of cooperation between Russia and China could be their shared regional security interest in Central Asia. An increased Chinese presence in Central Asia, through bilateral energy contracts with Turkmenistan and Kazakhstan, is a concern for Russia as it views Central Asia as its sphere of influence. However, Russia must look past this for its own benefit. Chinese diplomatic rhetoric generally has been aware of Russia’s concerns, and has deferred to Moscow on regional security issues. Bilateral defense relations have improved with Moscow and Beijing conducting joint exercises, including the first official naval exercise called *Maritime Cooperation 2012* in the Yellow Sea near Qindao. Shared regional security interests are also visible in the Shanghai Cooperation Organization (SCO), which Russia should further utilize as a platform to strengthen bilateral cooperation.⁴⁹ Russia, in its bid to increase its political and military influence in Central Asia, should view China as a strategic partner rather than a competitor. Interviews conducted with Russian policy experts indicate that China’s presence is no longer being perceived as a threat to Russia by Moscow as China’s interests in the region are arguably economic and not political. For the moment, Beijing would much rather have Russia hold political responsibilities over the region.

The new Chinese President Xi Jinping recently visited Moscow in his first foreign trip, signaling a move towards true strategic cooperation between the two nations. The Chinese government is arguably driven by its economic interests and a need for raw materials to drive this ambition. However, this should suit Russia, as it is well positioned to provide the key raw material: energy. President Xi, during his visit, said “China and Russia, as the biggest neighbors of each other, share many commonalities in their blueprints of national development. Currently, China and Russia are both in important periods of national revival, and bilateral relations have entered a new stage in which each provides the other with important development opportunities and treats the other as a major partner.”⁵⁰ Various agreements were signed during the trip, and the issue of a gas pipeline was reignited. However, in addition to economic reasons, China may be “partnering” with Russia to send the US a message of its global alliances. Regardless, Russia should use this opportunity to cement a position in the Asian gas market.

United States – Make Space for Cooperation

Russia has to take measures to improve relations with the US. Moscow and Washington have shared energy interests to develop the Arctic for energy resources. Also, foreign technology is essential to develop Russia's Far East. This is a natural area of cooperation where economic interests have the potential to override other military and security concerns. Russia's aspirations for a Northern Sea Route for trade and commerce, and a potential source of revenue given transit fees along the route will be partly dependent on its relations with the US and NATO.

There is also potential for further nuclear cooperation between the United States and Russia. This year marks the 50th anniversary of the Limited Test Ban Treaty (LTBT). With Russia and the US controlling more than 90% of global nuclear weapons this is an area of cooperation that could spillover into other aspects of the US–Russia relationship. The US Senate should ratify the CTBT (Comprehensive Test Ban Treaty) providing further opportunity for US and Russia to work together in enforcing the treaty.

The third area of possible cooperation is a missile defense between NATO and Russia. With US's impending withdrawal from Afghanistan in 2014, there is shared interest for both US and Russia to ensure Afghanistan does not politically implode with repercussions for regional instability.

Both Russia and the United States need a better relationship to advance mutual interests. Russia will need to be careful in balancing its ties with China in dealing with the United States, but given its geographical presence between the East and the West, deep histories with both nations, and mutual interests across all ends, ties to both nations is a natural strategy.

Conclusion

The growth of shale gas production is impacting global natural gas markets, and thereby affecting Russia and its natural gas monopoly, Gazprom. The abundance of shale gas and the real prospect of export of US shale indicate the need for a new business model for Gazprom. Gazprom has short term and longer term goals to counter the threat to its traditional and most lucrative market, Europe. Gazprom is moving towards an aggregator model where it looks to control gas production, transportation and delivery to its clients. Additionally, Gazprom is hoping to increase its LNG market share, realizing the importance of the Asian markets on its future.

More broadly, Russia needs to use its hard petro power combined with soft power in bilateral relations with the US, Europe, and Asia. While shale reserves and production in the US and China are surely a huge concern for Russia and Gazprom, there is still time for the gas giant to implement far reaching and much needed changes in the way it does business and politics.

