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Russian Gas – Has the 2009 economic crisis changed Russian gas fundamentals?

Introduction

European demand for natural gas is projected to increase in future. A large share of this increase has been assumed covered by imports from Russia. Repeated gas wars with Ukraine raised attention to security of supply, but the alarm bell went off even higher as observers started to question Russia's ability to deliver with or without the Ukraine (see e.g. CEPS, 2006). Persevering Russian gas demand has been deemed the main culprit along with limited upstream investments. The 2009 global crisis and recession has changed the global community's perspective on many issues. Has the crisis brought on significant changes to the Russian gas dilemma?

Russia is the world's largest gas producer and ranks number one in the world when it comes to the size of its natural gas resources. Energy companies are interested in Russian gas because of upstream opportunities as well as downstream implications. European policy makers take interest in Russian gas from the perspective of energy security. Russian gas is a favored subject among political analysts due to its entanglement with foreign policy and EU-Russian relations.

Meeting the need of these groups for correct and timely analysis is crucially dependent on an accurate understanding of Russia's relation to its own production, and also exports. The role of gas in the Russian economy and politics is discussed and commented on repeatedly by observers and analysts abroad as well as within Russia (e.g. Pelczynska-Nalecz, 2001 and Belyi, 2009). These contributions often take a discursive approach judging the credibility of statements put forward by decision makers and linking these statements to real life events. Economic assessments are, however, few and far between even though it's economic realities that make up the boundaries for decision makers' scope of action.

2008 started quite well for Russian gas and Russia in general. Economic growth in 2007 had stayed on track with previous years and prospects for the coming year were promising as well. So far critics of Putin's economic model and advocates of the model's unsustainability had waited in vain for the long heralded economic downturn (eg .IMF, 2003 or Bim and Iskyan, 2003). Raw materials prices were high and expected to remain so if not increase into the future. Gazprom was literally coming on track again with its upstream ambitions when railroad construction to Bonanenkovo was started up again as a sign of Gazprom's renewed commitment to the Yamal project. Gazprom also remained committed to the Shtokman project upholding 2013 as the launching date for dry gas to shore. Although GDP had shown strong growth, domestic gas demand had not followed as tightly as many feared meaning that Russia, thanks to these ambitious green-field developments, might have outmaneuvered the heralded supply squeeze. Controversy still remained to what extent Russia would depend on Central Asian gas to honor its export commitments, but overall things were much more uplifting for both Russian and European consumers of Russian gas than only a few years earlier.

2009 has pulled Russia further into economic turmoil than anyone had foreseen at the outset of the crisis. Forecasters have persistently revised their expectations downward and Russia now stands to lose some 8 % off of last year's GDP (BOFIT, 2009 and WB, 2009). The crisis has seemingly

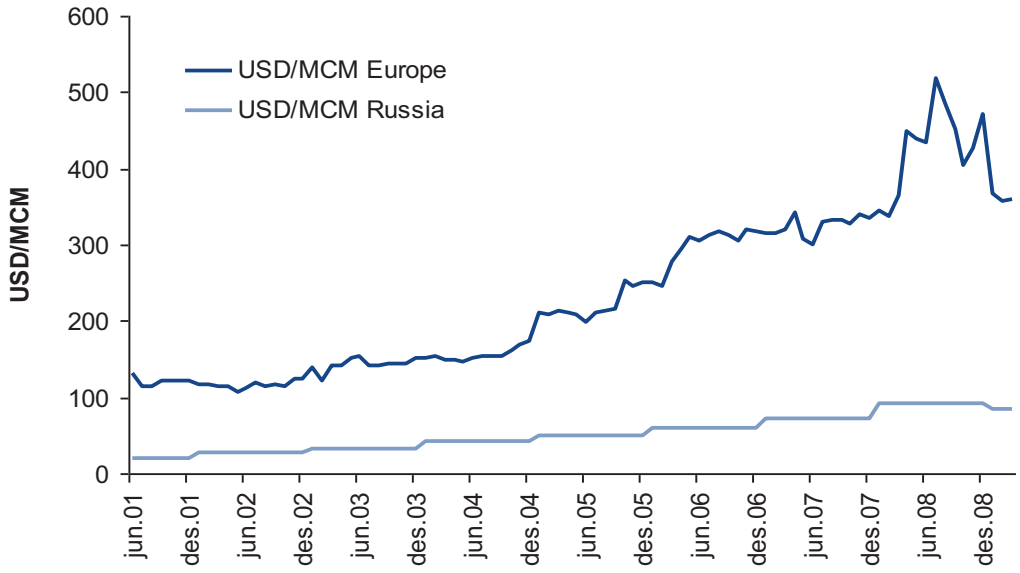
proven that Russia is even more dependent on world markets, and in particular the oil market, than one thought before.

The question at hand is whether the economic crisis has altered in any way the core drivers of Russian gas and if so how these changes affect the 2008 outlook. For the purpose of this article we define Russian gas as the interaction of domestic gas demand and gas supply. A common topic of discussion is the Russian gas balance, but we wish to emphasize a perspective beyond pure volumes. Ability to export follows in consequence from our discussion but is of secondary importance here. First we look briefly at the role of Russian gas in the Russian economy. Second we review the state of Russian gas in the years leading up to the 2009 crisis. In conclusion we comment on key aspects of post-crisis development.

