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Russia's Gas Business – Facts, Challenges and the Road to Reform



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Abstract

The Russian gas sector, one of Russia's key industries, needs urgent reform to deal with ageing gas fields, excessive state regulation, monopolistic control over the industry and inadequate, outdated pipeline infrastructure. The dangers of supply disruptions are particularly striking in view of ever-increasing demand for natural gas in Russia's domestic market and internationally. To prevent Russian natural gas supply from decline, three major issues must be addressed. First, regulation has kept domestic prices artificially low and eliminated incentives to make necessary investments. Second, independent producers still lack fair access to the market, especially the pipeline network. Third, there is a compelling need for systematic investment.

Keywords: Russia, Natural Gas, Energy, Reform

1 Introduction

Russia's natural gas business is superlative in many respects. Russia is the world's largest producer and exporter of natural gas. Russia also has the highest natural gas consumption in the world and natural gas is the most important fuel in Russia's energy demand.

Yet, even as the sustainability of Russia's high economic growth in coming years depends to a considerable extent on the performance of Russia's gas business, the sector is in urgent need of reform. Deep-seated problems threaten the supply of natural gas to both domestic and foreign markets. Industrial producers in the domestic market must already deal with bottlenecks so severe that gas has to be rationed. The stagnation in production reflects the conjunction of a number of factors, including ageing gas fields, excessive state regulation, monopolistic control over the industry, and inadequate and outdated pipeline infrastructure.

This paper aims at providing an overview of current developments in Russia's natural gas business and identifying the challenges that have to be addressed to ensure adequate natural gas production in the future. The paper is structured as follows: section two reviews the characteristics of Russia's gas business; section three describes the challenges and problems of the sector and discusses some reform proposals; and section four concludes.

2 Basic Facts

2.1 Output and Output Projections

Russia is the world's largest natural gas producer. In 2004, Russia accounted for 22% of total world production (Table 1). The gas industry is a major foundation of the Russian economy, e.g. accounting for 10% of industrial production growth in 2003.¹ Despite its importance for the Russian economy, the performance of the sector has been rather weak in recent years. Production in 2004 amounted to 589 bcm (billion cubic metres), a level only 4% higher than a decade earlier (see Fig. 1).

Under the national energy strategy, drafted by the Ministry of Energy and approved by the Russian government in 2003 (Government of the Russian Federation, 2003), overall production should increase to 730 bcm in 2020 under the optimistic scenario. The pessimistic scenario foresees gas production rising to 680 bcm by 2020.

These projections are quite modest. Under the optimistic scenario, the annual average growth rate of Russian natural gas production from 2002 until 2020 is only 1.4%. Under the pessimistic scenario, it is just 0.9%. The International Energy Agency, which was unable to find justification for the government's pessimistic scenario (IEA, 2002), expects a production increase to 801 bcm in 2020. This corresponds to a still-modest annual production growth rate of 2.1% between 2002 and 2020 (IEA 2004).

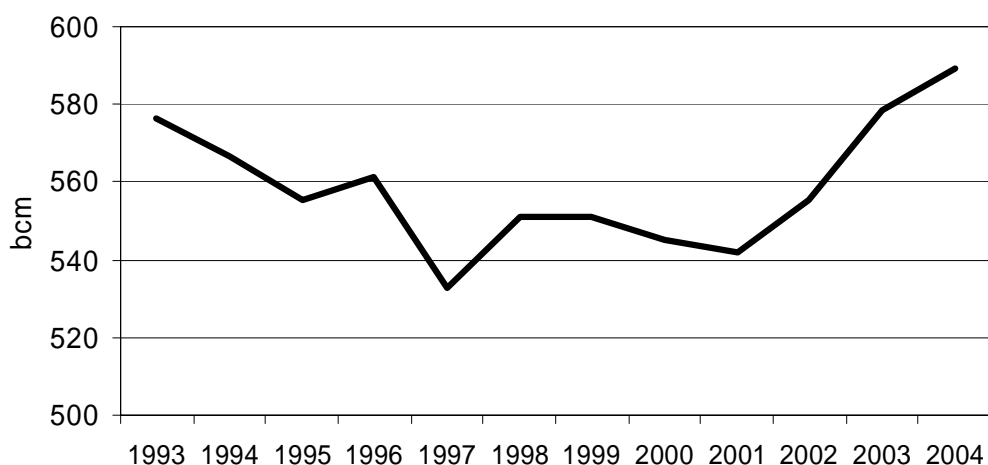
¹ This share was calculated by the OECD (Tompson, 2005). Using official Russian statistics, the GDP share is only 2% (Goskomstat, 2004 and own calculations) since it does not take into account transfer prices and related services.

