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# **BRIEF WRITE-UP ON RUSSIAN GAS RESERVES, PRODUCTION, CONSUMPTION AND IMPORT-EXPORT VOLUMES**

Advisory Assistance to the Ministry of Energy of Georgia  
P.E.D. IQC – Contract No. DOT-I-00-04-00020-00 Task Order # 800

**May 17, 2006**

This publication was produced for review by the United States Agency for International Development. It was prepared by CORE International, Inc.

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## **Disclaimer**

The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

# Brief Write-up on Russian Gas Reserves, Production, Consumption and Import-Export Volumes<sup>1</sup>

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<sup>1</sup> The present document was prepared at the Minister of Energy of Georgia, Mr. Nika Gilauri's urgent request to collect and provide data on Russian gas market as a digest and excerpts from the report 'Independent Gas Producers in Russia' published by Russian Petroleum Investor (RPI), March 2006.

## SUMMARIZED FORECAST OF RUSSIA'S GAS BALANCE

	2004	2005	2006	2007	2008	2009	2010
Total Russian Production, bcm	633.5	641.0	643.0	646.6	620.9	655.0	675.0
Total Russian Consumption, bcm	428.5	433.5	439.0	443.0	449.0	456.0	463.0
Exports to Europe and Turkey, bcm	153.0	164.2 <sup>2</sup>	175.3	186.5	197.7	208.8	220.0
Exports to FSU, bcm	65.0	60.0 <sup>3</sup>	55.0	50.0	42.0	34.0	33.0
<b>Balance:</b>	<b>-13.0</b>	<b>-16.7</b>	<b>-26.3</b>	<b>-32.9</b>	<b>-67.8</b>	<b>-43.8</b>	<b>-41.0</b>
Imports from Central Asia, bcm	13.3	19.0	26.0	75.0	78.0	85.0	105.0
<b>Balance:</b>	<b>0.3</b>	<b>2.3</b>	<b>-0.3</b>	<b>42.1</b>	<b>10.2</b>	<b>41.2</b>	<b>64.0</b>

## 1. GAS CONSUMPTION IN RUSSIA – ACTUAL AND FORECASTS

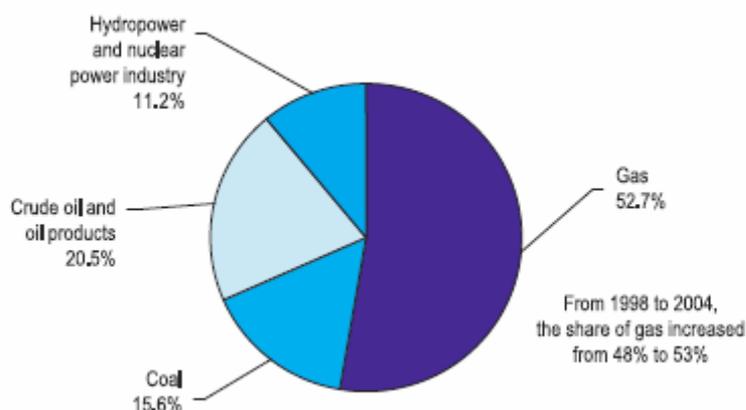
### Gas Consumption – Actual

Consumption Data for Russia for 2004	bcm	bcm	
Delivered via UGSS for Russian market -	333.5		
Tech needs for UGSS transportation -	52		
		<b>385.5</b>	Transported via UGSS including tech needs for transportation
Independent Producers bypassing UGSS -	19		
		<b>352.5</b>	Total Delivered to Russian Consumers excluding consumption at the fields and tech needs for UGSS
Gazprom consumption at the exploration fields -	16		
Independent Producers' consumption at the expl. fields -	8		
		<b>24</b>	Total Consumption at the fields
<b>Total Consumption in Russia</b>	<b>428.5</b>		

<sup>2</sup> Due to lack of actual data for 2005-2009 planned export volumes to Europe and Turkey, per the Minister of Energy of Georgia, Mr. Nika Gilauri's advice, respective figures for those years show linear increase from 2004 year level of 153 bcm to 2010 year level of 220 bcm.

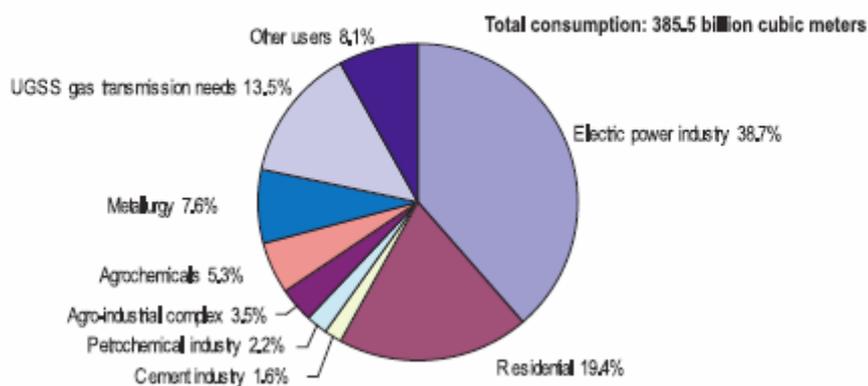
<sup>3</sup> Due to lack of actual data for 2005-2009 planned export volumes to FSU countries, per the Minister of Energy of Georgia, Mr. Nika Gilauri's advice, respective figures for those years show rapid decrease for 2008-2009 to 2010 year level of 33 bcm.

**Figure 5.1.1. Russia's primary FER consumption structure in 2004**



Source: Federal Energy Agency

**Figure 5.2.1. Consumption of gas delivered via UGSS by selected sectors of the economy in 2004**



Source: Rosstat

Gas consumption in the electric power industry, the most gas-intensive industry in the economy, grew 10% during the five years from 2000 through 2004. In absolute terms, it grew to 13 billion cubic meters and represents nearly 40 percent of the increase in gas consumption in Russia.

**Table 5.2.1. Gas consumption in Russia by economic sector (billions of cubic meters)**

Consumers	2004	2003	2002	2001	2000	Average annual growth, %
Electric power industry	149.2	143.8	141.8	140.6	136.2	2.3
Residential	44.6	44.9	42.9	41.7	40.5	2.4
Metallurgy industry	29.4	28.8	28.6	28.6	28.3	0.9
Agrochemical industry	20.4	19.3	18.8	17.8	17.9	3.3
Agro-industrial complex	13.6	13.8	13.7	14.0	14.5	-1.6
Housing and utilities	30.2	32.1	30.7	30.8	30.0	0.1
Petrochemical industry	8.5	8.0	6.6	6.1	6.0	9.2
Cement industry	6.3	5.7	5.4	5.0	4.9	6.7
Gas transportation system internal needs	52.0	51.3	47.7	45.7	47.1	2.5
Other users and consumption (losses, field usage, etc.)	31.3	30.6	30.6	34.9	30.1	0
Total	385.5	378.3	366.8	363.2	355.5	2.3

Source: Rosstat, Gazprom

## Gas Consumption – Forecasts

The forecasts of demand for gas in Russia, which MEDT and Gazprom included in their conceptual documents on gas industry reform, proceed from expectations that gas consumption will grow in tandem with growth in GDP. However, gas demand growth estimates reveal a significant variance depending on gas price change scenarios. They are a key factor underlying future consumption of resources.