Supply and Demand

The Soviet Union's gas supply was considered a public good and industry was built based on the low production cost of this input. This view prevails to some extent in the Russian populace as well as political and academic circles. Kuzovkin (2008) argues that domestic prices should be kept no higher than necessary to cover Gazprom's operating and capital expenditure out of concerns for GDP and inflation performance. Transitioning to market economy, the alternative cost of gas has yet to be fully incorporated into Russian domestic prices. Low prices have led to absent demand side restructuring and stagnant production (Makarov et al., 2005).

Figure 1 Natural Gas Prices in Europe and Russia (for Industrial Consumers)



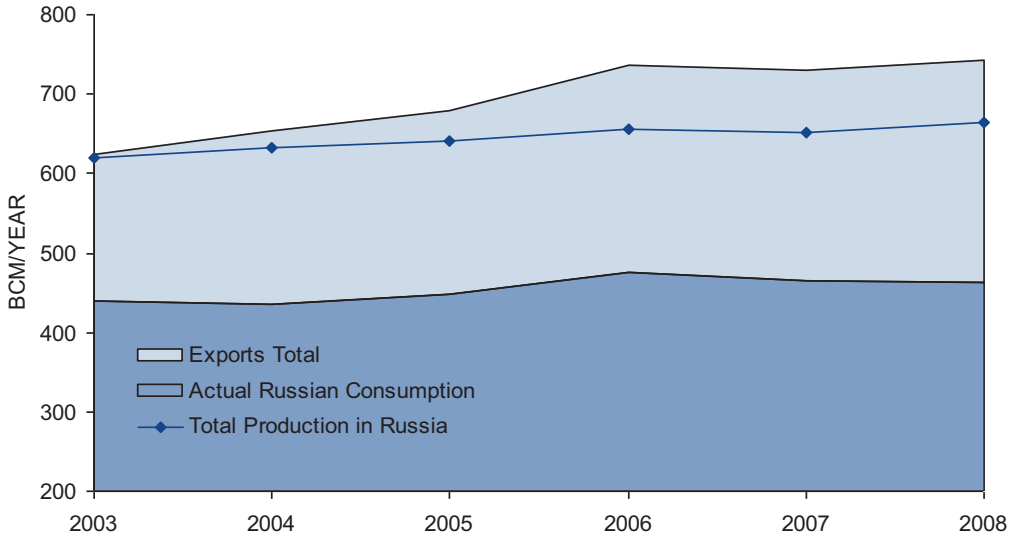
Sources: Heren, Rosstat

As the Russian economy came back to life in the 2000s, this happened partly because heritage enterprises, thanks to a favorable business cycle, could operate at a profit. Surviving companies have restructured in line with liberalized product, capital and labor markets but remain dependent on cheap energy. The Russian population remains dependent on cheap gas as well. District heating systems are extremely run down and a large share of Russian power is generated using more than obsolete gas turbines. Excessive energy use both on behalf of the population and industry has been

permissible due to cheap gas leaving little incentive to invest in more efficient technologies and general refurbishment (Kutshera and Øverland, 2009). See Figure 1.

In 2006 Russian consumption jumped 6 % to 475 BCM after a period of steady growth. Although the increase was to due to cold weather it lead to concerns that Russia would not have enough gas to go around. Since then consumption has fallen somewhat and stood at some 460 BCM in 2008 including losses and consumption in production (see figure Figure 2). The striking feature of Russian gas demand is therefore that it remains stably high despite the large efficiency potential rather than that it exhibits rapid growth. See e.g. Solanko and Sutela (2009).

Figure 2 Russian Production, Consumption and Exports



Sources: Gazprom Data Book, Econ Pöyry Analysis

On the supply side prices have not stimulated upstream development. From a monopolist's viewpoint it makes little sense for Gazprom to invest in upstream capacity if it has enough to go around now. However, from 2003-2008 Gazprom's share of domestic gas sales has decreased from around 80 % to 70 % to the benefit of independent producers. The Russian Energy Strategies till 2020 and 2030 both spell out an increased role of independent (non-Gazprom) producers in the Russian market. Gazprom's reduced share can therefore be argued to reflect political priorities. On the other hand the strategies envision however that independents increase their share in incremental production with Gazprom increasing its production as well. Rather, the independent share of domestic gas sales has increased on the backdrop of stable Gazprom production; suggesting that Gazprom has preferred to leave the domestic market to independents that de jure sell at deregulated prices and concentrate on the higher margin export market instead.[5]

This leads to the notion that for one Gazprom has a very limited scope short term production increases as it prioritizes the export market. Second, it implies that domestic prices and price outlook have not been sufficient to cover exploration, development and production costs. Had they

