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COUNTRY ANALYSIS BRIEFS

Russia

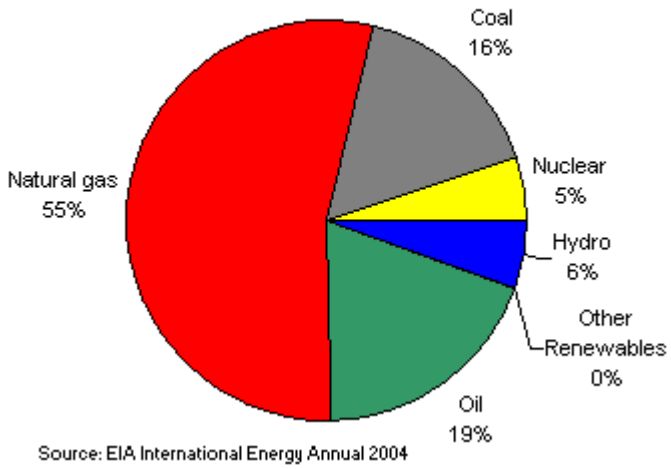
Last Updated: April 2007

Background

Russia holds the world's largest natural gas reserves, the second largest coal reserves, and the eighth largest oil reserves. Russia is also the world's largest exporter of natural gas, the second largest oil exporter and the third largest energy consumer.

In 2006, Russia's real gross domestic product (GDP) grew by approximately 6.7 percent, surpassing average growth rates in all other G8 countries, marking the country's seventh consecutive year of economic expansion. Russia's economic growth over the past seven years has been driven primarily by energy exports, given the increase in Russian oil production and relatively high world oil prices during the period. Internally, Russia gets over half of its domestic energy needs from natural gas, up from around 49 percent in 1992. Since then, the share of energy use from coal and nuclear has stayed constant, while energy use from oil has decreased from 27 percent to around 19 percent.

Total Energy Consumption in Russia, by Type (2004)



Source: EIA International Energy Annual 2004

Russia's economy is heavily dependent on oil and natural gas exports, making it vulnerable to fluctuations in world oil prices. According to an International Monetary Fund (IMF)study, a $1 per barrel increase in Urals blend oil prices for a year is estimated to raise federal budget revenues by 0.35 percent of GDP, or $3.4 billion. In order to manage windfall oil receipts, the government established a stabilization fund in 2004 worth. By the end of 2006, the fund was expected to be worth almost $80 billion, or about 7 percent of the country's nominal GDP. Raw materials, such as oil, natural gas, and metals, dominate merchandise exports and account for over two-thirds of all Russian export revenues.

Although estimates vary widely, the IMF and World Bank suggest that in 2005 the oil and gas sector represented around 20 percent of the country's GDP, generated more than 60 percent of its export revenues (64% in 2007), and accounted for 30 percent of all foreign direct investment (FDI) in the country.

Kremlin policy makers continue to exhibit an inclination to advance the state's influence in the energy sector. Taxes on oil exports and extraction are still high, and Russia's state-influenced oil and gas companies are obtaining controlling stakes in previously foreign-led projects. State-owned export facilities have grown at breakneck pace, while private projects have progressed more slowly or have been met with roadblocks by state-owned companies or by various government agencies. (see Oil Exports).

Oil

Russia is a major world oil producer,

Reserves

sometimes producing even more than Saudi Arabia. Following the collapse of the former Soviet Union (FSU), Russia's oil output fell sharply, and has rebounded only in the last several years.

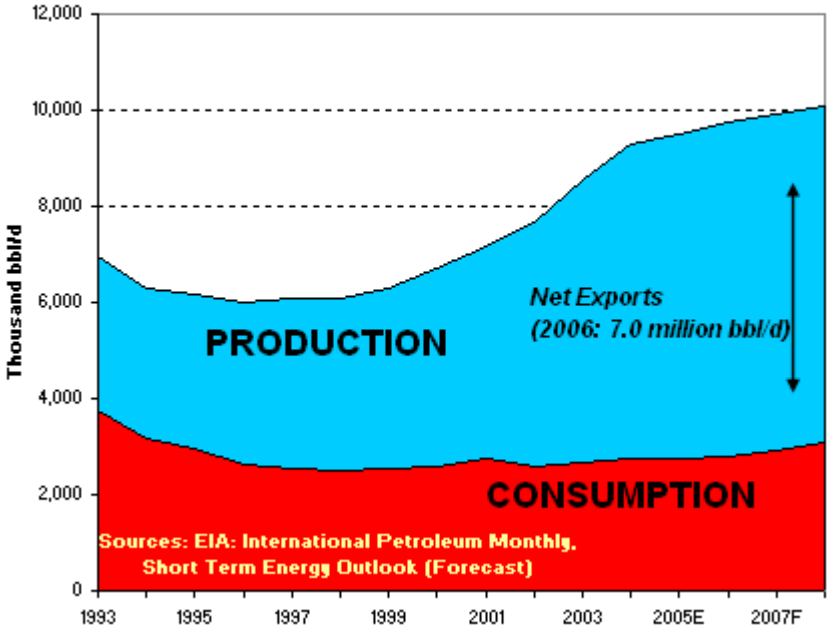
According to the *Oil and Gas Journal*, Russia has proven oil reserves of 60 billion barrels, most of which are located in Western Siberia, between the Ural Mountains and the Central Siberian Plateau. Eastern Siberia is one area where little exploration has taken place. There, only four or five oil and gas fields have been discovered, and a 1996 Petroconsultants study (the latest available) estimated that around 35 million barrels of oil and 5 Trillion Cubic feet (tcf) of natural gas exist in the region.

Production

In the 1980s, the Western Siberia region, also known as the "Russian Core," made the Soviet Union a major world oil producer, allowing for peak production of 12.5 million barrels per day in total liquids in 1988. Following the collapse of the Soviet Union in 1991, Russia's oil production fell precipitously, reaching a low of roughly 6 million bbl/d, or around one-half of the Soviet-era peak (see Fig. 1). According to observers, several other factors are thought to have caused the decline, including the depletion of the country's largest fields due to state-mandated production surges and the lack of investment in field maintenance.