Two scenarios for change in gas consumption in Russia are possible:

- Prices are regulated: Gas prices are gradually increased to match or outpace inflation.
- Prices are not regulated: There is a rapid transition to liberalized gas prices for all categories except residential customers. This triggers market forces that shape prices in accordance with the demand and supply dynamics for most of the marketed gas (80%).

The first scenario does not create economic incentives for gas savings. Instead, it perpetuates the existing pattern of gas consumption. If this scenario wins out, growth in gas demand can be expected to range from 1.5% to 2%. The former forecast pays heed to the trend to slowdown of gas demand growth in recent years. The later relies on continuation of the 2001 through 2004 rates.

The second scenario, with its inevitable price jump after liberalization, would cause a decrease in gas demand. It would also trigger inter-fuel competition. The largest gas consumers, industrial enterprises and power plants, would scramble for whatever alternative fuels are practicable and/or invest in less gas-intensive technology. MEDT estimates the gas demand under this scenario would stabilize to grow at 1% per year, again assuming its GDP growth forecasts proved valid.

The most likely scenario is that of the regulated price. We believe that the slowdown in the rate of growth in gas demand, observed in recent years, will continue. By the end of the current decade, it will have fallen from its average of two percent during 2001-2004 to 1.5 percent. This is a yearly average of 1.7 during 2005-2010. Thus, gas demand from end-consumers will increase from 352.5 bcm in 2004 to 390 bcm in 2010.

**Table 5.3.2. Gazprom estimate of deliveries to domestic markets via UGSS  
(billions of cubic meters)**

	2008	2007	2006
Gazprom <sup>1</sup>	299.8	297.9	296.5 <sup>2</sup>
Independent producers	49.2	48.7	47.6
Total	349.0	346.6	344.1

Source: Gazprom

Note:

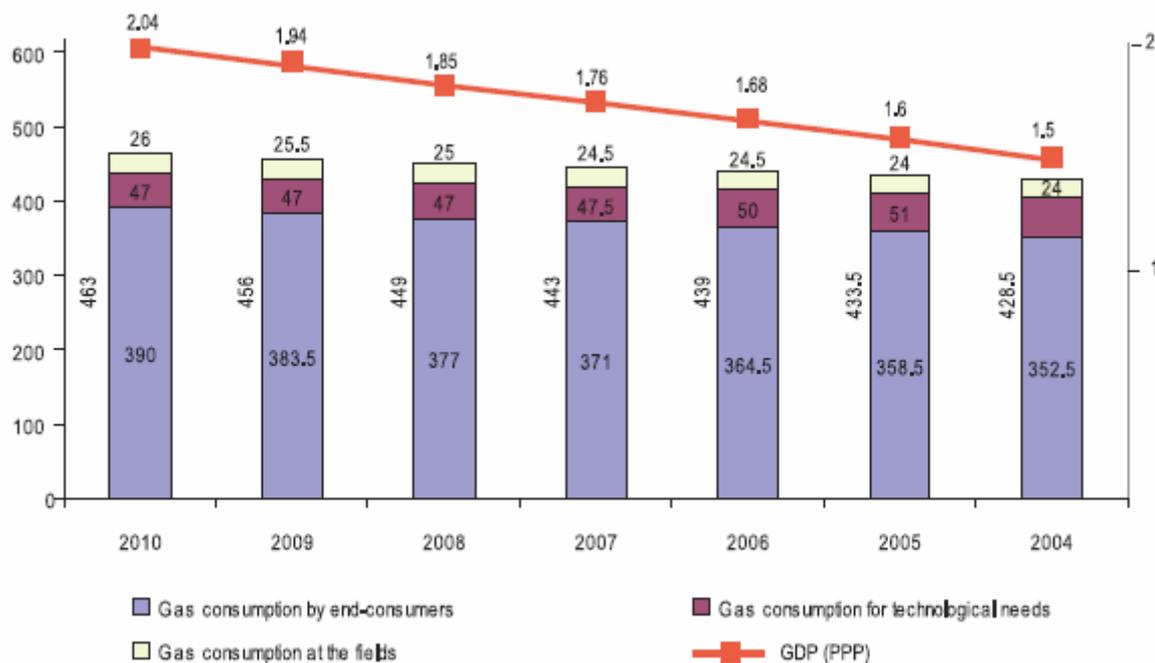
1 - excludes about 70 billion cubic meters of gas per year for Gazprom's technical needs.

2 - includes 12.1 billion cubic meters of gas which Gazprom plans to purchase from independent producers

If deliveries remains within the expected ranges throughout this decade, by 2010 deliveries could reach 354 billion cubic meters. According to our calculations, excluding Gazprom's internal use and deliveries by independent producers without accessing the UGSS, by 2010 domestic gas demand, will reach 390 billion. That is, it will exceed by approximately 50 billion cubic meters the Gazprom-projected level of domestic demand.

Gazprom and independents companies will consume at the fields approximately the same volume of gas of gas as in 2004, or about 24-26 bcm. As a result of improvements in the gas transportation system, Gazprom's gas consumption for technical needs will decrease by five bcm to 47 bcm. In aggregate, gas consumption in Russia will rise to 463 billion cubic meters by 2010.

Figure 5.1.5. Forecast of domestic gas consumption under most likely scenario

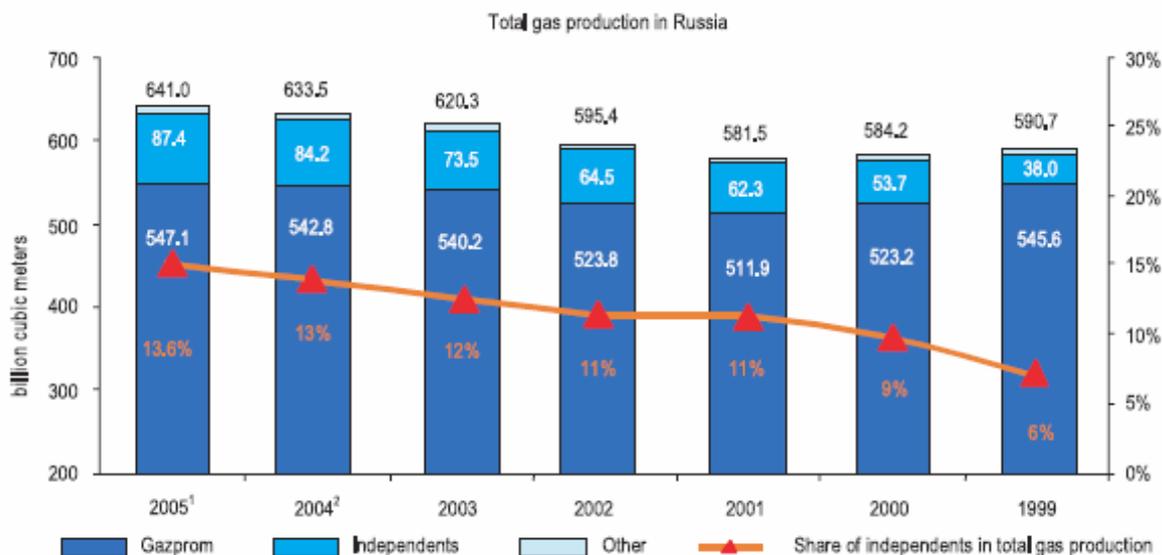


Source: RPI, IMF (GDP forecast)

## 2. GAS PRODUCTION VOLUMES – ACTUAL, FORECASTS AND RESERVES

### Gas Production – Actual

There were 641.0 billion cubic meters of gas produced in Russia during 2005. Companies not part of Gazprom produced 93.9 billion cubic meters of gas (14.7%). Of this amount, independent companies produced 87.4 billion cubic meters (13.6% of total production). The balance was produced by regional companies and non-affiliated portions of companies in which Gazprom held interest.