BIBLIOGRAPHY

Books and Articles

Abdelal Rawi, Sogomon Tarontsi and Alexander Jorov, 'Gazprom: Energy and strategy in a new era', *Harvard Business School Case*, 07/07/2009

Albright Madeline and Ivanov Igor, 'A new agenda by US-Russia cooperation', *New York Times*, 12/30/2012, http://www.nytimes.com/2012/12/31/opinion/31iht-edalbright31.html?_r=0

Antrim Caitlyn, 'Relocating the reset: US-Russian partnership in the Arctic,' *World Politics Review*, 02/29/2012, <http://www.worldpoliticsreview.com/articles/11627/relocating-the-reset-u-s-russian-partnership-in-the-arctic>

Assenova Margarita, 'Russian energy review in 2012: Consolidating state control in an uncertain market', *Eurasia Daily Monitor*, Volume: 10 Issue: 10, 01/18/2013, http://www.jamestown.org/single/?no_cache=1&tx_ttnews%5Btt_news%5D=40333&tx_ttnews%5BbackPid%5D=7&cHash=09711aff791cfcecb3928a6e333044f5

Barysch Katinka, 'Should the Nabucco pipeline project be shelved?', *Centre for European Reform Policy Brief*, 05/05/2010

Blas Javier, 'Russia faces challenges to gas supremacy', *Financial Times*, 04/17/2012, <http://www.ft.com/intl/cms/s/0/7099a0b6-886a-11e1-a526-00144feab49a.html#axzz2OOJLi7MS>

Buckley Neil, 'Gazprom posturing masks Russia's weakened position', *Financial Times*, 02/01/2013

Charap Samuel, Russia, Syria and the Doctrine of Intervention, *Survival: Global Politics and Strategy*, *International Institute for Strategic Studies*, 01/31/2013

Deutch John, 'The Good News about Gas'. *Foreign Affairs*, 2011

Deutch John, 'Shale gas: Can we safely tap a huge resource?'. *The Washington Post*, 08/18/2011

Diehl Jackson, 'The coming collapse', *World Affairs Journal*, accessed on 19/03/2013, <http://www.worldaffairsjournal.org/article/superpower-symbiosis-russia-china-axis>

Forbes Alex, 'Gas is dead. Long live gas', *European Energy Review*, 20 December 2012, http://www.europeanenergyreview.eu/site/pagina.php?id=4008#artikel_4008

Friedman Thomas L, 'The first law of petropolitics', *Foreign Policy*, May/June 2006

Goldman Marshall, *Petrostate: Putin, Power and the New Russia*, Oxford University Press, 2008

Goldthau Andreas, 'Rhetoric versus reality: Russian threats to European energy supply', *Energy Policy*, Volume 36, Issue 2, February 2008

Gordon Philip reviewed, *Pipelines, Politics and Power: The Future of EU-Russia Energy Relations*, Centre for European Reform, 2009

Grigoryev Yuli, 'The Russian gas industry, its legal structure and its influence on world markets', *Energy Law Journal*, Volume 28, Issue 1, 01/01/2007