Table 1. The Five Top Natural Gas Producers in 2004

	Production (billion cubic metres)	Share of world production
World Total	2691.6	100.0 %
Russian Federation	589.1	21.9 %
USA	542.9	20.2 %
Canada	182.8	6.8 %
UK	95.9	3.6 %
Iran	85.5	3.2 %

Source: BP, 2005.

Figure 1. Russian Natural Gas Production over Time



Sources: BP, 2004; 2005.

2.2 Reserves

Russia also holds the world's largest natural gas reserves. Official Russian gas reserves were estimated at 48 trillion cubic metres in 2004 – almost twice those of Iran, the next largest gas producing country. If production remains at 2004 levels, Russian natural gas reserves are sufficient for about 80 years. This is a bit shorter compared to other major natural gas producers, where reserves are projected to last more than 100 years (Table 2).

Table 2. The Five Countries with the Largest Natural Gas Reserves in 2004

	Total Reserves (trillion cubic metres)	Share of world reserves	R/P ratio*
World Total	179.53	100.0 %	67
Russian Federation	48.0	26.7 %	82
Iran	27.5	15.3 %	>100
Qatar	25.8	14.4 %	>100
Saudi Arabia	6.8	3.8 %	>100
United Arab Emirates	6.1	3.4 %	>100

Source: BP, 2005.

* Reserves-to-production ratio: If the reserves remaining at the end of the year are divided by the production that year, the result is the length of time (years) that those remaining reserves would last if production were to continue at that level.

Currently, most Russian natural gas is taken from the Siberian “super-giant” fields: the Medvezhye, Urengoy and Yamburg fields. These three fields, situated in the Yamalo-Nenetskii autonomous district, accounted for 87% of total Russian gas production in 2002 (Goskomstat, 2003a). All three fields have passed their peak production periods and at least Medvezhye and Urengoy have been in gradual decline in recent years (IEA, 2002).

2.3 Market Players

One of the most remarkable features of the Russian gas sector is its monopolised market structure. The market for natural gas is sternly dominated by Gazprom, the world's largest gas extracting company. Gazprom was founded in 1989 as the successor to the Soviet Ministry for the Gas Industry and was transformed into a joint-stock company in 1992. In 2003, Gazprom accounted for 87% of total Russian natural gas production (Ahrend and Tompson, 2004). The remaining 13% was produced either by oil companies that have traditionally extracted substantial quantities of gas as a by-product of oil production or a small handful of independents. The leading oil companies also producing gas are Surgutneftegas and Rosneft. Russia's leading independent gas producer is Novatek which currently accounts for about 4% of Russia's gas output.