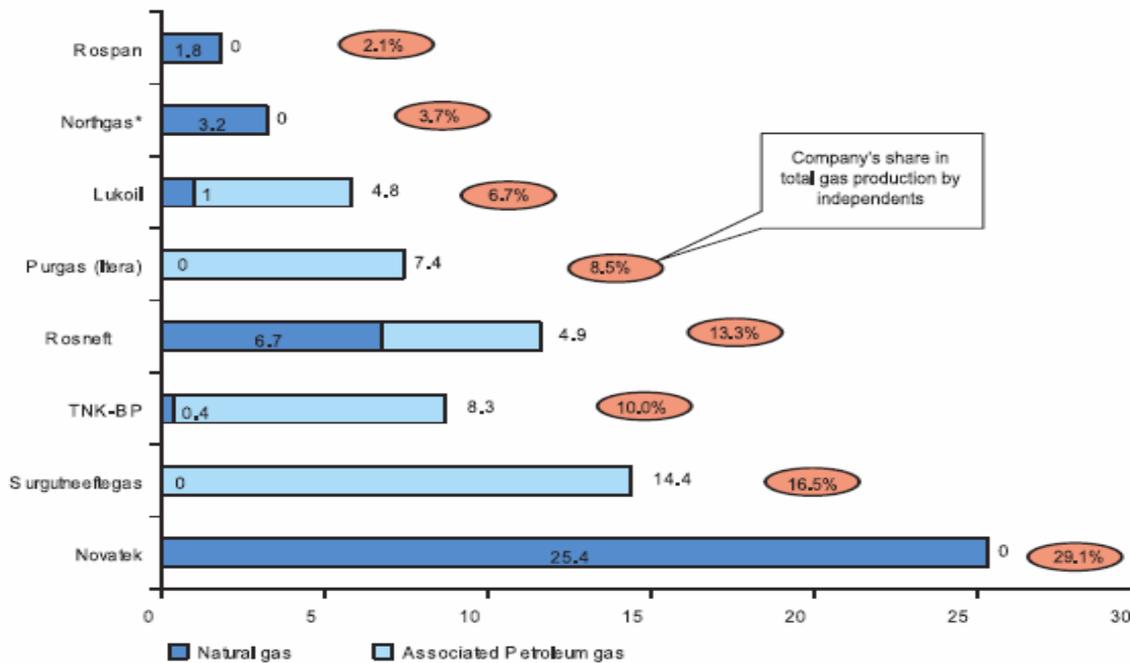
Source: RF Ministry of industry and Energy, TsDU TEK, Gazprom

Notes:

1 - 2005 financial records by Gazprom include the share of Northgas for the 4Q

2 - The TsDU TEK and RF Ministry of industry and Energy data for Gazprom production in 2004 in Figure differ from Gazprom's reports. The gas monopoly puts 2004 production at 545.1 billion cubic meters. The difference arises from Gazprom's inclusion, beginning in November 2004, of all production by Purgazdobycha in its production reports. Gazprom acquired Purgazdobycha in 2004 through an asset swap with NOVA TEK. (The transaction was concluded in late October 2004; earlier Gazprom had included 90 percent of Purgazdobycha's production in its reports.) TsDU and RF Ministry of industry and Energy data do not reflect these changes.

**Figure 1.2.3. Major gas producers among independent companies in 2005  
(billions of cubic meters)**



Source: RF Ministry of industry and Energy, TsDU TEK  
Note: Rosneft's production figure does not include Rosneft-SMNG output

## Gas Production – Forecasts

The government's Energy Strategy through 2020 provides gas production projections under several socio-economic scenarios. Projections range from 635 million cubic meters to 665 billion cubic meters per year by 2010. Of this amount, 105 billion to 115 billion cubic meters will come from production by independent companies. By 2020 the independents are expected to produce 150 billion cubic meters of gas.

Independents claim that this forecast underestimates the potential of the "non-Gazprom" sector. They say their current projects would allow them to bring gas production to 150 billion to 160 billion cubic meters by 2010.

**Table 5.3.1. Forecasts of gas production by Gazprom**

2010	2009	2008	2007	2006
560 <sup>1</sup> /550 <sup>2</sup>	550 <sup>2</sup>	520 <sup>1</sup> /550 <sup>2</sup>	550 <sup>1</sup>	548 <sup>1</sup>

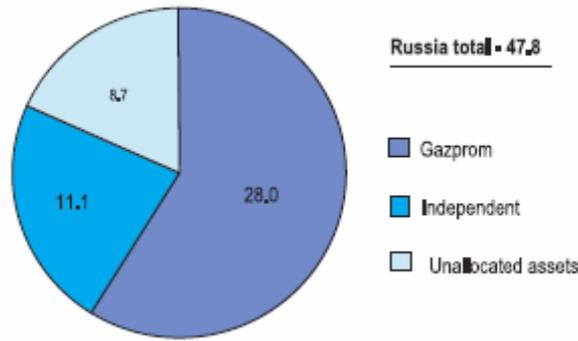
Notes:  
1 - Gazprom estimate  
2 - RPI estimate

## Total Reserves

According to the Ministry of Natural Resources, at the beginning of 2004 Russia had explored gas reserves (A+B+C1 categories) of 49.1 trillion cubic meters. Of this sum, 47.8 trillion cubic meters, 97%, were in free gas - gas found in gas reservoirs and gas caps. There were 1.3 trillion cubic meters of gas in dissolved gas - gas confined with crude oil and condensate in a reservoir that, under normal conditions, appears as associated petroleum gas.

Independent producers - companies that are not part of the Gazprom system - control 11.1 trillion cubic meters of the free gas reserves (23.2% of free gas reserves). Gazprom controls 28.0 trillion cubic meters (58.6%). Unallocated assets - 8.7 trillion cubic meters (18.2%) account for the balance.