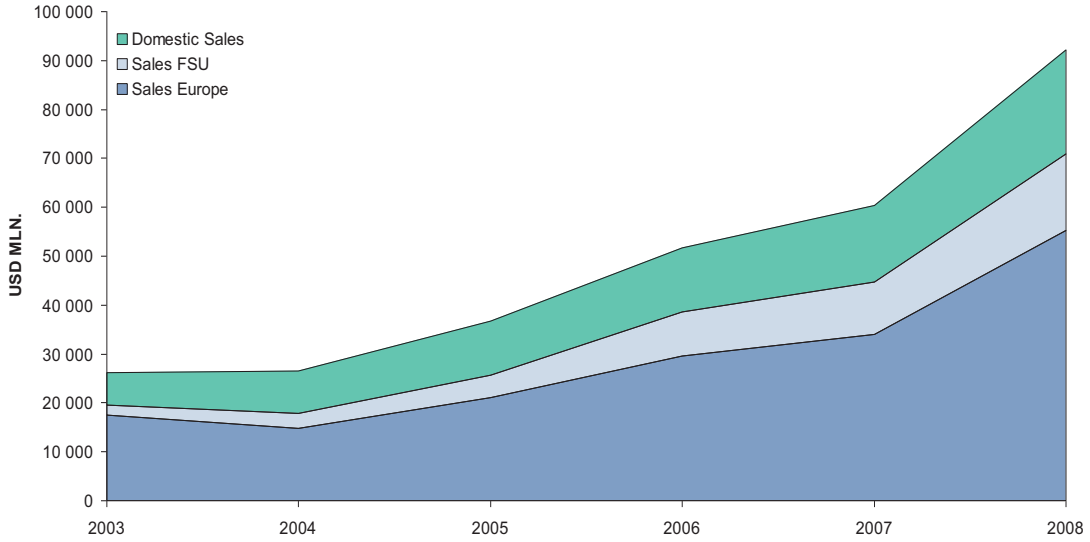
[5] Gazprom production grew on average 1.3 % per year in 2003-2008. Notwithstanding Government intention to increase independents' market share Gazprom, as a commercial entity, acts according to own interest. Commonplace accusations of discriminatory access to the trunk line system support the notion that Gazprom, ceteris paribus, seeks to maintain its market position vis-à-vis independent producers.

been, one would expect Gazprom to increase production rather than sacrifice its domestic market share.[6]

Russia's total production has grown modestly at an annual average of 1.3 % and total of 7 % from 2003-2008. Gazprom's production has grown by a mere 0.4 %. For reference consumption grew 6 % and exports by more than 50 %. The difference has been covered by increased imports of Central Asian gas. Russia's implicit import needs rose from 45 BCM in 2003 to around 80 BCM in 2006-2008 (Econ Pöyry Calculations).[7] This has to be covered by Central Asian gas which has been claimed sold in several directions and in addition the actual reserves of the main supplier Turkmenistan have recently been put to question (Dubnov, 2009). How much will be available in the future is therefore subject to uncertainty.

Stable domestic demand and expectations of export growth match poorly with an accelerating depletion of Gazprom's main production assets in West-Siberian. Thus 2006 and 2007 saw renewed vigor in Gazprom's efforts to develop its next giant on the Yamal Peninsula, the Bovanenkovo gas field, and conquer a new technological frontier in the Shtokman project. Substantial growth in export revenues and the looming gas deficit had seemingly put a lid to the long lasting Gazprom in-fight over which fields to develop first.

Figure 3 Gazprom Revenues by Geographical Market



Sources: Gazprom Data Book, Econ Pöyry Analysis

[6] The issue of Gazprom's domestic market share vis-à-vis independent producers is closely linked to ongoing reform of the domestic gas market. An in depth discussion of this reform is unfortunately beyond the scope of this paper.

[7] According to Gazprom (2003 and 2008) the company imported 44 BCM of Central Asian gas and in 2003 and 60 BCM in the years 2007-2008.

The Role of Russian Gas

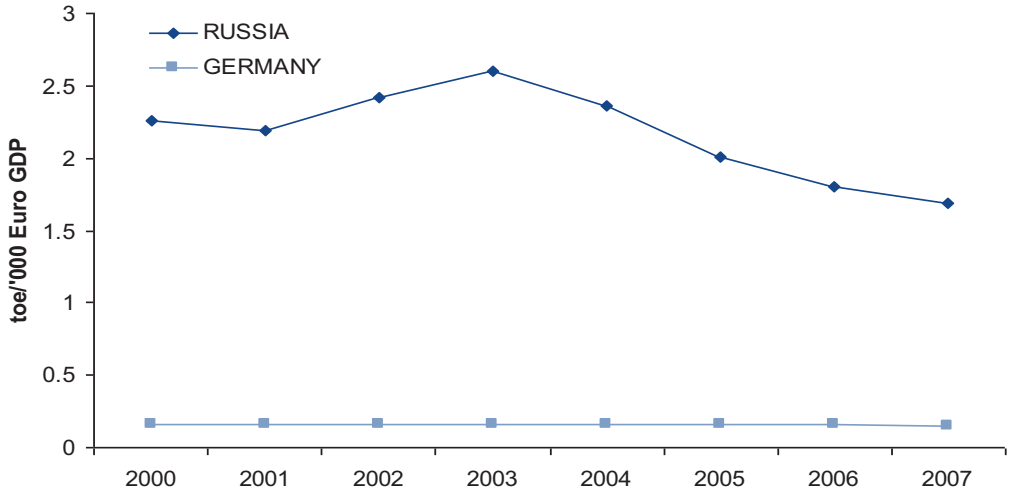
Russian gas plays an important role in Russian exports. Some 20-25 % of non-crude export revenues are generated from gas. Another 25 % is generated from petrochemicals exports. This underlines the well-known fact that Russian hydrocarbon dependency stretches beyond crude oil. The hydrocarbon dependency however stretches beyond its commonly highlighted fiscal implications.