A turnaround in Russian oil output began in 1999. Many analysts attribute the rebound in production to the privatization of the industry following the collapse of the Soviet Union. The privatization clarified incentives and increased less expensive production. Higher world oil prices (oil prices tripled between January 1999 and September 2000), the use of technology that was standard practice in the West, and the rejuvenation of old oil fields also helped raise production levels. Other experts partially attribute the increase to after-effects of the 1998 financial crisis, the fall in oil prices, and the subsequent devaluation of the ruble.

Figure 2: Russian Total Liquids Production and Consumption (1992-2008E)



In 2006 Russian total liquids production averaged almost 9.7 million bbl/d, including 9.2 million bbl/d of crude oil, a 220,000 bbl/d increase over 2005. This growth rate was down from annual growth of roughly 700,000 bbl/d between 2002-2004.

In upcoming years, total Russian oil production is expected to grow at an annual rate of around 1.5-2.5 percent partially due to growth in output from the Sakhalin projects, (see Sakhalin Fact Sheet). Government taxation of production and export revenues along with the continued lack of clarity concerning the ownership of subsoil resources contributed to lower output for 2006 and could possibly contribute to lower than expected output during 2007. As Table 1 (below) shows, production from mature oil fields also has a major role in the recent slowdown in Russian oil supply growth.

In the upcoming decade, a few major oil fields (listed in Table 1 below) will contribute to most of Russia's supply growth and others will offset decreasing production from mature fields. In 2004, around 20 percent (or 1.8 million bbl/d) of Russia's oil production came from fields that had already produced 80 percent of their total recoverable reserves. Achieving continued growth at post-peak fields will become more problematic as oil companies run out of easy and less costly opportunities to manage the rate of decline.

"Pre-peak" fields, which have come online in the last decade, can add between around 1.2-1.5 million bbl/d to Russian supply according to John Grace's recent analysis of Russia's oil supply. New field developments will produce almost all of Russia's annual oil growth in the next five years and will likely produce more than half of the country's oil in 2020. In the next five years, new field developments at Sakhalin Island, the Shell Joint Venture's West Salymskoye project, Lukoil/ConocoPhillips's TimanPechora project, Rosneft/Gazprom's offshore Prirazlomnoye project, and Rosneft's Vankorskoye and Komsomolskoye will help stem production losses at older fields.

TABLE 1: Pre- and Post-Peak Russian Oil Fields

Oil Field	Owner	Basin	Production (2004)	Cum. Depletion (in 2004)
Pre-Peak Russian Fields				***Percent***
Priobskoye	Rosneft (fmr. Yukos)	W. Siberia	437,481	8
Tevlin-Russinkoye	Lukoil	W. Siberia	240,980	45
Tyanskoye	Surgutneftegaz	W. Siberia	191,136	20
Sugmutskoye	Gazprom (fmr. Sibneft)	W. Siberia	191,475	44
Sporyshevskoye	Gazprom (fmr. Sibneft)	Yamalo-Nenetsk	107,505	44
W. Salym	SPD: Sibir, Evikhon, Shell	W. Siberia	~80,000	n/a
Total			***1.2 million bbl/d***	
Post-Peak Russian Fields				
Samotlor	TNK-BP	W. Siberia	974,071	71
Romashkino	Tatneft	Volga/Ural	295,451	84
Momontovskoye	Rosneft	W. Siberia	251,491	82
Federovskoye	Surgutneftegaz	W. Siberia	456,330	67
Lyantorskoye	Surgutneftegaz	W. Siberia	168,219	81
Pravdinsko-Salymskoye	Khantymnasiysk neftegaz	W. Siberia	119,353	27
Povkhovskoye	Lukoil	W. Siberia	112,053	95
S. Yagunskoye	Lukoil	W. Siberia	n/a	n/a
Arlan	Bashneft	Volga/Ural	74,995	91
Total			***2.4 million bbl/d***	

John Grace estimates that these post-peak fields are declining from 1-5% per year.

*Proved reserves according to World Petroleum Congress/Society of Petroleum Engineers (WPC/SPE), unless otherwise noted

Sources: Production and reserves data for selected fields from IHS Energy Database (Remaining Proved+Probable Oil/Recoverable P+P Oil). Reproduced with permission. Grace, John. Russian Oil Supply. Oxford Institute of Energy Studies: 2005. pp. 38.

Refinery Sector

Russia has 41 oil refineries with a total crude oil processing capacity of 5.4 million bbl/d, but many of the refineries are inefficient, aging, and in need of modernization. According to *Energy Intelligence*, refinery throughput at Russian refineries increased by roughly 5.8 percent to around 4.4 million bbl/d in 2006. Russian refineries produced around 1.1 million bbl/d of Mazut, 1.3 million bbl/d fuel oil, and 800,000 bbl/d gasoline. Retail product prices are typically lower than world oil product prices, hurting incentives to supply the local market. For example, in 2005 retail gasoline and automotive diesel prices in Russia were approximately $2.05 and $1.88 per gallon, respectively. In contrast, gasoline and diesel prices average around $5.50 and $4.90 in OECD Europe.

Oil Exports

Russia's production

Russia's Oil Balance

growth in the upcoming decade will depend on the availability of viable export routes for the country's crude oil. Transneft currently has a monopoly over Russia's pipeline network.

During 2006, Russia produced roughly 9.8 million bbl/d of liquids (not including oil products), consumed roughly 2.8 million bbl/d in liquids, and exported (in net) around 7 million bbl/d. According to official Russian statistics, roughly 4 million of this total is crude oil. Over 70 percent of Russian crude oil production is exported, while the remaining 30 percent is refined locally. Crude oil exports via pipeline fall under the exclusive jurisdiction of Russia's state-owned pipeline monopoly, Transneft.

Expanding Russia's capacity to export oil in order to keep pace with the country's growing production is important to both Russian policymakers and oil companies. However, the two sides are sometimes at odds over how best to boost the country's export capacity.