**Figure 1.1.1. Explored free gas reserves in Russia as of early 2004 (trillions of cubic meters)**

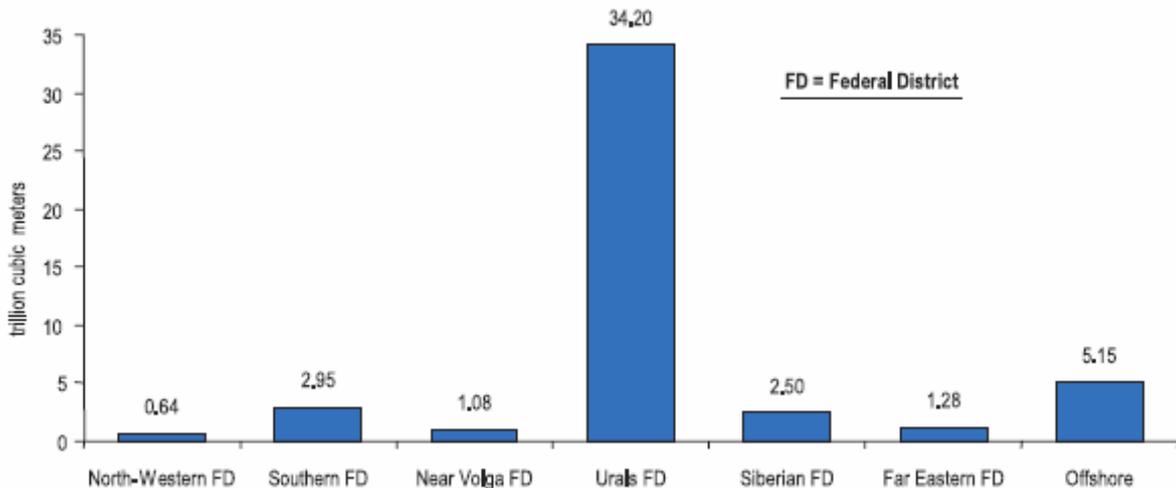


Source: RF Ministry of Natural Resources

Gas reserves are distributed unevenly across Russia: 34.2 trillion cubic meters of free gas (72% of explored reserves) and 0.9 trillion cubic meters of dissolved gas (69%) are concentrated in Western Siberia. While free gas reserves occur predominantly in the Yamal-Nenets Autonomous District, reserves of dissolved gas occur predominantly in the Khanty-Mansiysk Autonomous District.

Most of the fields are located close to one another in the nation's primary gas producing region, the Nadym-Pur-Taz region (NPTR) in the Yamal-Nenets Autonomous District (YNAD) in Western Siberia. Over 80 percent of Gazprom's explored reserves are concentrated in this region.

**Figure 1.1.2. Geographic distribution of explored reserves by region**



Source: RF Ministry of Natural Resources.

Russia's explored reserves of free gas are predominated by fat gas. In early 2004, fat gas made up approximately 55 percent of free gas reserves. Dry gas constitutes the balance of explored free gas reserves.

There is another noteworthy characteristic of resource base distribution: Dry gas is most common in Gazprom reserves, while the reserves of independent producers consist primarily of fat gas. Fat gas production and treatment costs are several times higher than those for dry gas.

### **Gazprom's Reserves and Their Prospects**

Of the 28.0 trillion cubic meters of natural gas reserves that Gazprom reported on its balance sheet at the beginning of 2004, wholly owned production subsidiaries held mineral resource licenses for 26.0 trillion cubic meters of reserves (92.9%). The remaining 2.0 trillions cubic meters derive from companies in which Gazprom held interest.

**Table 1.1.1. Distribution of reserves by wholly owned subsidiaries and affiliated companies of Gazprom at the beginning of 2004 (billions of cubic meters)**

	Reserves, combined ABC1
Reserves held through wholly-owned subsidiaries	25,978
Reserves held through majority owned subsidiaries	0,728
Reserves held through other companies in which Gazprom has an equity stake	1,300
Total for Gazprom	28,006

Source: Gazprom

**Table 1.1.2. Reserves by region as of the beginning of 2004 (billions of cubic meters)**

Region	Reserves, combined ABC1
Western Siberia (Urals federal district)	22,824
Northern European Russia (Northwestern federal district)	1,478
Southern Russia (Southern federal district)	2,625
South Ural region (Privolzhski federal district)	844
Southwestern Siberia (Siberian federal district)	235
Total for Gazprom	28,006

Source: Gazprom

U.S. company DeGolyer and MacNaughton has conducted audits of Gazprom's reserves (gas, oil and gas condensate) annually since 1997. It does so in accordance with the Society of Petroleum Engineers (SPE) standards. As of the beginning of 2004, DeGolyer and MacNaughton had completed audits of 22 of Gazprom's deposits, approximately 87 percent of the company's reserves. Their appraisal put proved and probable reserves of natural gas at 18.5 trillion cubic meters. Below are reserve estimates for the 10 largest fields belonging to Gazprom comparing Russian and SPE findings. As it is shown in the table, SPE estimates are for about **35% lower** than Gazprom's own estimations for those fields.

**Table 1.1.3. Reserves by field as of the beginning of 2004 (trillions of cubic meters)**

Reserves in major fields	Combined ABC1	SPE International Standards		
		Proved	Probable	Combined Proved and Probable
<b>Western Siberia (YNAD continental part)</b>				
Urengoykoye	5,026.4	3,092.7	419.4	3,512.1
Yamburgskoye	4,133.3	2,789.7	305.1	3,094.8
Zapolyaroye	3,357.7	2,710.5	159.6	2,870.0
Medvezhye	478.5	309.7	22.3	332.1
Komsomolskoye	468.0	421.2	8.0	429.2
<b>Western Siberia (Yamal Peninsula)</b>				
Bovanenkovskoye (Yamal Peninsula)	4,186.3	3,270.1	291.4	3,561.5
Kharasaveiskoye	1,254.9	1,081.7	302.7	1,384.4
<b>Barents Sea</b>				
Shtokmanovskoye (Barents Sea)	2,536.4	Not evaluated	Not evaluated	Not evaluated
<b>Southern Russia</b>				
Astrakhanskoye	2,519.7	190.3	42.6	232.9
<b>South Ural region</b>				
Orenburgskoye	695.4	357.5	17.5	375.0
Total for named fields	24,656.6	14,223.4	1,568.6	15,792.0

Source: Gazprom

### 3. GAS IMPORTS FROM MIDDLE ASIA – ACTUAL AND FORECASTS

**Table 5.3.5. Projected deliveries of Central Asian gas to Russia (billions of cubic meters)**

Exporting Country	2010	2009	2008	2007	2006	2005 <sup>1</sup>	2004
Turkmenistan <sup>2</sup>	70-80	70-80	63-73	60-70	10	4	4.2
Uzbekistan <sup>3</sup>	10	10	10	10	9	8	6.6
Kazakhstan <sup>4</sup>	20	n/a	n/a	n/a	7	7	2.5
Total	100-110	n/a	n/a	n/a	26	19	13.3

Source: Gazprom, RPI

Notes:

1 - Estimate.

2 - Under an April 2003 contract signed between Gazprom and Turkmenneftegaz,, Turkmenistan is to deliver between 1.54 trillion and 1.74 trillion cubic meters of gas to Russia between 2004 and 2028.