The Russian exchange rate has been largely trade flow driven (Fjaertoft, 2008). Till now the price of gas has been closely linked to the price of crude and other oil products. In the future however this link is expected to abate as LNG ties regional markets and spot trading gains in significance vis-à-vis long term contracts (IEA, 2008). Macroeconomists might find need to be more explicit about gas price effects versus oil price effects in assessing the Russian economy. Although gas prices will remain correlated with oil a weaker relation and increased gas exports relative to oil might affect the way the Russian economy reacts to oil price volatility.

Development of production is highly dependent on export revenues due to the moderate level of domestic prices. Without the increasing export earnings, realizing the large upstream projects mentioned above scarcely seems possible.

At the other end cheap domestic gas has been vital to Russian industrial recovery. Russia inherited one of the world's most energy intensive economies. The absence of price reform, and rising raw material prices have enabled relatively inefficient soviet-built companies to operate at a profit without the owners embarking on substantial restructuring. In consequence Russian primary energy consumption per unit of GDP soars miles above the equivalent ratios of its European trading partners (see Figure 4).

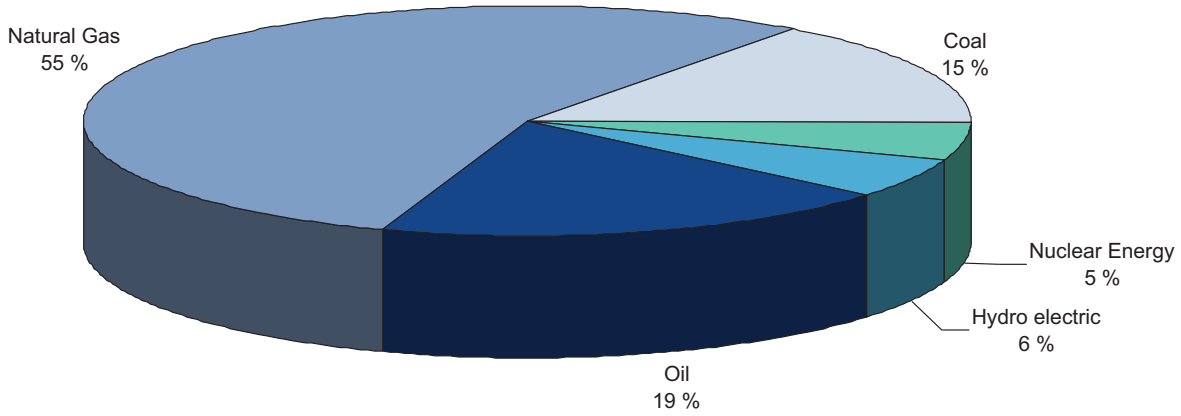
Figure 4 Energy Intensity of Russia and Germany



Sources: BP (2008), IMF WEO, Rosstat, Econ Pöyry Analysis

For a large part this energy intensity translates into heavy industry's reliance on gas as an input in production both directly and in form of electric power. In addition, decaying municipal infrastructure related to water and heat supply provides a substantial contribution to the large share of gas in Russian primary energy consumption (see Figure 5).

Figure 5 Primary Energy Consumption by Fuel (2008)



Source: BP (2009)

Table 1 summarizes the most important consumers of Gazprom's domestic gas sales. Around 45 % of Russia's installed generation capacity is gas fired (Econ Pöyry estimates) and 60 % of Russian power is consumed by industrial consumers (APBE, 2007). In addition the importance of gas in Russian energy consumption is illustrated by Rosstat reports for 2007 that 58 % of Russian gas consumption was transformed into other energy sources (i.e. power).

Table 1 Gazprom's Domestic Sales (volume)

Metals and Fertilizer	12–14 %
Power	36–38 %
Municipal Services	9–11 %

Increased prices would imply a negative productivity shock to Russian industry and a negative shock to disposable income of the population. The latter effect comes into play directly through increased gas and power expenses, but also through the employment channel. Katyshev et al. (2007) find that a 10 % increase in gas and power prices leads to a negative 0.9 % growth in GDP[8] Makarov et al. (2005) support the same short-run effect, but argue that in a 10-year perspective gas prices lower than European netback will lead to lower growth than a scenario with speedy transition to netback prices. The reason for this is twofold. First low prices provide incentives to continue on the same track of expanding energy intensive production. This production is however close to capacity limits and will exhibit increasingly diminishing return to scale and therefore lead to lower growth. The authors argue that higher prices provide incentive to invest in alternative production which will exhibit higher return to scale. The second negative long-run effect of low prices stems from reduced gas exports and ensuing government revenues. In so they support the argument of

[8] With no real experience of gas price volatility in Russia the reliability of such quantitative estimates can be questioned. Nonetheless negative effects of gas price increases, at least in the short run, seem quite probable.

hydrocarbon dependency stretching beyond oil and that lack of price reform will be detrimental to Russian gas production.