Destinations of Russian Oil Exports

During 2006, Russia exported almost 4 million bbl/d of crude oil, and over 2 million bbl/d (102 million tonnes) of oil products. Roughly 1.3 million bbl/d were exported via the Druzhba pipeline to Belarus, Ukraine, Germany, Poland, and other destinations in Central and Eastern Europe (including Hungary, Slovakia, and the Czech Republic), around 1.3 million bbl/d via the new flagship Primorsk port near St. Petersburg, and around 900,000 bbl/d via the Black Sea.

The majority of Russia's oil exports transit via Transneft-controlled pipelines, but around 300,000 bbl/d of oil is transported via other non-Transneft-controlled sea routes or via rail. Because of higher world oil prices recently, almost 170,000 bbl/d of Russia's oil is transported via railroad (see Fig. 2).

Oil Product Exports and Balance

Most of Russia's product exports consist of fuel oil and diesel fuel, which are used for heating in European countries and, on a small scale, in the United States. Russian oil exports to the U.S. (click for data table) have almost doubled since 2004, rising to almost 500,000 bbl/d of crude oil and products. Increases in product exports can be attributed to political pressures to maintain refinery operations and higher international oil product prices. A draft plan for the refining sector's development for 2005-2008 foresees continued increases in the production of high quality light oil products, catalysts and raw material for the petrochemical industry. As production of fuel oil is reduced, local refineries are only meeting about half of the country's demand for high octane gasoline. Consequently, Russia must import the remainder.

Table 2: Russian Oil Exports by Export Outlet (2006, thousand bbl/d)

Novorossiysk	768
Other Black Sea	217
Primorsk	1,255
Druzhba Pipeline	**1,261**
Germany	437
Poland	466
Hungary	136
Czech Republic	104
Slovakia	118
Lithuania	158
Exports	**3,660**
Non-Transneft Sea	170
China (Rail)	178
Murmansk (Rail)	47
Other Non-Transneft Rail	47
CPC	53
Total Crude Oil Exports	**4,155**

*Reprinted by Permission: Energy Intelligence (*Nefte Compass, *January 18, 2007)*

Europe has been increasingly concerned about the stability of oil (and gas) exports from Russia since early 2006. OECD Europe's reliance on Russian crude exports has grown from around 9

percent of total crude imports in 1995 to around 29 percent in 2006. Using a different barometer, the share of Europe's oil consumption that comes from Russia has grown from around 7.5 percent to around 25 percent during the same time period.

Proposed Oil Pipeline Routes and Pipeline Expansion Projects

Baltic Pipeline System (BPS) Expansion

The BPS came online in December 2001 carrying crude oil from Russia's West Siberian and Timan-Pechora oil provinces westward to the newly completed port of Primorsk in the Russian Gulf of Finland (see Maps section). The BPS gives Russia a direct outlet to northern European markets, allowing the country to reduce its dependence on transit routes through Estonia, Latvia, and Lithuania. Unfortunately for the Baltic countries, the growth of the BPS has come at considerable cost, as Russian crude which traditionally moved through the Baltic region has been re-routed through the BPS.

Throughput capacity at Primorsk has steadily increased, reaching around 1.3 million bbl/d during 2006 on average, and 1.5 million bbl/d as recently as March 2007. In the aftermath of the transit dispute with Belarus in January 2007, Transneft president Semyon Vainshtok announced preliminary plans to build a pipeline spur from the Belarus border to Primorsk at an initial capacity of 1 million bbl/d, with the possibility of further expansion to 1.5 million bbl/d. The construction, although not sanctioned yet by the Russian government, could be completed in as few as 18 months. The expansion, called BPS-II, would expand Primorsk's export capacity to around 3 million bbl/d.

Related information on energy in the Baltic Sea Region is discussed in the Baltic Sea Region Country Analysis Brief.

Murmansk Area and Kharyaga-Indiga Pipeline

International shipping from the Murmansk area has two advantages: the port is ice-free most of the year, and it is deep enough to make shipping to the United States economic without reloading in Europe. Several pipeline proposals connecting the Murmansk area to existing producing areas in the south in the last several years have been met with lukewarm reactions by Transneft (see Maps section) The state-owned company now plans a pipeline to Indiga, 240 miles from the Timan-Pechora producing basin, that is closer but iced over in winter. No timeline has been set for construction. Oil from Timan-Pechora has a lesser sulfur content and is lighter than the rest of the Urals blend.

Now, Russian oil is delivered to the Murmansk area by rail, and last year around 270,000 bbl/d of oil and products were shipped from the area. Sintez Corp and Arktikshelfneftegaz are planning a 200,000 bbl/d loading facility with plans to expand to around 500,000 bbl/d by 2025. Lukoil is building up its terminal at Varandei to include a tank farm of 325,000 cubic meters, two underwater pipelines of 14 miles each and an ice-resistant loading facility.

Druzhba Pipeline and Adria Reversal Project

Of the 1.3 million bbl/d of oil transported via the Druzhba Pipeline, only around 350,000 bbl/d flows to the south to Hungary, the Czech Republic and Slovakia. Reversal of the Adria pipeline, which spans between Croatia's port of Omisalj on the Adriatic Sea and Hungary (see map), has been under consideration since the 1990s. The pipeline, which was completed in 1974, was originally designed to load Middle Eastern oil at Omisalj, then pipe it northward to Yugoslavia and on to Hungary. However, given both the Adria pipeline's existing interconnection with the Russian system, and Russia's booming production, the pipeline's operators and transit states have since considered reversing the pipeline's flow, thus giving Russia a new export outlet on the Adriatic Sea. The proposal included expanding the pipeline's capacity from 100,000 bbl/d to 300,000 bbl/d at a cost of around $320 million.

In 2005, Croatia determined that an environmental impact study of such a reversal was incomplete and not based on enough expert knowledge, thereby killing the proposal. During the Belarus-Russia oil dispute in 2007, Hungary said that it could technically reverse its portion of the pipeline within 20-30 days.

Eastern Siberia Pacific Ocean Pipeline (ESPO): Taishet - Skovorodino - Kozmino Bay

Until 2004, Russian energy officials were unwilling to commit to one of two oil transit pipelines to eastern Asia. President Putin announced that Russia would commit to building a pipeline route from the Russian city of Taishet to Kozmino Bay, southeast of Nakhodka. The endpoint for the pipeline was moved from Perevoznaya Bay to protect endangered species there. More recently Putin and Transneft officials have clarified that the 2,500-mile pipeline will be built in two stages.