3 - In December 2002, Gazprom and Uzbekneftegaz signed an agreement for delivery of 87 billion cubic meters of Uzbek gas to Russia between 2003 and 2012.

4 - Kazakhstan and Russia do not have a long-term contract for delivery of gas to Russia, deliveries are fixed each year through new agreements.

As the above table illustrates, Gazprom's long-term strategy assigns Central Asian gas an increasingly significant role in balancing Russia's gas supply and demand. Many independent experts have questioned the viability of such heavy reliance on Central Asia. After the agreement between Gazprom and Naftogaz Ukrainy to meet Ukrainian shortage with deliveries of Central Asian gas, Gazprom's strategy misses its original point altogether. The Central Asian republics do not have the resources to make large-scale deliveries of gas to Ukraine and Russia simultaneously.

**Table 5.3.6. Russia's 2010 gas balance, excluding gas deliveries by independent companies (billions of cubic meters)**

	2010	2006
Gazprom Production	550	548
Deliveries of Central Asian gas:		
Per contracts	100-110	26
Excluding allocated to Ukraine (anticipated deliveries)	24	4
Total resources	574	552
Export shipments	215-225	190
Balance available to domestic consumers	349-359	367
Forecasted domestic demand	463	439
Difference between gas resources and domestic demand (market for independents)	104-114	77

Source: RPI analysis

## 4. GAS EXPORTS TO EUROPE – ACTUAL AND FORECASTS; ROUTES AND TECHNICAL SPECIFICATIONS

Table 1.3.1. Gas balance of the UGSS

	2004	2003	2002	2001	2000
Total gas supplies (bcm), including	687.4	674.1	6,637.1	630.6	633.5
Gazprom's gas production and purchases by Gazprom's subsidiaries <sup>1,2</sup>	529.1	524.9	510.6	499.0	510.1
Gas from independent suppliers, including purchases by Gazprom and gas transit from Central Asia	105.2	95.5	79.6	77.4	68.2
Withdrawals from underground storage	41.1	42.8	40.4	48.3	53.3
Decrease in natural gas volume within the UGSS pipelines	11.4	10.2	5.9	5.2	1.2
Other	0.6	0.7	0.6	0.7	0.7
<b>Total deliveries (bcm), including</b>	<b>687.4</b>	<b>674.1</b>	<b>637.1</b>	<b>630.6</b>	<b>633.5</b>
Additions to underground storage	45.5	56.3	45.7	46.8	60.3
Deliveries to customers in Russia,	333.5	327.0	319.1	317.5	308.4
Deliveries to Europe	148.9	134.7	129.4	127.0	129.0
Deliveries to FSU countries other than Russia	97.1	94.2	88.8	88.0	87.1
Technical needs and losses <sup>3</sup>	52.0	51.3	47.7	45.7	47.1
Increase in natural gas volume within the UGSS pipelines	10.4	10.6	6.4	5.6	1.6

Source: Gazprom

Notes:

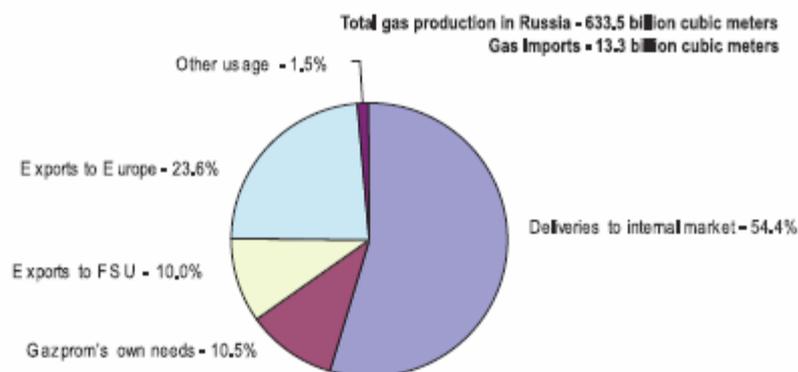
1 - Amounts are less than yearly production figures. A portion of production goes to operate booster compressor stations and to supply gas to northern locales near fields; it does not enter the UGSS.

2 - Includes gas purchased from independent producers.

3 - Gas consumed to run compressor stations and gas expended during repair and diagnostic work.

### Gas Exports – Actual

Figure 1.3.1. Russia's gas distribution as of the end of 2004



Source: RPI

In 2004 there was 153.2<sup>4</sup> billion cubic meters of gas exported to Europe and Turkey. Exports to FSU countries have reached 65 billion cubic meters in 2004. Total of 218.2 bcm was exported from Russia in 2004.

<sup>4</sup> Other sources also quote 148.9 or 147.5 bcm.

According to *BP Statistical Review 2005*, Russian gas export to Europe was following:

<b>Russian Gas Export to Europe in 2004</b>	
Austria	6,00 bcm
Belgium	0,20 bcm
Bulgaria	2,90 bcm
Croatia	1,05 bcm
Czech Rep	7,18 bcm
Finland	4,61 bcm
France	11,50 bcm
Germany	37,74 bcm
Greece	2,20 bcm
Hungary	9,32 bcm
Italy	21,00 bcm
Latvia	1,40 bcm
Lithuania	2,60 bcm
Netherland	2,67 bcm
Poland	7,90 bcm
Romania	4,60 bcm
Serbia	1,76 bcm
Slovakia	7,30 bcm
Slovenia	0,56 bcm
Switzerland	0,30 bcm
Turkey	14,35 bcm
Other Countries	1,30 bcm
<b>TOTAL</b>	<b>148,44 bcm</b>

### Gas Exports – Forecasts

In its export strategy, Gazprom plans increase in its gas deliveries of up to 180-190 billion cubic meters to Europe and Turkey by 2010, an increase of 27 billion to 37 billion cubic meters over 2005. At the same time Russia's gas exports to the FSU by 2010 decrease to 33-35 billion cubic meters (mostly by substituting its gas with Central Asian gas for deliveries to Ukraine). Considering obligations to deliver to Europe and Turkey, Russia's total gas exports by the year 2010 are likely to be 215-225 billion cubic meters per year.