- Gustafsen Thane, *Wheel of Fortune: The Battle for Oil and Power in Russia*, Harvard University Press, October 2012
- Gutterman Steve, 'Russia tones down criticism of new US missile plans', *Reuters*, 03/21/2013, <http://news.yahoo.com/russia-tones-down-criticism-u-missile-plans-192213110.html>
- Henderson James and Patrick Heather, 'Lessons from the February 2012 European gas crisis', *Oxford institute for Energy Studies: Energy Comment*, April 2012
- Jaffe Amy Myers, 'Shale gas will rock the world', *Wall Street Journal*, 05/10/2010
- Kasayev Eldar, 'The myth of a natural gas OPEC', *The National Interest*, 11 February 2013, <http://nationalinterest.org/commentary/the-myth-natural-gas-opec-8082>
- Kong Bo, *China's International Petroleum Policy*, Praeger: Santa Barbara, 2010
- Kuzmin Viktor, 'Gazprom faces new challenges', *Russia, Beyond the Headlines*, 12/05/2012, http://rbth.ru/articles/2012/12/05/gazprom_faces_new_challenges_20807.html
- Leung Guy C.K., 'China's energy security: Perception and reality', *Energy Policy*, 2011
- Luft Gul and Anne Korin (eds.), *Energy Security Challenges for the 21st Century*, Greenwood Publishing Group, 2009
- Lukyanov Fyodor, 'Putin outlines his moral vision for modern Russia', 12/18/2012, http://rbth.ru/articles/2012/12/18/putin_outlines_his_moral_vision_for_modern_russia_21217.html
- Milov Vladimir, Martha Brill Olcott, 'The great uncertainty: Russian-Central Asian energy relations', *Carnegie Endowment for International Peace*, 06/13/2007
- Morse Edward L. and Amy Mayers Jaffe, *Energy and Security: Towards a New Foreign policy Strategy*, Johns Hopkins University Press, 2005
- O' Sullivan Meghan L., 'Energy independence alone won't boost US power', *Bloomberg*, <http://www.bloomberg.com/news/2013-02-14/-energy-independence-alone-won-t-boost-u-s-power.html>
- O' Sullivan Meghan L., *Shrewd Sanctions: Statecraft and State Sponsors of Terrorism*, Brookings Institution Press, 2003
- Pryde Ian, 'Gas, black gold and the country's future', *Russia, Beyond the Headlines*, 12/04/2012, http://rbth.ru/articles/2012/12/04/shale_gas_divides_russia_and_the_us_20801.html
- Rotman David, 'Natural gas changes the energy map', *Technology Review*, November-December 2009
- Smith Keith, 'Russia and European energy security', *Centre for Strategic and International Studies*, October 2008
- Vatansver Adnan and Koranyi David, 'Lowering the price of Russian gas: A challenge for European energy security', *European Energy Review*, 03/11/2013, http://www.europeanenergyreview.eu/site/pagina.php?id=4068#artikel_4068
- Victor, Jaffe and Hayes ed. *Natural Gas and Geopolitics*, Cambridge University Press, 2006

‘European energy security: An analysis of future Russian natural gas production and exports’, *Energy Policy*, Issue 38, 2010

Yergin Daniel, *The Prize: The Epic Quest for Oil, Money and Power*, 2008

Yergin Daniel, *The Quest: Energy, Security and Remaking of the Modern World*, New York: Penguin Press, 2011

Yergin Daniel, ‘China and America need not be energy rivals’, *Financial Times*, 05/21/2007

‘A Russian Frenemy’, *Los Angeles Times*, 03/05/2013,
<http://articles.latimes.com/2013/mar/05/opinion/la-oe-arons-russia-pause-20130305>

‘Global energy rivalry changing gas market’, *Russia, Beyond the Headlines*, 10/23/2012,
http://rbth.ru/articles/2012/10/23/global_energy_rivalry_changing_gas_market_19359.html

‘US shale boost provokes EU fears and indecision’, *Euractiv*, 23/01/2013,
<http://www.euractiv.com/specialreport-europe-industry-ha/us-industry-shale-boost-provokes-news-517266>

‘Russia and America: The dread of the other’, *The Economist*, 02/16/2013,
<http://www.economist.com/news/europe/21571904-leading-role-played-anti-americanism-todays-russia-dread-other>

‘Russia gas: Bearish implications’, *The Economist*, 09/08/2011

‘Russia in the Arctic: Economic interests override military aspirations’, *Strategic Comments*, Volume 18, Comment 43, November 2012

‘Step forward for shale gas imports’, *Daily Yomiuri Online*,
<http://www.yomiuri.co.jp/dy/business/T130224003880.htm>, 02/25/2013

‘The geopolitics of US energy independence’, *The International Economy*, Summer 2012

‘200 years of the Russian gas industry: Strategy and prospects’, *Valdai Discussion Club*, 10/24/2010,
<http://valdaiclub.com/economy/33300.html>

‘Update 2: Gazprom to study LNG output expansion for Asia’, *Reuters*, 06/29/ 2012

‘Gazprom puts its stake in shale oil’, *Russia Beyond the Headlines*, 11/01/2012,
http://rbth.ru/articles/2012/11/01/gazprom_puts_its_stake_in_shale_oil_19659.html

Reports

Ebel Robert, ‘The geopolitics of Russian energy: Looking back, looking forward’, *Centre for Strategic and International Studies*, July 2009

International Energy Outlook 2011, US Energy Information Administration, 09/2011

Golden Rules for a Golden Age of Gas, International Energy Agency, 11/12/2012

BP Statistical Review of World Energy, June 2012, bp.com/statisticalreview

Energy 2020: North America: The New Middle East?, Citibank Report, 03/20/2012

Myers Amy and Meghan L. O'Sullivan, *The Geopolitics of Natural Gas: Report of Scenarios Workshop, The Geopolitics of Energy Project at Harvard*, July 2012