The first stage of the pipeline will include the construction of a 600,000 bbl/d pipeline from Taishet to Skovorodino along with a port facility at Kozmino Bay. Oil will be shipped via rail to the Pacific coast until the second stage of the pipeline is constructed. China has agreed to finance the 43-mile, 300,000-bbl/d spur from Skovorodino to the Chinese border. Transneft now estimates that the first stage of the project will cost around $11 billion, up from an original estimate of around $6 billion. Putin and Transneft have made the completion of the first stage a top priority. Construction began five months late in April 2006, and the first stage is expected to be complete by late 2008. The second stage of the pipeline will run from Skovorodino to the Pacific Coast, and it will have a capacity of 1.6 million bbl/d.

(Source: US Government, click to enlarge)

The route to Kozmino Bay is significantly more expensive than an alternative route to Daqing, China, since it covers a greater distance and involves more investment. However, the new route will open up a new Pacific port from which Russian oil exports could be shipped by tanker to other Asian markets and possibly even to North America.

The initial stage of the ESPO pipeline will get significant volumes of sweet crude from the TNK-BP-led East Siberian Verkhnechonsk field, in which Rosneft is a partner, and from Surgutneftegas' Talakan field. Also, significant volumes (up to 270,000 bbl/d by 2010 according to Degolyer & McNaughton) would come from Rosneft's Vankor field. Production from the three fields alone should be able to fill the pipe by around 2011.

Some hurdles exist to the Eastern Pipeline's plan. First, financing the project is challenging. Russia has obtained Japanese promises of $7 billion for the project, but the first stage will be financed with a $2.4 billion revolving credit from state-owned Sberbank. The route passes through multiple environmentally sensitive areas which could have the potential to further delay the project. Finally, the government estimates that transportation tariffs could be roughly $6 per barrel, but other outside analysts estimate the level at up to $10 per barrel, which would help pay for increasing capital costs.

Oil Shipment: Black Sea

After Russian oil flows through the various pipelines described above, crude oil and products are shipped onward to Europe, the United States, and Asia via tanker. The bulk of Russia's oil (roughly 1 million bbl/d of crude) is shipped to the Mediterranean and to Asia via tankers in the Black Sea, mostly from the port of Novorossiysk. With the opening of the BTC pipeline in early 2006 and rising oil production exports from Caspian countries, Black Sea port shipments through the Bosporus will likely remain at around the same levels for the next couple years. The new Russian support for the Bourgas Alexandropoulis pipeline route, combined with existing support, makes this option one of the more commercially-feasible routes to help alleviate flows via the Bosporus.

Alternate Oil Export Routes

Rail exports comprise roughly 5% of Russian crude oil exports. But unless significant investment flows into expanding the Russian pipeline network's capacity, non-pipeline transported exports are poised to increase even more in the upcoming years. As China's growth continues, rail routes

are the only way to provide Russian crude oil to East Asia. In the absence of a dedicated pipeline route, Russian crude oil is exported via rail to the northeast cities of Harbin and Daqing and to central China via Mongolia. Rail exports of crude oil to China increased from approximately 200,000 bbl/d in 2005 to 300,000 bbl/d by 2006 according to China's Ministry of Railways.

A map that shows most of these pipeline projects is available in the Maps section.

Natural Gas

Russia has the largest natural gas reserves in the world, but the country's aging natural gas infrastructure, and monopolistic industry have created unneeded inefficiency.

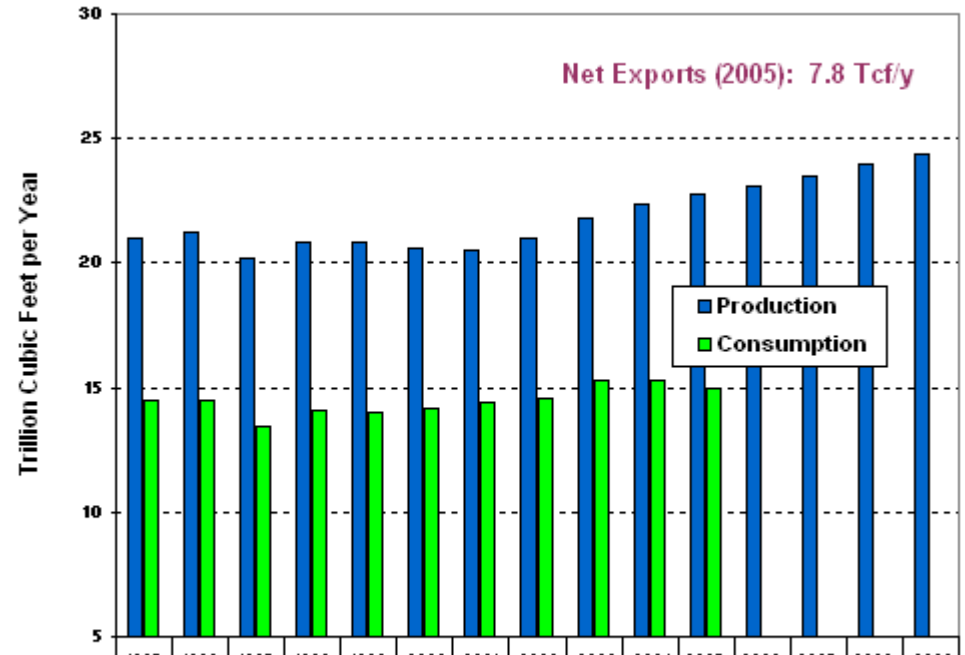
Overview

Russia holds the world's largest natural gas reserves, with 1,680 trillion cubic feet (Tcf)-- nearly twice the reserves in the next largest country, Iran. In 2004 Russia was the world's largest natural gas producer (22.4 Tcf), as well as the world's largest exporter (7.1 Tcf). According to official Russian statistics, production during 2005 and 2006 is predicted to be about the same with around 1 percent growth rate per year.