### Trunk Gas Pipelines

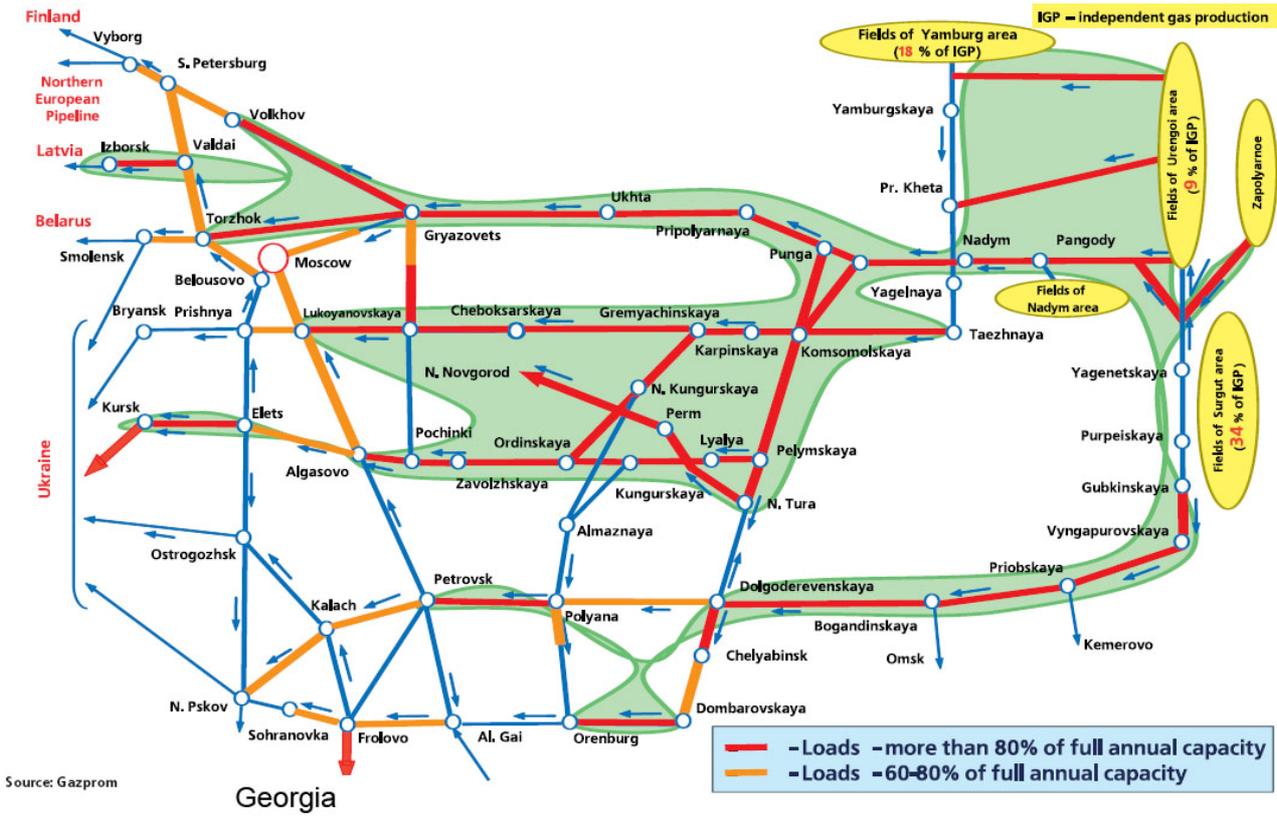
National trunk gas pipelines are integrated into a unified, centrally controlled system for natural gas preparation, transportation and storage. The system is known officially as the Unified Gas Supply System. Gazprom is the operator and owner of the UGSS.

**Table 1.4.1. Primary Components of Russia's UGSS as of the end of 2004**

<b>System component</b>	<b>Measure</b>
Length of trunk pipelines (thou.km)	152.8
Number of compressor stations	263
Number of compressor units	4,067
Total capacity of compressor stations (mln kW)	44.2
Number of underground storage facilities (units)	24
Overall (active) holding capacity of underground storage facilities (bn cu m)	62.5

Source: Gazprom

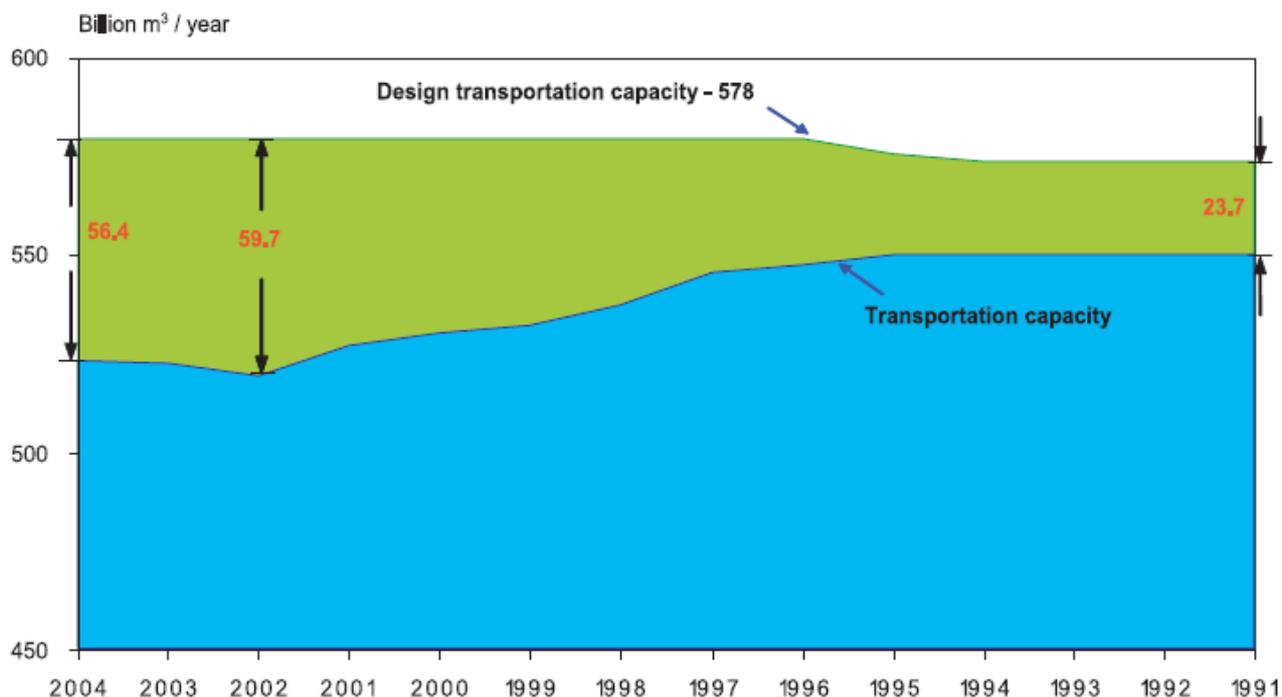
Key directions of UGSS trunk gas pipelines



From the standpoint of transmission capacity, the major bottleneck is at the point of entry into UGSS in Nadym-Pur-Taz region. This is where major gas trunk lines originate. The Nadym-Pur-Taz section of UGSS is where most of the capacity that has been retired from service is located. Although design capacity of the

outbound gas lines in NPTR is 580 billion cubic meters of gas per year, VNIIGAZ found that the lines are capable of transmitting only 520 billion cubic meters per year.

**Figure 1.4.1. Decrease of UGSS capacity**



Source: Gazprom

In 2004, 506.5 billion cubic meters of gas were produced in the NPTR. The technical condition of this section of the UGSS may soon become a limiting factor for gas production in Russia. The greatest impact will be on independent producers. They are given access to the pipeline on the principle of "leftover" capacity.

The UGSS has other obstacles that impede effective operations:

- shortage of intersystem connections;
- absence of reverse-flow gas pipelines;
- deficiencies in holding capacity in underground gas storage facilities. (At just 9% of annual production, storage is far below international standards.)