'*Overview of the LNG Industry and Project Development*', Presentation by Seng-Kee Wong, General Manager, LNG Origination & Governance and Marc Maesele, Project Director, US LNG Export, Shell, 03/07/2013

Russian Energy Policy Towards its Neighboring Countries, CRS Report for Congress, 03/27/ 2008

Shale Gas Production Subcommittee Second Ninety Day Report, US Department of Energy, 11/18/2011,

http://www.shalegas.energy.gov/resources/111811_final_report.pdf

World Energy Outlook 2011, OECD, 2011

List of interviewees to be provided upon request

References:

- ¹ *World Energy Outlook 2011*, OECD, 2011
- ² Javier Blas, 'Russia faces challenges to gas supremacy', *Financial Times*, 04/17/2012, www.ft.com/intl/cms/s/0/7099a0b6-886a-11e1-a526-00144feab49a.html#axzz2O0JLi7MS
- ³ 'European energy security: An analysis of future Russian natural gas production and exports', *Energy Policy*, Volume 38 (2010), p.2
- ⁴ 'Russian energy policy towards its neighboring countries', *CRS Report for Congress*, 03/27/ 2008, pp. 6-7
- ⁵ Yuli Grigoryev, 'The Russian gas industry, its legal structure and its influence on world markets', p. 8
- ⁶ Artem Kves, Interview conducted 02/07/2013
- ⁷ 'Russian energy policy towards its neighboring countries', *CRS Report for Congress*, 03/27/ 2008, p. 7
- ⁸ 'EU, Russia say third package conflict can be solved', *Reuters*, 12/01/2011, www.reuters.com/article/2011/12/01/russia-eu-idUSL5E7N12NY20111201
- ⁹ Information from Golden Rule for a Golden Age of Gas, International Energy Agency, 11/12/2012
- ¹⁰ 'Shell's shale gas hunt in Sweden under fire', *Reuters*, 05/21/2010, www.reuters.com/article/2010/05/21/us-shell-shalegas-sweden-idUSTRE64K4LP20100521
- ¹¹ *World Shale Resources: An Initial Assessment of 14 Regions Outside of the United States*, EIA, 04/05/2011
- ¹² Ken Morton and Artem Kves, Interviews conducted, 02/07/2013
- ¹³ *Shale Gas Production Subcommittee Second Ninety Day Report*, US Department of Energy, 11/18/2011, www.shalegas.energy.gov/resources/111811_final_report.pdf
- ¹⁴ *Ibid*
- ¹⁵ *International Energy Outlook 2011*, US Energy Information Administration, 09/2011
- ¹⁶ *Ibid*
- ¹⁷ 'LNG export destinations are being diversified, says QNB', *Arab News*, 03/25/2013, www.arabnews.com/lng-export-destinations-are-being-diversified-says-qnb
- ¹⁸ 'Gazprom expects price drop for Europe in 2013', *Russia Beyond the Headlines*, 02/05/2013, http://rbth.ru/business/2013/02/05/gazprom_expects_price_drop_for_europe_in_2013_22533.html
- ¹⁹ 'Cheniere says may sell spot Sabine Pass LNG late 2015', *Reuters*, 09/19/2012, www.reuters.com/article/2012/09/19/us-lng-sabine-idUSL4E8KJ0GN20120919
- ²⁰ Jonathan Philipps, Interview conducted, 01/23/2013
- ²¹ Geoffrey Lyons, Interview conducted, 01/24/2013
- ²² *International Energy Outlook 2011*, US Energy Information Administration, 09/2011
- ²³ Information from official Shell presentation, Harvard Kennedy School, 03/08/2013
- ²⁴ Artem Kves, Interview conducted 02/07/2013
- ²⁵ Kartik Misra, Interview conducted, 03/01/2013
- ²⁶ 'President Putin's growing gas insanity', *Forbes*, 09/29/2012, www.forbes.com/sites/matthewhulbert/2012/09/29/president-putins-growing-gas-insanity/
- ²⁷ 'Russia, China find compromise on gas deal after 15 year standoff', *Reuters*, 03/25/2013, www.reuters.com/article/2013/03/25/russia-china-gas-idUSL5N0CHI1H20130325