Price Reform

Prices are key to the situation Russian gas saw itself in on the eve of the 2009 crisis. Low prices led to stably high demand necessitating green-field developments the prerequisite of which had been higher prices.

In early 2007 the government approved the goal of reaching equal profitability of foreign and domestic gas markets by 2011 (Decree No 333, 2007). The Federal Tariff Service was charged with developing a proper methodology for determining the corresponding domestic price. At the same time limits were set to maximum price increases allowed to reach this goal.
Since 2007 the Federal Tariff Service has published "would-be" prices according to the following equal profitability formula:

Figure 6 Equal Profitability Formula

$$P_i = \left(P_{em} \times \left(\frac{100\ \% - E}{100\ \%}\right) - \frac{\sum_{r=1}^{3} CF_r}{\sum_{j=1}^{9} V_{emj}} - M_{em} - \Delta T^{av}\right) \times K^i_{diff}$$

Source: Federal Tariff Service

Where:

P_i = Domestic Price
P_{em} = Average realized price in the European market
E = effective export toll in percent
CF_r = Customs fees collected in quarter *r*
V_{emj} = Volume sold on the European market in month *j*
M_{em} = Marketing expenses on the the European market
ΔT^{av} = Difference in average transportation cost within Russia and the Russian border, calculated based on regulated tariffs for third party access to Gazprom's pipeline grid
K^i_{diff} = differentiation coefficient applied to various price zones based on distance from place of extraction

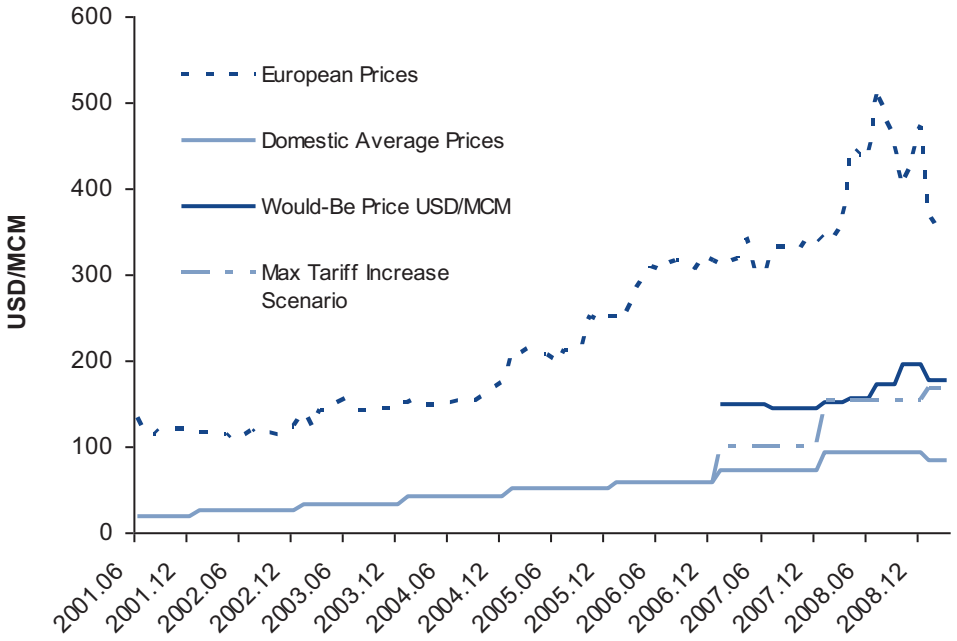
The formula above is often mistakenly referred to as a netback formula. The inclusion of the gross export toll means that prices will remain below real netback on par with the prevailing export toll. At present the nominal export toll stands at 30 %. Figure 7 illustrates how published would-be prices remain substantially below European levels.

Although would-be prices imply a doubling of domestic prices, the ability of price reform in its present layout to achieve efficiency gains on the demand side by incorporating true alternative cost should be put to question. Energy intensity will most likely be reduced, but as long as Russian prices remain below true netback Russian consumers will rationally choose a higher level of gas in the consumption compared to other goods and inputs than is justified by being closer to point of extraction. Russian society will continue to carry the cost of foregone consumption on behalf of its consumers.

The Russian discourse on price reform is however less concerned with consumption being optimal than Gazprom being able to cover the cost of sustained production. Price increases are referred to as being 'lobbied' by the gas monopolist while moderation is shown out of concern for

'everyone else'. See Øverland and Kutshera (2009) for a discussion on price reform and the government's susceptibleness to public discontent. As an illustration of the Russian perspective Kuzovkin (2008) argues that the full resource rent should be extracted by the government by adjusting the export toll so as to ensure equal profitability at fixed (and moderate) domestic prices.

Figure 7 Actual and Reform Scenario Prices (Industrial Consumers)



Sources: Heren, Rosstat, Federal Tariff Service, Econ Pöyry Analysis

Based on Figure 7 Russian price reform stands out as both having too little ambition and enjoying a low level of commitment from Russian policy makers despite active efforts on behalf of Gazprom in favor of higher prices. Actual price increases have persistently lagged behind the proclaimed goals.