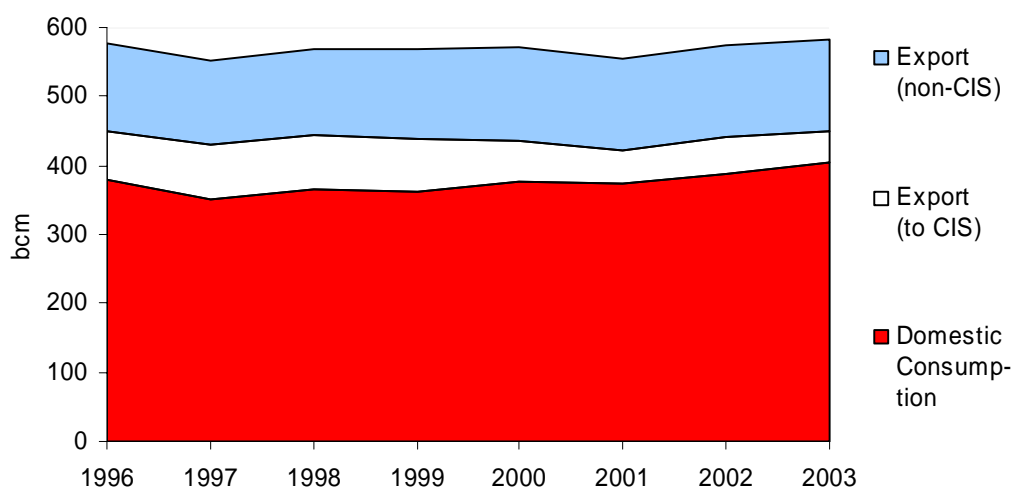
Gazprom controls production both upstream and downstream. In addition to operating a 150,000-kilometre high-pressure inter-regional pipeline network, it has substantial control over the low-pressure distribution systems maintained by regional and local investment companies. After privatisation efforts in the late 1990s, severe financial problems and indebtedness to Gazprom led to a wave of reacquisition by the monopoly (IEA, 2002). Gazprom also has full ownership of Gazexport, the company that controls virtually all gas exports outside the Confederation of Independent States (CIS). Finally, Gazprom is Russia's only company that maintains underground gas storage facilities and has thus the advantage of being able to store a significant amount of gas when solvent demand is unavailable (IEA, 2002).

2.4 Markets for Russian Gas

Domestic Market

The major share of natural gas produced in Russia is used in the domestic market. In 2003, domestic natural gas consumption (residential and industrial consumption) amounted to 406 bcm, whereas Russia exported 176 bcm. In other words, domestic consumption accounted for about 70% of natural gas production in 2003, and only about 30% was exported (BP, 2005). As Fig. 2 shows, the share of gas production consumed domestically has been fairly stable since 1996.

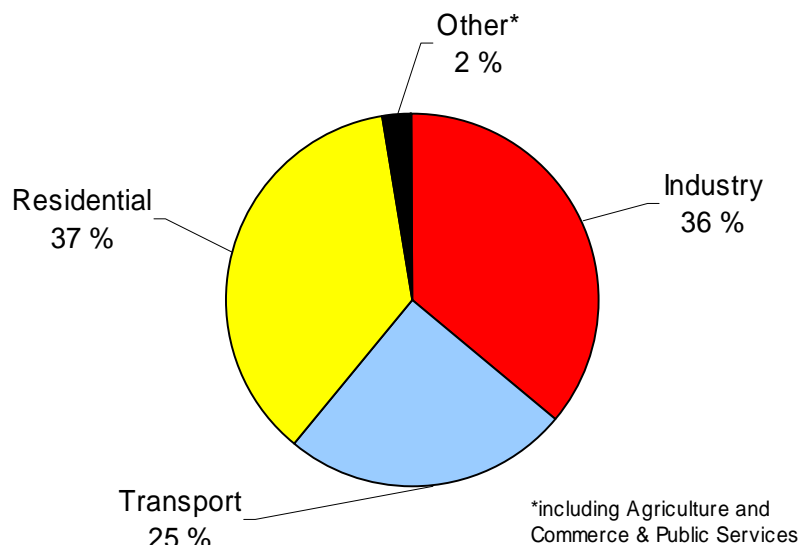
Figure 2. The Use of Russian Gas



Sources: Goskomstat, 1998; 2001; 2002; 2003; 2005 and BP, 2004.

Regarding Russian gas demand by sector, residential demand had the highest share of total Russian gas consumption with 37% in 2002, closely followed by industrial demand with 36%. The transport sector assumed 25% of Russian natural gas consumption (Fig. 3).