### Modernization of the UGSS

Investment in gas transportation facilities will exceed Gazprom's spending target. During the past two years, Gazprom sharply increased upgrade and development of UGSS, spending 57% of capital outlays on the facility in 2004 and 64% in 2005. In those two years alone, Gazprom expended \$8.8 billion on gas transportation.

These investments in transportation infrastructure, however, will not compensate for the shortfall in transportation capacity anticipated in the NPTR production region. Gazprom's investment program focuses on bolstering capacity for gas exports: the CPTO-Torzhok (Yamal-Europe system), Pochinki-Stavropolskoye UGS, etc. Funding has largely been earmarked for these projects (more than 76% in 2005). Costs for GTS reconstruction, as in previous years, are financed with whatever monies remain.

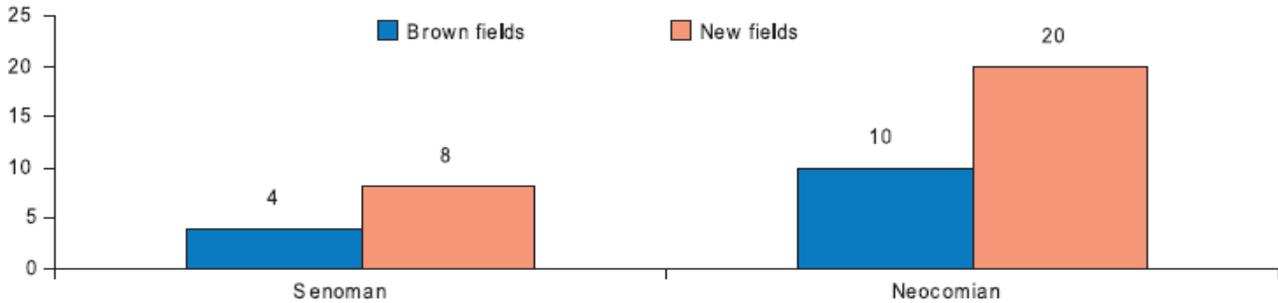
Gazprom spent about \$1 billion on UGSS modernization in 2005. To upgrade projects in full, Gazprom would have to spend \$4.4 billion in 2006. This exceeds its financial capabilities. Shortfalls in spending mean that improvements in the gas transportation system, such as the addition of 35 bcm in capacity by 2007, may not be realized. Given the pace of the GTS upgrade, coupled with the plans of independent producers and anticipated increases in Central Asian gas imports and gas transit, problems with gas transport capacity are likely to grow larger.

## 5. GAS PRODUCTION AND INTERNAL WHOLESALE PRICES

### Gas Production Prices

According to various sources, production prices on existing fields in Russia vary from \$4 to \$15 per 1000 cubic meters. On new fields production costs vary from \$10 to \$28 per 1000 cubic meters.

Figure 1.1.3. Gas production costs (\$ per 1000 cubic meters)



Source: Northgas

### Wholesale Gas Prices - Actual

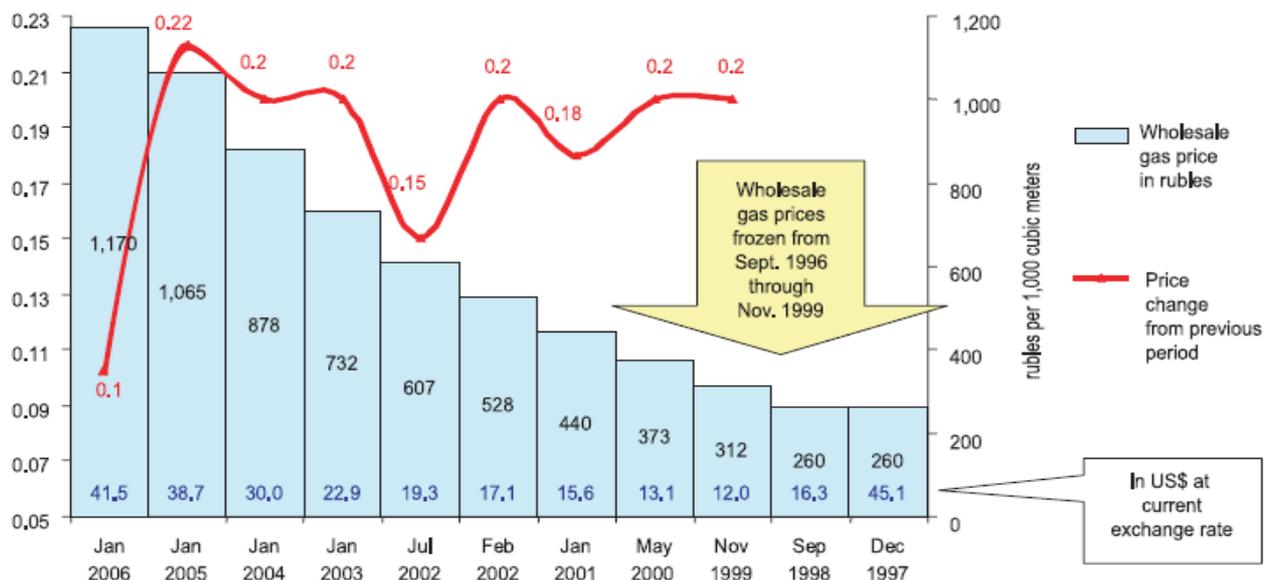
The existing wholesale price system differentiates two customer categories:

- domestic customers - gas is distributed to residential apartments and single-family homes for cooking, heating water and autonomous heating supply;
- other customers - industrial sectors, power companies, utilities, government and federally funded organizations, etc.

Differentiation of wholesale prices by consumer category stems from the practice of cross-subsidies. Relatively low residential gas prices exist at the expense of significantly higher prices for industrial customers. Wholesale residential gas prices in 2004 averaged 68% of wholesale industrial gas prices. After gas prices rose on January 1, 2005, and then again on April 1, 2005, (the latter affecting only residential users), they were 71% of industrial levels. This is consistent with the government's plans to equalize wholesale gas prices for residential and industrial consumers.

Wholesale prices are also differentiated by geographic areas, zones.

Figure 3.3.3. Weighted average wholesale gas prices for industrial customers (exclusive of VAT)