Gazprom, Russia's state-run natural gas monopoly, produces nearly 90 percent of Russia's natural gas, and operates the country's natural gas pipeline network. Gazprom is also Russia's largest earner of hard currency, and the company's tax payments account for around 25 percent of federal tax revenues. Despite its enormous size and significance, Gazprom is seriously encumbered by domestic regulation. By law, the company must supply the natural gas used to heat and power Russia's vast domestic market at government-regulated prices (approximately $28 per thousand cubic meters), regardless of profitability.

Gazprom's natural gas production forecast calls for modest growth of 1-2 percent per year by 2008. Russia's natural gas production growth has suffered due primarily to aging fields, state regulation, Gazprom's monopolistic control over the industry, and insufficient export pipelines. Three major fields (called the 'Big Three') in Western Siberia--Urengoy, Yamburg, and Medvezh'ye comprise more than 70 percent of Gazprom's total natural gas production, but these fields are now in decline. Although the company projects increases in its natural gas output between 2008 and 2030, most of Russia's natural gas production growth will come from independent gas companies such as Novatek, Itera, and Northgaz. A Gazprom web page discusses these projections in detail.

Fig. 5: Russian Natural Gas Production and Consumption 1992-2009



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005e	2006e	2007e	2008e	2009
Production	21.0	21.2	20.2	20.9	20.8	20.6	20.5	21.0	21.8	22.4	22.7	23.1	23.5	24.0	24.4
Consumption	14.5	14.5	13.4	14.0	14.0	14.1	14.4	14.6	15.3	15.3	14.9				

Source: 1992-2005: EIA International Energy Annual (2006). Forecast 2006-09: Gazprom (2006)

The Mid-term outlook for Gas Supply from Russia

For Gazprom to fulfill its long-term aim of increasing European sales, it will need to boost its production, as well as to secure more reliable export routes to the region. According to a 2006 International Energy Agency (IEA) report, Gazprom's three largest fields are declining at an average rate of 700 Bcf per year, necessitating around 6,100 Bcf per year of new production by 2015 to maintain current production levels. Gazprom began importing natural gas from Turkmenistan to help fulfill its supply contract with the Netherlands. Since then, Turkmenistan and Russia have had repeated disputes over the pricing of the natural gas which resulted in a halt to natural gas suppliesto Russia in 2004.

Gazprom's management approved an aggressive investment program in 2005 of around $10.8 billion per year. Much of the investment has gone into foreign acquisitions and planning for the Nordstream pipeline. Little, in comparison, has been spent on investing in some of Gazprom's known, yet undeveloped resources in the Yamal peninsula, partly because of their high cost.

Oil companies, whose natural gas is largely flared, and independent gas companies will play an important role by increasing their share of Russian total production from 9 percent in 2005 to around 17 percent by 2010. Their success, however, depends largely on gaining access to Gazprom's transmission system

Shtokhman

Discovered in 1988 in the Barents Sea, the Shtokhman field contains reserves of an estimated 19 billion barrels of oil equivalent. The field's location, roughly 340 miles northeast of the Russian mainland and 1000 feet deep, makes its development particularly challenging. International Oil Companies (IOCs) had hoped to participate in the field's development, but in Fall 2006, Russia announced it would develop the field on its own. Originally, the plan for field development would have used LNG exports, but Gazprom is now tentatively planning to pipe the gas and connect it to the Nordstream pipeline (see below). A 2006 Deutsche Bank report estimated that the pipeline option's capital expenditures might be twice as expensive as small-scale LNG exports. IOCs may still be involved in the giant field's development but on a contractor basis.

Domestic Gas Prices

Domestic gas prices in Russia are only around 15-20 percent of the market rate at which Russia's gas is sold to Germany, and Gazprom lost around $420 million in 2006 on domestic natural gas sales. The government regulates prices only for Gazprom's domestic supplies, which currently make up 76 percent of the market, while independents are free to set their own price. Given Gazprom's dominance, the going price of independent gas is usually higher only by 10 percent to 15 percent.

Low prices have impacted the gas industry's ability to finance capital spending and have hurt incentives to increase efficiency. Raising domestic prices towards parity with market rates in Europe is now a major component of the country's energy strategy that will play a significant role in avoiding supply shortfalls in the future. In November 2006, the Russian government approved a program to gradually increase gas prices to market levels, with initial increases of around 15 percent in 2007. Under the program, the Federal Tariff Service will stop setting caps on Gazprom's prices for industrial consumers in 2011 and for residential consumers in 2013.

Import and Export Markets

Russia exports significant amounts of natural gas to customers in the Commonwealth of Independent States (CIS). In addition, Gazprom (through its subsidiary Gazexport) has shifted much of its natural gas exports to serve the rising demand in countries of the EU, as well as Turkey, Japan, and other Asian countries (see Table 3). Rising domestic demand

In 2006, Gazprom, which has a monopoly on Russian gas exports, transported 5.3 Tcf (roughly 60%) to destinations outside the CIS and the Baltic states, an increase of 3 percent from 2005. Exports of Russian gas to neighboring Baltic and CIS countries totaled 1.3 Bcf in 2006 (not including re-exports of Central Asian gas). The latest data for 2005 estimates that exports to neighboring Baltic and CIS countries, including re-exports, was approximately 2.7 Bcf.

TABLE 4: Major Recipients of Russian Natural Gas Exports, 2005

Rank	Country	Imports (bcf/year)	Pct of Domestic NG Consumption
1	Germany	1,291	43%
2	Italy	824	30%
3	Turkey	630	65%
4	France	406	26%
5	Hungary	294	62%
6	Czech Republic	252	84%
7	Austria	246	70%
8	Poland	226	47%
9	Slovakia	226	108%
10	Finland	148	105%
11	Romania	140	23%
12	Fmr Yugoslavia	134	57%
13	Bulgaria	101	89%
14	Greece	85	96%
15	Switzerland	13	12%
Sales to Baltic & CIS States, 2005*			
	Ukraine	2,113	79%
	Belarus	710	100%
	Baltic States	205	100%
	Azerbaijan	120	36%
	Georgia	46	100%

*Includes some re-exports of Central Asian gas.
Source: EIA, BP (2006), CIS and E. European Energy Databook, 2006.