Figure 3. Russian Domestic Natural Gas Demand by Sector (2002)

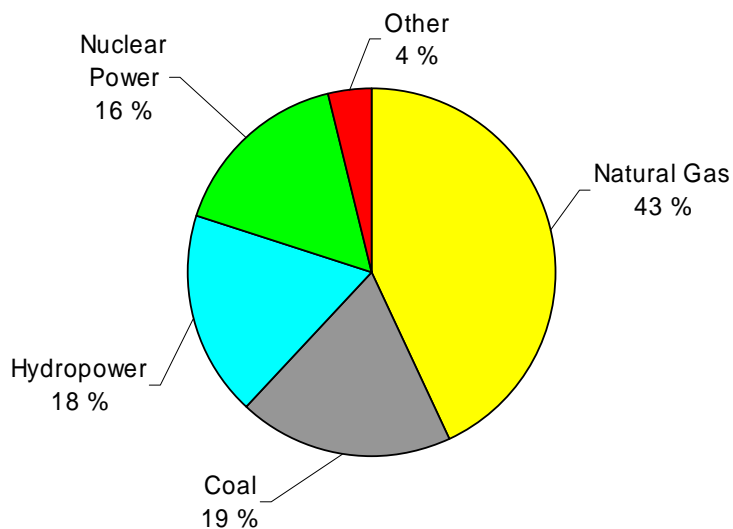


Source: IEA, 2005.

Natural gas is also the most important fuel in Russia's energy mix (Fig. 4). The World Energy Outlook (WEO, 2002) projected that natural gas will become even more significant over the next thirty years in Russia. The share of gas in Russian total primary energy supply is forecasted to rise from 52% in 2000 to 56% in 2030. The share of natural gas in final energy consumption will increase from 27% to 32% (IEA, 2004).

Because of artificially low regulated gas prices, demand exceeds supply with rationing as the logical consequence. Gazprom is in charge for the administration of the rationing process. In no regular process and never-ending negotiations, consumer enterprises have little certainty about the quantity of gas they can count on more than three months in advance (Ahrend and Tompson, 2004).

Figure 4. Major Input Fuels in Electricity in Russia (2002)



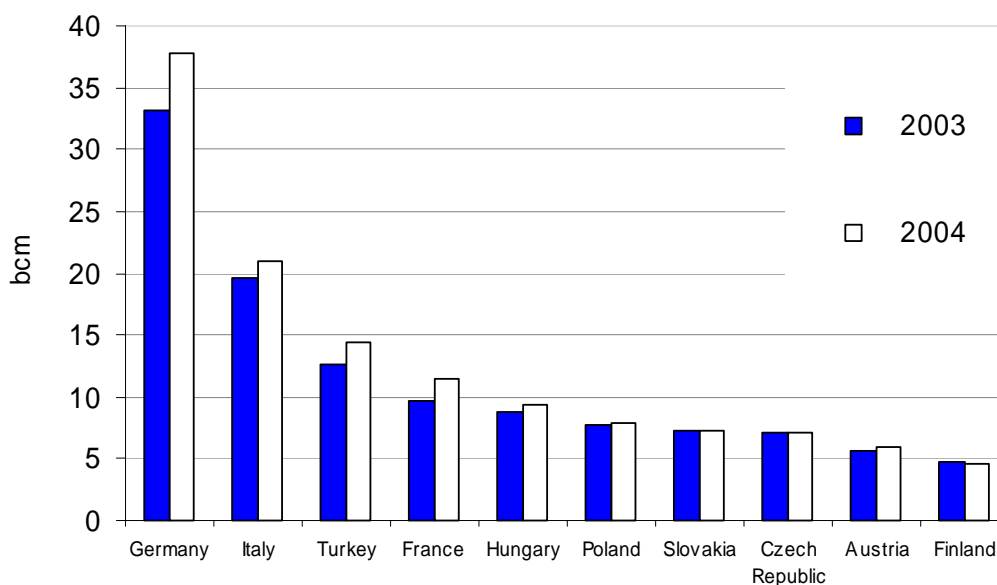
Source: IEA, 2004.