Effects of the Global Recession

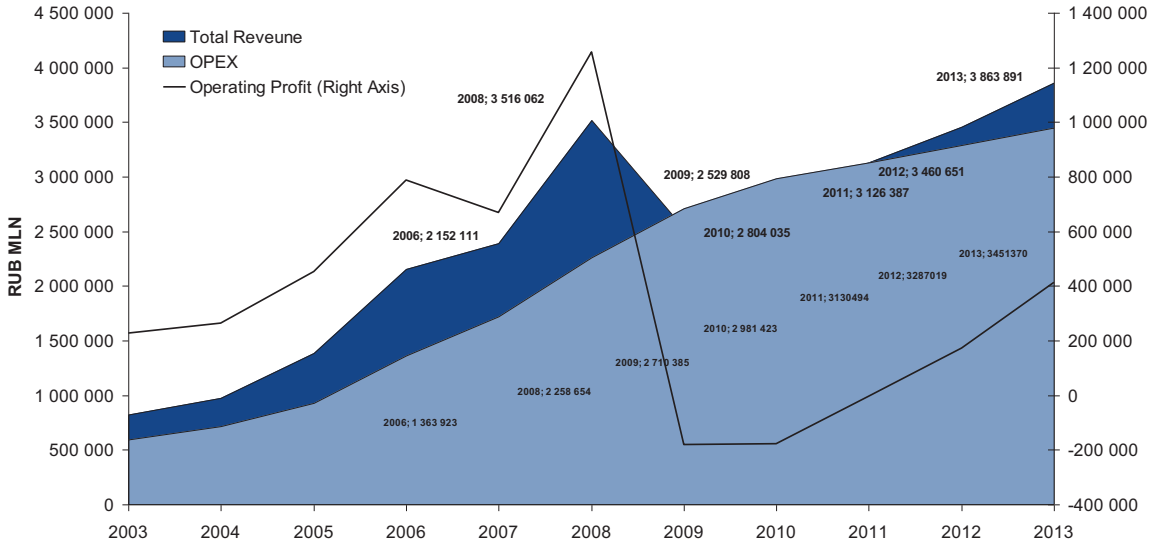
The global economic downturn has hit Russian particularly hard (WB, 2009) and not without consequence for Russian gas. Some effects on demand, supply and the progress of price reform are already visible although one must still wait to be conclusive of the recession's full effect.

According to Rosstat total gas production was down 20 %, while Gazprom produced 25 % less gas during the first half of 2009 compared to the first half of 2008. [9] Implicit Russian gas consumption decreased in the first half of 2009 by 10 %.[10] The fall in consumption is modest compared to the expected decrease in GDP of around 10 % and industrial production of around 17 % reflecting a low elasticity of gas consumption to output. Russian export volumes to Europe and the CIS went down 40 % and 50 % respectively.

[9] http://www.kommersant.ru/doc.aspx?DocsID=1222973
[10] Implicit consumption = Production minus net exports

With both domestic and foreign consumption down the looming gas deficit might have been pushed into the future. Even if a quick recovery brings domestic and foreign consumption back to past trajectories, the level shift should buy Gazprom a few years of slack in bringing key projects on stream. Indeed if both the development of Yamal and Shtokman adhere to schedule, the recession might have provided the window needed to avoid defaulting on European or domestic contracts. Should Russian policy makers come through with price reform Russia could come out of the crisis significantly less dependent on gas.

Figure 8 Gazprom Revenue, OPEX and Operating Profit – History and Forecast



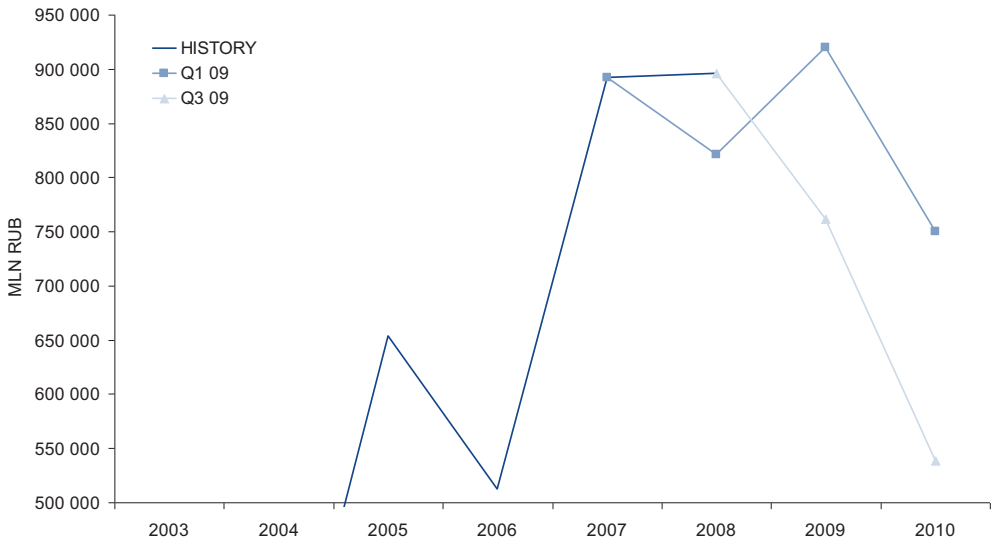
Note: History inclusive 2008, 2009-2013 Econ Pöyry projections.
Sources: Gazprom Data Book, Econ Pöyry Analysis