Source: FTS

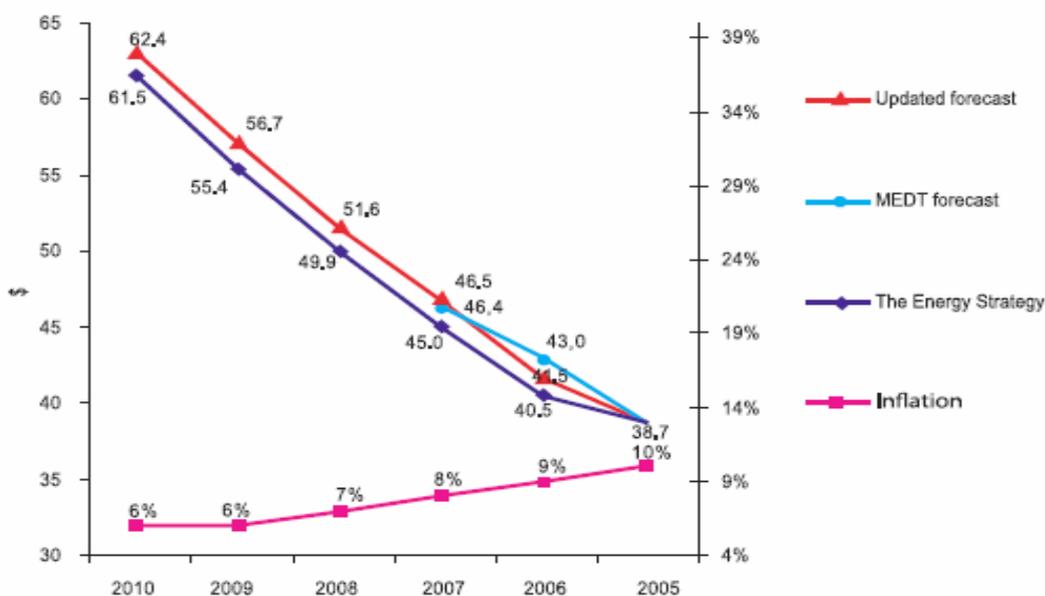
## Wholesale Gas Prices - Forecasts

Approximately 95 percent of the gas in the domestic market is consumed as fuel. Demand is inelastic. This suggests that prices for gas can increase considerably without causing any decreases in gas demand.

The government and Gazprom both support higher gas prices, although they differ in price change philosophies. The government supports a continuation of past pricing policies and an evolutionary or gradual change in gas prices that outpaces inflation. Gazprom advocates liberalizing gas prices for industrial customers.

The MEDT social and economic development program for 2005 through 2007 makes provisions for gas price growth of 11 percent in 2006 and eight percent in 2007. It assumed inflation rates of 7.7 percent and 6.0 percent, respectively.

Figure 5.1.4. Forecast of gas prices for industrial customers



Source: RF Ministry of Industry and Energy, RF Ministry for Economic Development and Trade, RPI

Longer term gas price forecasts are contained in the Energy Strategy of Russia. That document was drafted by the former Ministry of Energy (Minenergo) and approved by the government in August 2003. Under its scenario, gas prices would reach \$40 to \$41 per 1,000 cubic meters by 2006 and \$59 to \$64 per 1,000 cubic meters by 2010. Minenergo based its price forecast on an assessment of investment requirements for the gas industry.

If the government succeeds in holding inflation within a range of 9 percent to 10 percent throughout 2006 and inflation gradually slows to 5.5 percent by 2010, the average gas price for industrial customers could grow from \$41.5 per 1,000 cubic meters in the beginning of 2006 to \$45 to \$45.5 in 2007 and to \$62 to \$63 in 2010 (under current exchange rate: USD/Ruble 1/28.2).

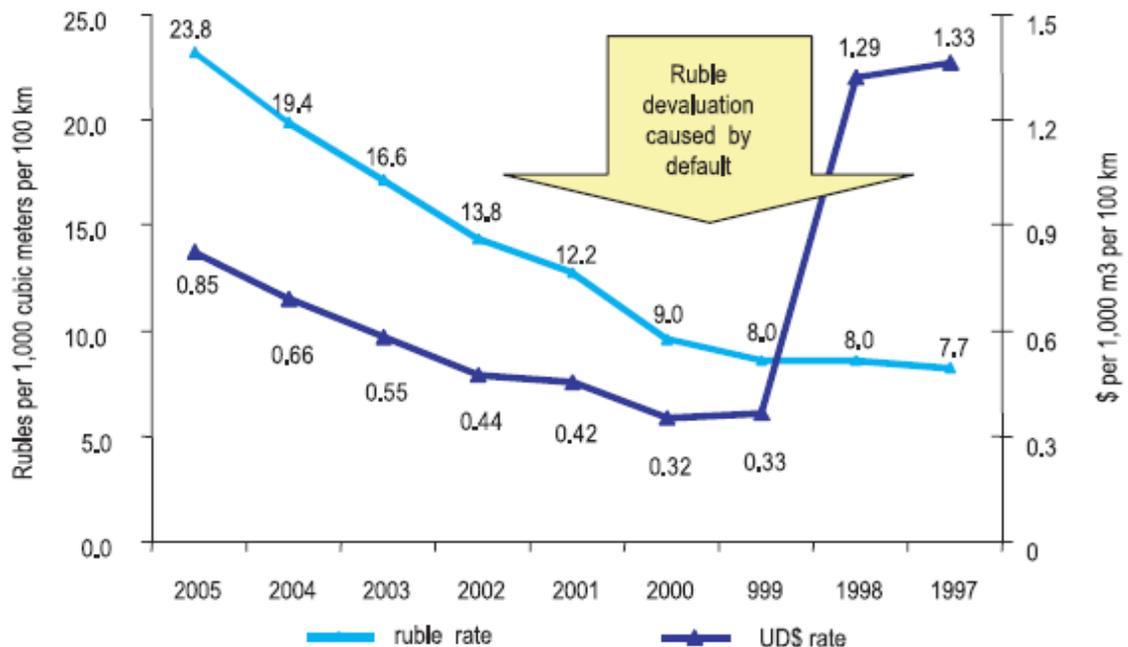
The government, Gazprom and RAO UES consider gas prices of \$60 to \$65 per 1,000 cubic meters to be a fair price of gas in the Russian domestic market.

## Transmission Tariffs for Independent Producers

Once Gazprom grants access to its gas transportation system, independent producers are required to pay government-regulated tariffs to use the UGSS. The first transmission tariff for the UGSS became effective in November 1997. The Federal Tariff Service (FTS) determines the rate for the tariff.

Effective October 1, 2005, the tariff for gas deliveries to domestic and Customs Union markets became 23.84 rubles (approximately \$0.85) per 1,000 cubic meters per 100 kilometers. The tariff for export delivery of gas is \$0.97.

**Figure 3.1.1. Transmission tariffs for independent gas producers**



Source: FTS

The current tariff-setting system is distinguishing by the absence of an official methodology for calculating rates. Tariffs are derived from consolidated cost data of gas transportation companies controlled by Gazprom. Since separate, detailed financial accounting is not maintained for production, transmission, storage and marketing operations within Gazprom, and since some of the gas production and transmission costs are covered by the holding company rather than individual gas transportation enterprises, tariffs are questioned by independent producers and industry watchers.

There are other shortcomings in the current pricing system:

- it is impossible to determine the actual cost of gas transmission from one point to another, let alone when alternatives exist;
- the practice of incorporating system-wide costs in the price of transmission services (even if only one route was used for gas delivery);
- the tariff is developed without inclusion of an investment component.

The FTS has developed a new pricing methodology to overcome problems in the existing tariff-setting system. Principles for calculating and applying the transmission fee are similar to the current approach. The transmission fee is calculated as a ratio of the sum of the cost of electricity, gas for internal needs and expenditures by gas transportation companies from their own profits to total transportation costs. It is fixed for transmission of 1,000 cubic meters of gas per 100 kilometers. The transmission fee accounts for 20 percent to 30 percent of the tariff. Transmission services are paid at this rate for the actual volume and distance that gas is shipped.