International Markets

During the Soviet era, most of Russia's natural gas exports went to customers in Eastern Europe. Since the mid-1980s, however, Russia has been diversifying its export destinations. Russia continues to export significant amounts of natural gas to CIS customers; about 27% of Russia's natural gas exports went to the CIS in 2004. However, Gazexport has shifted much of its natural gas exports to serve rising demand in the EU, Turkey and other countries (Fig. 5). The European Union is now Russia's major customer of natural gas, receiving about 62% of Russian natural gas exports, or 20% of total EU natural gas consumption.² This clearly shows that there is a high degree of mutual interdependence between Russia and the EU (Sutela, 2005).

The market for Russian natural gas is expected to grow in the future since the role of gas is increasing in the world's energy demand. Gas now accounts for about 20% of world energy consumption, and according to projections it will account for more than 30% by 2020 (BP, 2004). If the current trend of rising demand for natural gas in Europe continues, Russia will certainly remain the major supplier in gas to Europe for the next decades (Hill, 2004).

Figure 5. Top Ten Non-CIS Importers of Russian Natural Gas



Source: BP 2004, 2005.

2.5 Pricing

Pricing is a critical issue for the Russian gas sector. While export prices are linked under long-term contracts to international prices for oil products (IEA, 2003), Gazprom and the few other gas extracting companies in Russia must supply natural gas to Russia's domestic market at government-regulated prices (presently about \$28 per thousand cubic metres).

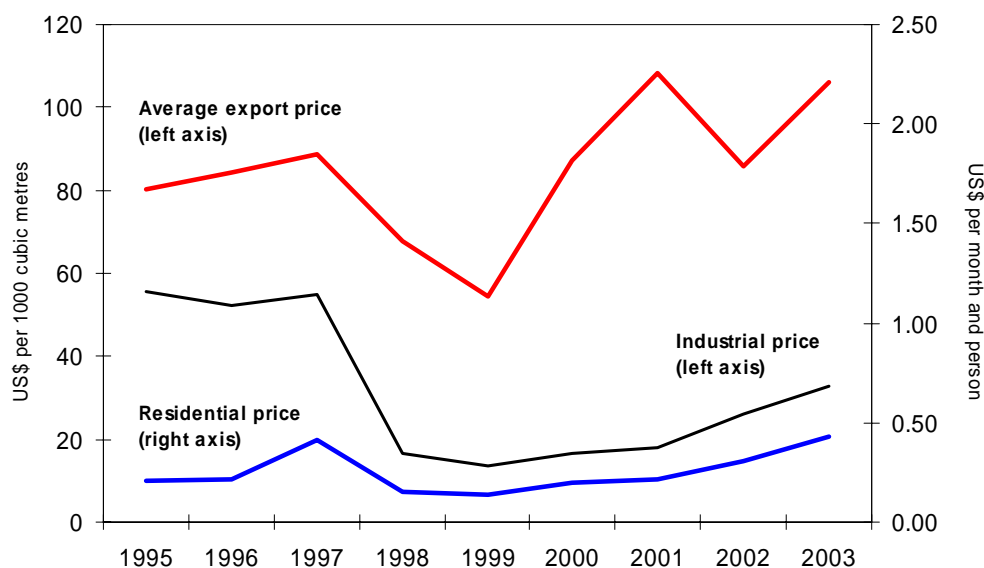
² While the average share of Russian gas in an EU country's gas consumption is 20%, some countries use substantially larger shares. Russian gas satisfies 41% of German consumption and 34% of Italy's (BP, 2005).