As noted above, the main fuel for Gazprom's increased activity upstream has been steadily increasing export revenues. Operating expenses where growing as well and Gazprom's margins were secured only by an ever increasing export price. Because operating expenses were eating away at margins, expansive investment policies rested heavily on external borrowing. Through the recession, however, Gazprom has seen export revenues to Europe go down 23 % and to the CIS 30 % (Gazprom, 2009). Operating expenses, however, have stayed on their past trajectory increasing 18 % in Q1 2009 relative to Q1 2008. With old loans coming due and margins down it seems questionable whether Gazprom will have the financial muscle to lift the Yamal or Shtokman project let alone both in the next years.

Indeed Gazprom has revised down its 2009 investment program by some 17 % in ruble terms. CAPEX investments have been adjusted down 30 % compared to the investment program approved in late 2008.[11] Thus the outlook for 2009 and 2010 is a lot grimmer than one had reason to believe at the outset of 2009.

[11] http://www.gazprom.ru/press/news/2008/december/article56840/
http://www.gazprom.ru/press/news/2009/september/article68557/

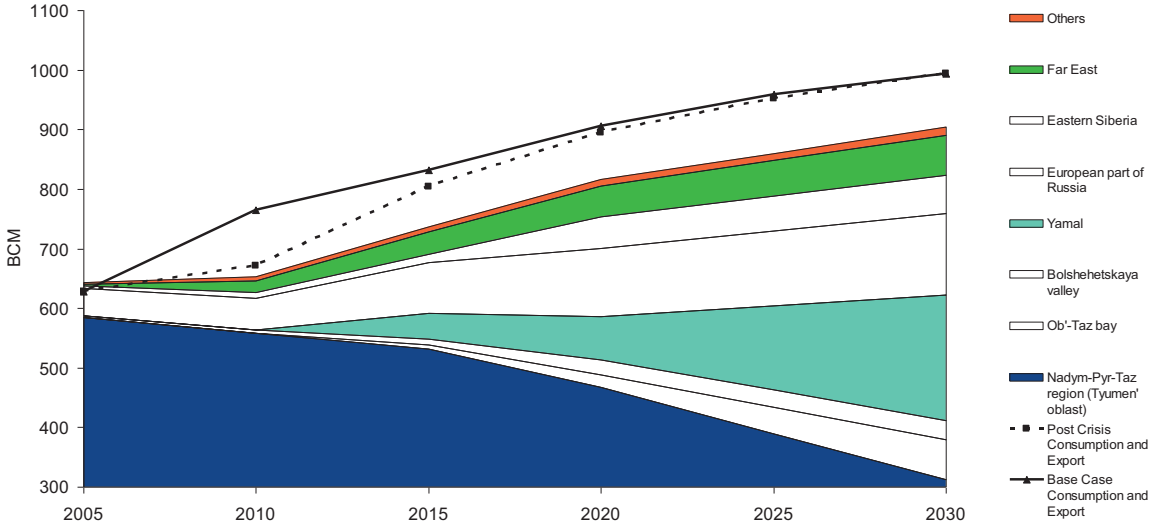
Figure 9 Gazprom Investment Program - History and Forecast



Note: History inclusive 2008. Projections Q1 09 and Q3 09 for 2009 and 2010 based on available information in Q1 and Q3 of 2009 respectively.
Sources: Gazprom Press Releases, Gazprom Data Book, Econ Pöyry Analysis

Figure 10 illustrates projected production by region according to the newly adopted Energy Strategy of the Russian Federation till 2030. This document, which is often criticized for being overly optimistic and parsimonious about details related to achieving proclaimed goals (see e.g. Ekspert No 34, 2009), presupposes that Yamal and Shtokman fields will come into play in time to preempt the increasing decline of the Nadym-Pur-Taz producing region between 2010 and 2015. Should this scenario play out, meaning that Gazprom follows through on its main upstream investments according to plan, the 2009 dip in consumption will avoid the deficit, or unsustainable increased reliance on Central Asian gas, that has been foreseen in recent years.