Ukraine-Russia Natural Gas Dispute of January 2006

Due to an ongoing dispute about natural gas prices, on January 1, 2006, Gazprom shut off gas supplies to Ukraine, and as a result supplies to Europe were also affected. Even though Russia has used the threat of a cutoff to demand higher natural gas prices in recent years, this was the first time that a supply disruption affected flows to Europe. After negotiations with Ukraine,

Russia's natural gas company agreed to a sell its natural gas to RosUkrEnergo, a trading company that also imports natural gas from Central Asia, at the market price of $6.51/mcf ($230 per thousand cubic meters).

Ukraine's January 4, 2006 agreement entails the purchase of 580 Bcf of natural gas from RosUkrEnergo at $2.69/mcf each year for five years. Some of the natural gas is comprised of less expensive natural gas from Central Asia). The contracts are also subject to review each year and may be adjusted to new market prices. In 2007, Ukraine proposed a return to the barter agreement where Ukraine would receive 1.06 Tcf from Russia in exchange for transiting roughly 4.4 Tcf of Russian natural gas to Europe.

Major Proposed Natural Gas Pipelines

Yamal-Europe II

The Yamal-Europe I pipeline (1 Tcf), which carries natural gas from Russia to Poland and Germany via Belarus, would be expanded another 1 Tcf under this proposal. Gazprom and Poland currently disagree on the exact route of the second branch as it travels through Poland. Gazprom is seeking a route via southeastern Poland to Slovakia and on to Central Europe, while Poland wants the branch to travel through its own country and then on to Germany. Expansion is expected to be complete by 2010 at a cost of around $10 billion.

Blue Stream Expansion and Interconnection

The Blue Stream natural gas pipeline connects the Russian system to Turkey through a 750-mile pipeline, 246 miles of which extends underneath the Black Sea (see map). Natural gas began flowing through the pipeline in December 2002, under an initial schedule of 71 Bcf per year, which

was to increase by 71 Bcf annually. Even though flows through the pipeline totaled only 113 Bcf during 2004, the recent launch of a new gas compressor station in Russia will allow the pipeline to run at its design capacity of 565 Bcf per year. During 2005, roughly 160 Bcf of natural gas has been transported via Blue Stream. Gazprom is still discussing plans with its project partner Eni whether to construct an extension to Ceyhan or Izmir (in Turkey), where the gas could be liquefied for export. Another option is to access the planned 280-350 Bcf Poseidon pipeline, which will bring Caspian and Middle East gas to Italy via Turkey and Greece starting in 2010.

In March 2003, Turkey halted deliveries through Blue Stream, invoking a clause in the contract allowing either party to stop deliveries for six months. After Russia filed suit in Stockholm's International Arbitration court, the two sides came to an agreement in November 2003 and the supply of natural gas to Turkey resumed in December 2003.

Nordstream Pipeline (or North European Gas Pipeline)

A northern pipeline extending over 2,000 miles from Russia to Finland and the United Kingdom via the Baltic Sea, was proposed in June 2003 by Russia and the UK, and was renamed Nordstream by the stakeholders in 2006. About 700 miles of the pipeline will pass under the Baltic Sea. In November 2006, Gazprom (51% shareholder), and Germany's BASF and E.ON (24.5% each) submitted project information to Baltic Sea countries for the start of an environmental impact assessment. Offshore pipe laying is expected to begin between 2008 and 2010. The project is expected to cost $5.7 billion and to transport approximately 0.9-1.0 Tcf of natural gas via two strings beginning by 2010. A second pipeline, which would double the transmission capacity could be built if demand necessitates it.

The main advantage of this pipeline is Russia will no longer have to negotiate transit fees with nearly half a dozen countries or pay them in natural gas. A possible spur connection to Sweden has also been considered. Polish and Latvian leaders have expressed frustration that they were not included in the negotiations.

Natural Gas for China

The Kovytka natural gas field, 63 percent owned by TNK-BP, could provide China with natural gas in the next decade via a proposed pipeline (see Maps section). The project is expected to come online in June 2007 after an 80-mile pipeline to Irkutsk is completed that would only provide natural gas to largely local industrial users in E. Siberia. China has stated it is ready to import up to 700 Bcf per year from the project; but since the natural gas would not arrive until 2012 at the earliest and since China is pursuing other natural gas import plans in the meantime, it is possible that Kovytka natural gas will not have a buyer. Also, Gazprom, which has long wanted a stake in the Kovytka field, does not favor a direct link from the field to China that is not a part of its natural gas pipeline network. The Russian government is also threatening to revoke TNK-BP's production license if a deal is not made during 2007 to pave the way for construction of the main export pipeline to China.

Coal

Russia has the second-largest amount of recoverable coal reserves in the world, and the Russian Energy Ministry is optimistic about future growth. Safety concerns and adherence to the Kyoto protocol could hinder the industry's potential.

With 173 billion short tons, Russia holds the world's second largest recoverable coal reserves, behind only the United States, which holds roughly 274 billion short tons. Between 1996 and 2001, Russia worked with the World Bank to restructure the country's coal industry. As a result, the state monopoly, formally known as RosUgol, has been dissolved, and roughly 77 percent of domestic coal production comes from independent producers. Russian coal production began a three-year upswing in 1999. After a slight decline earlier in the decade, production has increased markedly in recent years. Russian energy ministry sources estimate that total coal production was 269.6 million short tons in 2005 (roughly a quarter of U.S. coal production) and the fifth largest in the world.

According to the government's energy strategy, Russia should produce between 441 and 496 million short tons by 2020. The government has high hopes for the future of the coal industry. Exports of coal and coke from Russia to CIS countries rose by around 50% between 2004 and 2005, and recent articles in the trade press expect rising coal demand (especially in Asia) to continue. However, various problems may hinder the industry's development potential. Russia's agreement to the Kyoto Protocol may lower utility sector demand for coal.