Consequently, roughly two-thirds of Gazprom's revenues stem from export sales to Europe, which buys gas for around \$125-\$135 per thousand cubic meters (EIA, 2004). In addition to the difference between export and domestic prices, there are multiple price categories for domestic use of natural gas. Domestic residential consumer prices are lower than prices charged to domestic industrial producers (Fig. 2). Residential rates are further split into a number of sub-categories. Pensioners and war veterans, for example, pay lower rates than other residents (IEA, 2002).

The issue that domestic prices are kept artificially low can be illustrated by comparing the current prices for domestic industrial and residential consumers with price levels before the 1998 financial crisis in 1998 (Fig. 6). Residential rates in 2003 were only 4% higher than in 1997,³ and rates for industrial consumers in 2003 were well below the 1997 level.

Additionally, low natural gas prices are striking in comparison with prices for other fuels in Russia. In the late 1990s, the price of gas for industrial users was 30–50% below that for coal and 25–30% below that of oil products (IEA, 2002). There is no mystery as to the increasing popularity of gas as a primary energy source. Given the low regulated domestic prices Gazprom can be seen as a major contributor to the Russian economy, supplying industrial and residential consumers with cheap energy.

Figure 6. Development of Natural Gas Prices



Sources: IEA (2002), Goskomstat (2004), Moscow Bureau of Economic Analysis

³ IEA, 2002; Goskomstat, 2004 and own calculations.

3 Challenges and Problems

3.1 Price Reform

Despite strong pressures on Russia to implement changes, natural gas remains perhaps the least-reformed sector in the entire economy (see e.g. OECD, 2005). Part of the skittishness to addressing the imbalances created by the present arrangement is that any reform of the pricing system will result in an array of problems in the domestic market and affect relationship with Russia's trading partners.

On the other hand, the two-tiered pricing system is already a cause of contention with the European Union. The EU perceives having to pay prices for Russian natural gas far higher than those charged to Russian consumers to be both unfair and out of alignment with free market principles. To solve this problem, Russia agreed under an EU-Russia agreement signed in May 2004 to gradually increase gas prices to industrial Russian users from the current \$28 to between \$37-42 by 2006 and \$49-57 by 2010 (European Commission, 2004). This price increase is also in line with the national energy strategy (Government of the RF, 2003).

Prices and the Lack of Investment

Domestic problems are probably more serious than those affecting trading partners. A major headache is the lack of investment necessary to meet ever-increasing domestic and foreign demand. Old, decaying infrastructure and production declines at the major extraction fields loom as immediate problems that require long-term answers. Yet where is the needed investment to come from? Domestic gas prices remain well below the level that covers costs, profits and investment needed for exploitation of new fields (OECD, 2004), and thus give little incentive for Gazprom and other natural gas producers to develop new fields or improve infrastructure. Russia must, therefore, raise the domestic price of natural gas to achieve an economically efficient price that prevents deterioration of the capital stock and ensures supplies in the future.

Prices and Energy Efficiency

Another issue related to low domestic gas prices is energy inefficiency and the vast amounts of gas wasted. The problem can be considered from the dimensions of decreasing gas output and needless environmental degradation. As long as prices are low, efficient technology and elimination of waste will remain minor considerations (IEA, 2004). Leakage from the outdated transport system in particular represents pure waste. Although data are scarce, estimates of leakage in distribution in 1998 were at least 5 bcm (IEA, 2002), which is more than total Russian natural gas exports to Finland in 2004 (Fig. 4). Toleration of such waste is closely linked to the lack of investment caused by too-low domestic prices. Thus, higher domestic gas prices will contribute to a more efficient use of natural gas and promote energy efficiency programs and help secure consistent gas supply.

Unfavourable administrative arrangements for residential consumers also indirectly contribute to waste. Since there is no individual metering in private household consumption, monthly gas fees are paid as part of the rent. Residents often have no way to

adjust their apartment temperature or the overall heating consumption of their apartment building (IEA, 2002: 127).