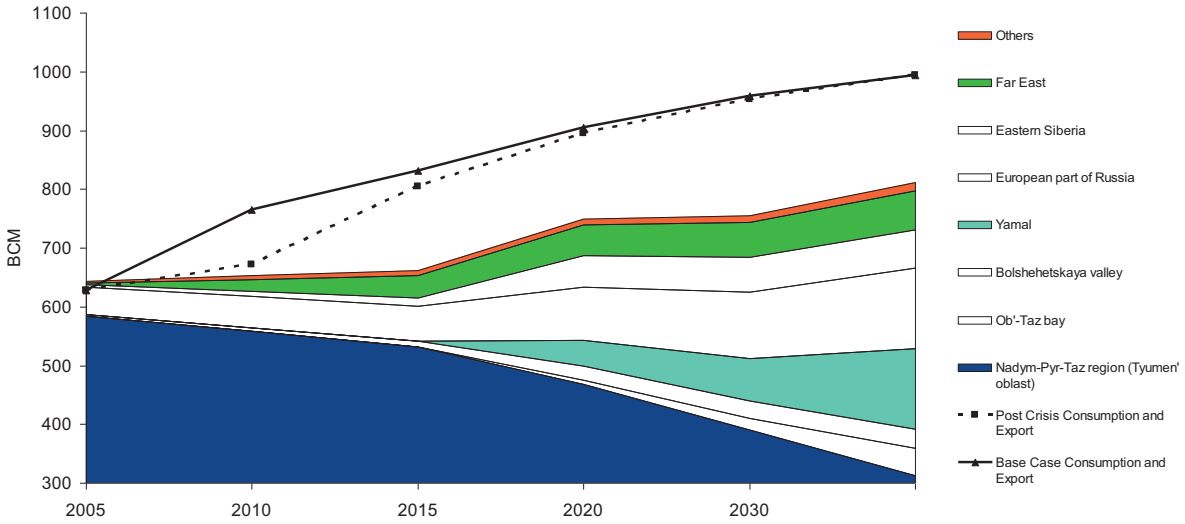
Figure 10 Russian Production by Region No-Delay



Note: Production figures reflect ES-2030 forecasts.
Sources: Energy Strategy Institute, Pöyry Oxford, Econ Pöyry

Following the line of argument in paragraphs above; the postponement of either Yamal, or Shtokman or both beyond 2015 stands out as a far more plausible scenario. Figure 11 provides and illustration of this scenario where start-up of Yamal, Ob-Taz and Shtokman fields have been assumed postponed 5 years with unchanged development timeframe and production build-up. Should Gazprom fail to follow through on these key projects, Russia will miss out on the opportunity created by the dip in domestic and export demand. Under the demand assumptions behind Figure 10 and Figure 11, the projects will also come into play too late compared to demand recovery implying an increased reliance on Central Asian gas to 140-170 BCM in 2015 and to 195-205 BCM in 2025. [12] In this case the 2009 recession will a blow more than a break for Russian gas. Delayed upstream development will have repercussions for European energy security depending on the priority given by Russian authorities to domestic and export markets. Further elaboration on this point is unfortunately beyond the scope of this paper.

Figure 11 Production by Region with 5-year Delay of Yamal, Ob-Taz Bay and Shtokman



Note: Production figures reflect ES-2030 forecasts.
Sources: Energy Strategy Institute, Pöyry Oxford, Econ Pöyry

Concluding Remarks

The 2009 global recession provides Russian gas with vital opportunities. Reduced domestic and export demand provides an chance of bringing vital upstream projects on stream without relying too heavily on Central Asian imports in the interim and thereby a reduced chance of defaulting existing commitments due to supply uncertainty.

The demand side effects of the global recession do however transfer into substantial risk on the supply side, namely delays of key upstream projects caused by falling revenue and credit constraints.

[12] The base case demand forecast assumes 0.9% annual growth, while the crisis case assumes -9 % growth in 2009 and ensuing 1.2 % annual growth as the economy returns to trend consumption. Both assumptions are not excessive compared to an historic average growth of 1.3% over the years 2003-2008. Nonetheless historic growth averages must be seen in relation to strong GDP growth in recent years. Should the Russian economy exhibit slower growth in years ahead, gas consumption might also grow at a slower pace. However, this again will depend on the driving sectors behind Russian growth in years to come.

Reduced European gas prices mean that Russian prices have a smaller gap to fill up to netback parity. In August of 2009 Russian prices were 30 % of European prices compared to 19 % in December of 2008. However, the negative supply shock to Russian industry of increased prices should not be underestimated as shown above. Russian industry is in trouble with industrial production down 15 % in Jan-Aug 2009 compared to the same period in 2008. Russian policy makers' choice to raise domestic gas tariffs by 16 % for industrial consumers in 2009 in face of inflation expectations of 10-12 % is symptomatic of an understandable and expected sentiment that now is not the time for decisive price hikes.

However, keeping in mind the strong link between Russian economic performance and the price of raw materials, Russian recovery is likely to be accompanied by higher European prices pulling the target out of range. If the Russian government saw price reform as a complicated issue in a period of boom, it is likely to do so as well on the path of recovery.

Past predicaments of Russian gas remain firmly in place also in the wake of post-recession recovery. Supply and demand seem to be headed in equally incompatible directions and if anything the economic turmoil has added acuteness to the risk of failing domestic supply. Price reform remains the key to unleashing Russia's vast energy savings potential, but as before the government seems prone to continue waiting till more lenient times. The problem is when is a good time for a tough decision?

If the Russian government sticks to the current version of reform, prices will remain well below reasonable European netback. Russian consumers will continue to rationally choose a higher intensity of energy in their consumption of goods or inputs than their European trading partners. The 2009 recession has given Russian gas a short break, but unless policy makers handle the key demand side challenges, Russia will in time return to the situation where domestic demand and the wish to export are incompatible with own production capacity.

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