Electricity

Generation

Russia's electricity sector is in need of investment and

Russia's power sector includes over 440 thermal and hydropower plants (approximately 77 of

repair. Rising electricity consumption during 2006 has increased natural gas consumption and has thus threatened Russia's ability to provide ample supply to its export partners. The government is looking towards nuclear power as a solution.

which are coal-fired) plus 31 nuclear reactors. A few generators in the far-eastern part of the country are not connected to the power grid.

The system has a total electric generation capacity of 205.6 gigawatts (GW), with 2004 output of approximately 881.6 billion kilowatt hours (Bkwh). After the collapse of the Soviet Union, economic recovery contributed to an increase in total electricity consumption from 715 Bkwh in 1998, to roughly 804 Bkwh in 2004. Thermal power (oil, natural gas, and coal-fired) accounts for roughly 63 percent of Russia's electricity generation, followed by hydropower (21%) and nuclear (16%), (International Electricity data).

Nuclear Power

The Russian government has stated that it intends to expand the role of nuclear and hydropower generation in the future to allow for greater export of fossil fuels. Russia has an installed nuclear capacity of 21.2 million kilowatts, distributed across 31 operational nuclear reactors at 10 locations, all west of the Ural Mountains. However, Russia's nuclear power facilities are aging. Fifty percent of the country's 31 nuclear reactors use the RBMK design employed in Ukraine's ill-fated Chernobyl plant. The working life of a reactor is considered to be 30 years: nine of Russia's plants are between 26 and 30 years old, and six are between 21 and 25 years old.

- On July 15, 2006, Russian Prime Minister Mikhail Fradkov approved a $55 billion nuclear energy program that calls for the completion of ten new 1,000 megawatt (MW) reactors by 2015, with an additional ten reactors to be in various stages of construction by that time.
- These plans will be challenged both by rising nuclear fuel costs and by generation from competitive alternative fuels such as natural gas. Many nuclear plants are also due for decommissioning and meeting this target will require between $5 and $10 billion per year of investment over the next decade.

The Russian government has also made hydroelectric generation a priority, particularly in the country's Far East, where provision and delivery of electricity supply can be problematic. In June 2003, a representative from the country's largest generation owner, Unified Energy System of Russia (UES), told reporters that the company plans to invest $14 billion in the development of Russia's hydroelectric sector, particularly in Siberia and the Far East.

Transmission and Distribution Sector

There are seven separate regional power systems in the Russian electricity sector: Northwest, Center, Middle Volga, North Caucasus, Urals, Siberia, and Far East. The Far East region is the only one not connected to an integrated power system. UES, which is 52 percent owned by the Russian government (Gazprom now has a 10% stake), controls most of the transmission and distribution in Russia. UES owns 96 percent of the transmission and distribution system, the central dispatch unit, and the federal wholesale electricity market (FOREM). The grid comprises almost 2 million miles of power lines, 93,000 miles of which are high-voltage cables over 220 kilovolts (Kv).

Electricity Exports

Russia exports significant quantities of electricity to the countries of the former Soviet Union, as well as to China, Poland, Turkey and Finland. UES also has plans to export electricity to Iran and possibly Afghanistan and Pakistan from two hydroelectric stations it is currently building in Tajikistan. There are currently two efforts underway to integrate the Russian and Western European electricity grids. UES is participating in the Baltrel program, designed to create an energy ring of power companies in the Baltic states. Also, the Union for the Coordination of Transmission of Electricity (UCTE), of which 20 European countries are members, has entered into discussions with Russian colleagues over the technological and operational aspects of interconnecting their systems.

Privatization and Electricity Market Reform

As part of the reform begun in March 2004, Russian President Vladimir Putin signed six bills into law that aim to substantially reform the industry. Under the new laws, tariff rates on the domestic market are to be made more universal instead of geographically-specific. In November 2006, Energy Minister Khristenko said that electricity rates will increase by 10 percent in 2007 and that around 5 percent of the electricity market will be liberalized beginning January 1, 2007. The reform also calls for UES's generation and distribution facilities to be privatized, but the country's transmission grid will remain under state control. The main goal of the Russian electricity reform

package is to create a generating sector divided into multiple wholesale electricity companies (commonly called "OGKs"), which participate in a new competitive wholesale market.

- In September 2006, the Russian cabinet finally approved the spin-off and privatization of two generating companies (gencos), Wholesale Generating Company (OGK)-5 and Territorial Generating Company (TGK)-5, as well as an additional 11 gencos to be spun off during 2007. The UES reform plan will distribute UES stakes in 20 gencos on a pro-rata basis to current UES shareholders. The state, with 53 percent ownership, is the largest shareholder in UES.
- The current plan is to transfer the state share in the gencos to two companies, the Federal Grid Company and the Hydro-OGK, which will remain state-controlled after UES ceases to exist on July 1, 2008. The goal is for the market to become completely liberalized by 2011.

Gazprom and UES

Gazprom would like to have a key role in the electricity sector during the deregulation process in order to influence decision-making on the fuel mix and to benefit from electricity and natural gas tariff liberalization. As a result, in March 2007, Gazprom and UES signed a long term, take-or-pay agreement for gas supplies for Russian electricity generation through 2010 where UES will receive around 3.6 Tcf per year of gas directly from Gazprom. Independent gas producers will meet the remainder of UES's fuel needs.

Maps

FSU Energy Map (click maps for high resolution versions):

(Source: CIA)