Prices Increases, Competitiveness and Social Issues

Abandoning the current pricing policies has consequences for the overall development of the Russian economy. As mentioned earlier, natural gas is the cheapest and most important fuel in Russia's energy demand. Low gas prices support Russian industries and ensure that the population is provided with cheap gas (Ahrend and Tompson, 2004). Access to abundant, cheap gas – especially for industrial consumers – confers a huge competitive advantage on the Russian economy. Consequently, Russian enterprises and private households are to a certain extent captive to the current system and thus inadvertently hostile to higher natural gas prices.

Yet, as mentioned above, Russia has committed to gradually increase gas prices to industrial users. With regard to the dependence of Russian enterprises and private households on low gas prices, price increases must be accompanied by mechanisms that mitigate the problems that might come from higher natural gas prices. Some negative social costs and economic costs due to higher gas prices are expected. For example, higher gas prices could lead to higher costs for many industrial enterprises and result in bankruptcies of inefficient firms and greater unemployment (Tarr and Tompson, 2003).

3.2 Structural Reform

Higher domestic prices alone cannot secure the future of Russia's gas industry; structural changes in the gas sector are also essential. The OECD observes that the current structural design of the gas sector in itself constitutes a substantial obstacle to growth (OECD, 2004). Two over-arching factors hamper development. First, Gazprom's dominant position restricts the access of independent producers (Ahrend and Tompson, 2004). Second, the Gazprom monopoly itself is a source of inefficiency (see e.g. the critique of Renaissance Capital, 2005).

Independent Producers Lack Access to Pipeline Grid

By restricting the access of independent producers to the market, Gazprom prevents competition and development of the gas sector. While other producers have large potential to increase production, they have no way to realise their production potential as long as Gazprom controls most of the gas transport infrastructure. A crucial point is that third parties need full access to the pipeline network since this basically is the only transport means of natural gas in Russia.⁴ Although Gazprom is legally obliged to grant access to transportation facilities, few agreements have been reached. Consequently, independent producers have no choice but to sell their gas to Gazprom at low prices (IEA, 2003). This also kills the incentive for independent producers to make investment or even enter the market.

⁴ An alternative to pipeline transportation is the transportation of gas as liquefied natural gas (LNG). While there are plans to develop LNG shipping, LNG presently has only minor significance in Russia (IEA, 2002).

The provision of fair access to independent producers will also involve changes in Gazprom's information policies as granting independent producers access to the pipeline system will have to be both reliable and transparent (Mandil, 2004). Transparency here includes disclosing information about spare capacity in the transportation grid.

Inadequate Management Priorities

Given that the natural gas industry is one of Russia's most important strategic sectors, inefficiency is a serious issue for the Russian economy. As mentioned, there are currently serious bottlenecks in supplying domestic producers with natural gas, which suggest that inadequate management has been a long-running problem. Instead of focusing on its core business, namely the provision of natural gas and tackling the problems that lay ahead, Gazprom has spent much of its strategic energies on acquiring assets elsewhere in the Russian energy sector (Renaissance Capital, 2005). Gazprom has purchased sizable stakes in the electricity, nuclear power and oil sectors. The fact that Gazprom has undertaken considerable investments in recent times indicates that the company has adequate financial means at its disposal which could be directed into the infrastructure of natural gas production and thereby stave off declines in the Russian natural gas supply.

To solve the structural problems connected with Gazprom many liberal economists have suggested breaking up the company. Yet, vertical separation of the gas sector is a non-trivial problem as it requires a careful balancing of efficiency gains against costs (some of which may not be readily foreseeable). Others argue that a disaggregated Gazprom would be an industrial midget, financially too weak to carry out the required massive investment projects in the next coming years (Royle, 2004). Moreover, economies of scale would be lost after vertical separation. A large, strong Gazprom is definitely in a better bargaining position in the international energy business.