- ²⁸ Interviews conducted with US Department of Energy and Russian analysts
- ²⁹ Clifford Klaus, 'Exxon and Russia's Oil Company in Deal for Joint Projects', *New York Times*, 16 April 2012, http://www.nytimes.com/2012/04/17/business/energy-environment/exxon-and-russian-oil-company-agree-to-joint-projects.html?_r=0
- ³⁰ 'Gaz de France secures Gazprom supplies', *The Moscow Times*, 04/10/2003, www.themoscowtimes.com/business/article/gaz-de-france-secures-gazprom-supplies/239175.html
- ³¹ 'European energy security: An analysis of future Russian natural gas production and exports', *Energy Policy*, Issue 38 (2010), p.2
- ³² Marshall Goldman, *Petrostate: Putin, Power and the New Russia*, Oxford University Press, 2008, p. 33-35
- ³³ Andreas Goldthau, 'Rhetoric versus reality: Russian threats to European energy supply', *Energy Policy*, Volume 36, Issue 2, February 2008
- ³⁴ 'A Russian "frenemy"', *Los Angeles Times*, 5 March 2013, www.articles.latimes.com/2013/mar/05/opinion/la-oe-aroon-russia-pause-20130305
- ³⁵ Victor Jaffe and Hayes ed. *Natural Gas and Geopolitics*, Cambridge University Press, 2006, pp. 40-45
- ³⁶ Ian Pryde, 'Gas, black gold and the country's future', *Russia, Beyond the Headlines*, 12/04/2012, www.rbth.ru/articles/2012/12/04/shale_gas_divides_russia_and_the_us_20801.html
- ³⁷ 'China and Russia energy deal viewed as strategic cooperation', *BSR Russia*, 26 February 2013
- ³⁸ Information gathered through interviews with Russian analysts
- ³⁹ 'Gazprom set to compete in Asia LNG market', *UK Reuters*, 21/06/2013, <http://uk.reuters.com/article/2013/06/21/russia-gazprom-idUKL5N0EX35G20130621>
- ⁴⁰ 'Interview: Gazprom set to compete in Asia LNG market- export chief', *Thompson Reuters*, 21/06/2013, <http://uk.reuters.com/article/2013/06/21/russia-gazprom-idUKL5N0EX35G20130621>
- ⁴¹ Margarita Assenova, 'Russian Energy Review in 2012: Consolidating State Control in an Uncertain Market', *Eurasia Daily Monitor*, Volume: 10 Issue: 10, Jan 18, 2013, www.jamestown.org/single/?no_cache=1&tx_ttnews%5Btt_news%5D=40333&tx_ttnews%5BbackPid%5D=7&cHash=09711af1791cfceeb3928a6e333044f5
- ⁴² Gazprom: Energy and Strategy in a New Era', *Harvard Business School Case*, Rawi Abdelal, Sogomon Tarontsi and Alexander Jorov, 07/07/2009
- ⁴³ Interviews conducted with analysts in the US and Russia.
- ⁴⁵ Amy Mayers Jaffe, 'Shale gas will rock the world', *Wall Street Journal*, 05/10/2010, <http://online.wsj.com/article/SB10001424052702303491304575187880596301668.html>
- ⁴⁶ Meghan O' Sullivan, 'Energy Independence Alone won't boost US power', *Bloomberg*, www.bloomberg.com/news/2013-02-14/energy-independence-alone-won-t-boost-u-s-power.html
- ⁴⁷ 'Pipelines and politics', *Centre for European Reform*, p. 33, www.cer.org.uk/sites/default/files/publications/attachments/pdf/2011/rp_851-271.pdf
- ⁴⁸ 'US shale boost provokes EU fears and indecision', *Euractiv*, 23/01/2013, www.euractiv.com/specialreport-europe-industry-ha/us-industry-shale-boost-provokes-news-517266
- ⁴⁹ Jackson Diehl, 'The Coming Collapse', *World Affairs Journal*, accessed on 19/03/2013, www.worldaffairsjournal.org/article/superpower-symbiosis-russia-china-axis
- ⁵⁰ 'United States, China compete for Russia's favor', *The Nation*, 03/24/2013, www.thenation.com/blog/173497/us-china-compete-russias-favor#