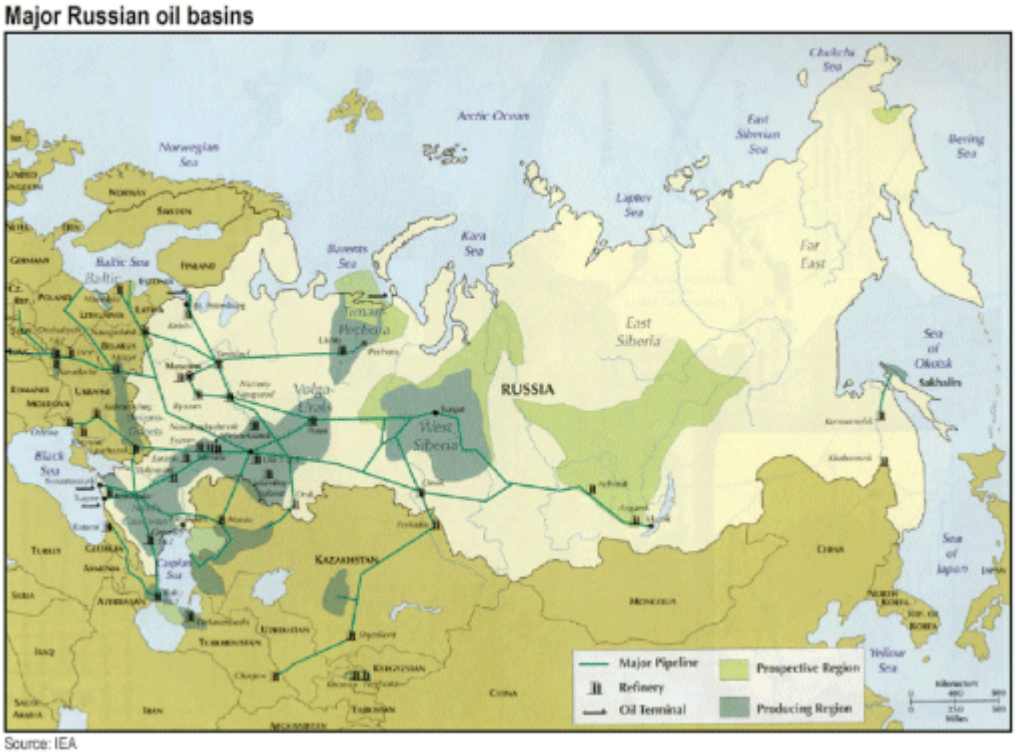
Major Pipelines to Europe:

(Source: CIA)

Russian Proposed Oil and Natural Gas Pipelines to China

(Source: CIA)

Major Russian Oil and Natural Gas Basins:



Major Russian gas basins

Source: IEA

(Source: CIA)

Bosporus Bypass Options (please click below for a full map)

Other Non-U.S. Government Maps:

University of Texas: Perry-Castaneda Map Collection: Link to Detailed Map of Caspian Sea (North Region)
University of Texas: Perry-Castaneda Map Collection: Link to Detailed Map of Caspian Sea (South Region)
University of Texas: Perry-Castaneda Map Collection: Link to Detailed Map of Caspian Sea (Legend)

Profile

Country Overview

Chief of State	Vladimir Vladimirovich Putin (acting president since December 31, 1999, president since May 7, 2000); re-elected March 2004
Head of Government	Mikhail Fradkov (since March 2004)
Location	Northern Asia (that part west of the Urals is included with Europe), bordering the Arctic Ocean, between Europe and the North Pacific Ocean
Independence	24 August 1991 (from Soviet Union)
Population (2006E)	142,200,000
Languages	Russian, many minority languages
Religion	Russian Orthodox, Muslim, other
Ethnic Group(s)	Russian 79.8%, Tatar 3.8%, Ukrainian 2%, Bashkir 1.2%, Chuvash 1.1%, other or unspecified 12.1% (2002 census)

Economic Overview

Net Exports (2006)	$141 Billion
Current Account Balance (2006)	$95.6 Billion

Energy Overview

Minister of Energy	Viktor Borisovich Khristenko
Proven Oil Reserves (January 1, 2007E)	60 billion barrels
Oil Production (2006E)	9,674 thousand barrels per day, of which 96% was crude oil
Oil Consumption (2005E)	2,854 thousand barrels per day
Crude Oil Distillation Capacity (2007E)	5,339 thousand barrels per day
Proven Natural Gas Reserves (January 1, 2007E)	1,680 trillion cubic feet
Natural Gas Production (2004E), (2005E)	22.4 trillion cubic feet (tcf), 22.7 tcf
Natural Gas Consumption (2004E), (2004E)	16.0 Trillion cubic feet (tcf)
Recoverable Coal Reserves (2003E)	173,073.9 million short tons
Coal Production (2004E)	308.9 million short tons
Coal Consumption (2004E)	257.5 million short tons
Electricity Installed Capacity (2004E)	215.3 gigawatts
Electricity Production (2004E)	881.6 billion kilowatt hours
Electricity Consumption (2004E)	804 billion kilowatt hours
Total Energy Consumption (2004E)	30.1 quadrillion Btus*, of which Natural Gas (55%), Oil (19%), Coal (16%), Hydroelectricity (6%), Nuclear (5%), Other Renewables (0%)
Total Per Capita Energy Consumption (2004E)	208.8 million Btus
Energy Intensity (2004E)	15,763 Btu per $2000-PPP**

Environmental Overview

Energy-Related Carbon Dioxide Emissions (2004E)	1,684.8 million metric tons, of which Natural Gas (52%), Coal (26%), Oil (22%)
Per-Capita, Energy-Related Carbon Dioxide Emissions (2004E)	11.7 metric tons
Carbon Dioxide Intensity (2004E)	0.9 Metric tons per thousand $2000-PPP**
Environmental Issues	air pollution from heavy industry, emissions of coal-fired electric plants, and transportation in major cities; industrial, municipal, and agricultural pollution of inland waterways and seacoasts; deforestation; soil erosion; soil contamination from improper application of agricultural chemicals; scattered areas of sometimes intense radioactive contamination; groundwater contamination from toxic waste; urban solid waste management; abandoned stocks of obsolete pesticides
Major Environmental Agreements	party to: Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulfur 85, Antarctic-Environmental Protocol, Antarctic-Marine Living Resources, Antarctic Seals, Antarctic Treaty, Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Endangered Species,

	Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Wetlands, Whaling signed, but not ratified: Air Pollution-Sulfur 94

Oil and Gas Industry

Organization	Transneft is predominant pipeline operator. State has majority ownership of Gazprom and Rosneft.
Major Oil/Gas Ports	Primorsk, Novorossiysk

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP figures from OECD estimates based on purchasing power parity (PPP) exchange rates.

Links

EIA Links

EIA - Country Information on Russia
EIA – International Energy Outlook, 2005 (Table E2: World Oil Production Capacity 1990-2025)
EIA – Selected oil and natural gas infrastructure of the Former Soviet Union (Map)

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