3.3 Investments

Both price reform and structural reform are strongly linked with the need to investment. Declining production comes at a time of increasing demand at home and abroad, especially in Europe. The main concern focuses on the production decline on the super-giant fields of western Siberia. To offset these production declines, systematic investment is needed. The IEA estimates that the cumulative investment needs for the period 2001–2030 are about \$330 billion, or \$11 billion per year. The IEA expects exploration and development costs will account for over half of total investment needs (IEA, 2003).

Measures to Prevent Output Decline

There are several options to substitute for the declines on the big three Siberian fields. One is to boost output at Zapolyarnoe – the fourth super-giant field. Gazprom initiated production on this field in 2001. In addition, it is possible to develop offshore fields like the Shtokmanovskoye field in the Barents Sea. Some prospective fields are on the Yamal Peninsula and Sakhalin Island in eastern Siberia. Additionally, there are about 500 smaller fields in European Russia. However, most new fields to be developed are smaller and located in environments more difficult to operate than the big three Siberian fields (IEA,

2003). Production costs are likely to be higher in the future further adding to investment needs.

As mentioned in connection with price reform, a large share of investment must be dedicated to refurbishing and replacing the old distribution infrastructure, which is in terrible shape in some parts. About 70% of the high-pressure pipeline network was commissioned before 1985 and more than 19,000 km of the pipeline grid should be replaced as soon as possible (IEA, 2002).

There is much scope for the role of independent producers to contribute a growing share of investments in the coming decades. Although non-Gazprom producers account for only 13% of gas production, they hold licenses to develop about a third of the country's proven reserves (IEA, 2003). The national energy strategy also calls for letting independent producers contribute a growing share of investments in coming decades (Government of the RF, 2003).

Factors Influencing Investment Decisions

The decision to investment depends on a number of factors. First, investors need assurances of adequate returns on their investment. Otherwise, there will remain a critical uncertainty concerning the financial health of the Russian gas industry and its capacity to engage in capital spending. Again, this suggests that domestic price reform is essential.

The general investment climate in Russia also must be more favourable. Although substantial progress has been made since market reforms have been launched and the business environment has continued to benefit from a stable macroeconomic and political framework, concerns remain (especially since the imprisonment of Yukos CEO Mikhail Khodorkovsky). Some of the biggest concerns have to do with protection of property rights, but overall rules for the private sector – especially large businesses – need further strengthening in Russia to attract the necessary investment (EBRD, 2004).

Taxation of gas sales and profits also needs to be revised, along with consideration of what tax incentives might be appropriate to make investments in Russia's natural gas sector attractive. Gazprom is already Russia's largest taxpayer. Tax revenues from the gas sector were used to compensate difficulties in collecting taxes from enterprises with liquidity problems. This often led to increases in the tax burden on Russia's gas business and cut the company's ability to invest (IEA, 2003).

Finally, the question of third-party access as discussed above needs to be solved to create incentives for independent producers to invest in Russia's gas business.

4 Conclusions

A number of problems inherent in Russia's gas business are increasingly undermining the functioning of the sector. Production of major extraction fields is in decline, even as domestic and international demand for natural gas is rising. There is thus a compelling need for reforms to meet these problems.

A core aspect of reform will be increasing domestic prices for natural gas to a level that provides incentive to invest. Ironically, Russian enterprises and private households are to some extent captive to low gas prices, and higher prices could force some producers into bankruptcy or increase social costs from higher unemployment. It is therefore important that price increases are implemented in a way that takes into account the social implications of higher natural gas prices.

Structural reforms also need to be addressed despite reluctance across the Russian energy sector. Despite the compelling needs for reform and making the natural gas sector more efficient, the Russian government several times in 2004 postponed structural reforms. Gazprom, which should be taking steps to boost output of natural gas and increase investment in gas field development and the transportation infrastructure, has instead embarked on a strategy of becoming a dominant player in a range of energy-related businesses. To meet rising domestic and foreign demand and for the Russian industry to develop successfully, Gazprom needs to return its attention to its core business.

All players in the Russian gas market require fair access to the transportation system so that a competitive market can emerge.

Finally, the general investment climate needs to be more favourable to potential investors.

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