

# Oil and natural gas extraction data

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 Climate Mitigation Services  
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## OAQ Gazprom, Russia

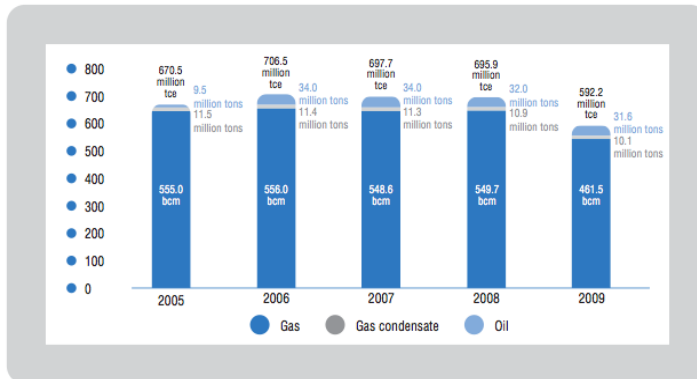
www.gazprom.com St. Petersburg

yellow column indicates original reported units **50.01% State-owned**

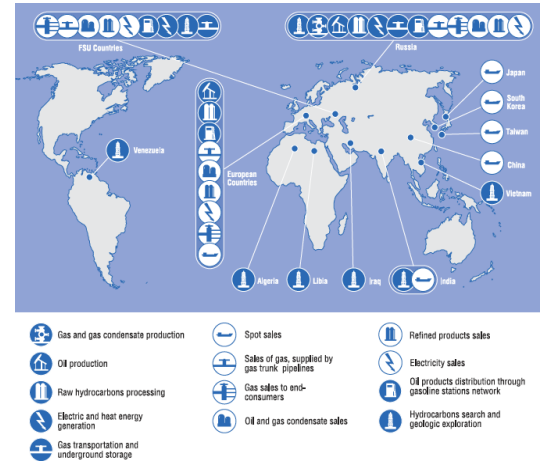
### Production / Extraction data

| Year | Crude Oil & NGL |                |                 |                 |                        | Natural Gas |                            |               |               |               |
|------|-----------------|----------------|-----------------|-----------------|------------------------|-------------|----------------------------|---------------|---------------|---------------|
|      | million tonnes  | million tonnes | Million bbl /yr | Million bbl /yr | Sum<br>Million bbl /yr | Bcm/yr      | Million m <sup>3</sup> /yr | Million SCM/d | Billion cf/yr | Billion cf/yr |

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- 67 2000
- 68 2001
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- 70 2003
- 71 2004
- 72 2005
- 73 2006
- 74 2007
- 75 2008
- 76 2009
- 77 2010



OAQ Gazprom (2010) "Gazprom in Figures 2005-2009," gazprom.com



Gazprom in Figures 2005-2009, page 5.

Gazprom acquired Sibneft in 2005.

35.31466 cf/SCM

For further details, see:

Victor, Nadejda, & Inna Sayfer (2012) "Gazprom: the struggle for power," in Victor et al, eds, Oil and Governance, pp. 655-700.

#### Note on Gazprom pipeline system

| Year         | Gazprom           |                   | Gazprom established as a state concern in 1989 |                 | Gazprom                    |                            | Gazprom   |          |                |            |                |
|--------------|-------------------|-------------------|--|-----------------|----------------------------|----------------------------|-----------|----------|----------------|------------|----------------|
|              | million tonnes/yr | million tonnes/yr | million bbl /yr                                | million bbl /yr | billion m <sup>3</sup> /yr | million m <sup>3</sup> /yr | Bcf/yr    | Bcf/yr   |                |            |                |
| 1989         | 85.7              |                   | 85.7   |                 | 22,764                     |                            | 22,764    |          |                |            |                |
| 1990         | 87.8              |                   | 87.8   |                 | 23,307                     |                            | 23,307    |          |                |            |                |
| 1991         | 87.3              |                   | 87.3   |                 | 23,178                     |                            | 23,178    |          |                |            |                |
| 1992         | 83.8              |                   | 83.8   |                 | 22,240                     |                            | 22,240    |          |                |            |                |
| 1993         | 80.8              |                   | 80.8   |                 | 21,452                     |                            | 21,452    |          |                |            |                |
| 1994         | 79.4              |                   | 79.4   |                 | 21,094                     |                            | 21,094    |          |                |            |                |
| 1995         | 77.8              | 50.0              | 127.8  |                 | 20,657                     |                            | 20,657    |          |                |            |                |
| 1996         | 73.6              | 75.0              | 148.6  |                 | 19,535                     |                            | 19,535    |          |                |            |                |
| 1997         | 70.0              | 100.0             | 170.0  |                 | 18,587                     |                            | 18,587    |          |                |            |                |
| 1998         | 72.4              | 125.0             | 197.4  |                 | 19,229                     |                            | 19,229    | 52.0     |                |            |                |
| 1999         | 9.9               | 16.32             | 72.6   | 117.7           | 19,268                     | 1,344                      | 19,268    | 47.5     |                |            |                |
| 2000         | 10.0              | 17.20             | 73.3   | 124.0           | 19,372                     | 1,429                      | 19,372    | 50.5     |                |            |                |
| 2001         | 10.2              | 20.67             | 74.8   | 149.0           | 18,081                     | 1,639                      | 18,081    | 57.9     |                |            |                |
| 2002         | 10.6              | 26.34             | 77.7   | 195.9           | 18,431                     | 1,402                      | 18,431    | 49.5     |                |            |                |
| 2003         | 11.0              | 31.45             | 80.6   | 233.8           | 19,077                     | 2,002                      | 19,077    | 70.7     |                |            |                |
| 2004         | 12.0              | 34.04             | 88.0   | 253.1           | 19,511                     | 1,986                      | 19,511    | 70.1     |                |            |                |
| 2005         | 21.0              | Acquire d 2005    | 153.9  | 147.7           | 19,600                     | Acquire d 2005             | 19,600    | 40.9     |                |            |                |
| 2006         | 45.4              |                   | 332.8  |                 | 19,633                     |                            | 19,633    |          |                |            |                |
| 2007         | 45.3              |                   | 332.0  |                 | 19,372                     |                            | 19,372    |          |                |            |                |
| 2008         | 42.9              |                   | 314.5  |                 | 19,414                     |                            | 19,414    |          |                |            |                |
| 2009         | 41.7              |                   | 305.6  |                 | 16,298                     |                            | 16,298    |          |                |            |                |
| 2010         | 43.7              |                   | 320.0  |                 | 17,961                     |                            | 17,961    |          |                |            |                |
| <b>Total</b> | <b>na</b>         | <b>na</b>         | <b>3,024</b>                                   | <b>1,571</b>    | <b>4,596</b>               | <b>na</b>                  | <b>na</b> | <b>-</b> | <b>437,167</b> | <b>439</b> | <b>437,606</b> |

A B C D E F G H I J K L M N O P

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| Alternate production estimate for 2008 |                 |              |             |
|--|-----------------|--------------|-------------|
| Oil                                    | Oil             | Natural gas  | Natural gas |
| Thousand bbl /d                        | Million bbl /yr | Million cf/d | Bcf.yr      |
| 1,124                                  | 410             | 51,818       | 18,914      |

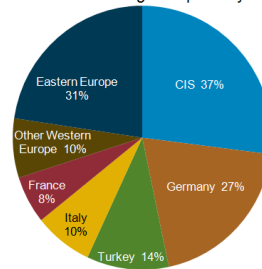
Source: Hults, & Thurber, 2012, Introduction, Table 1.1, page 24, in Victor et al, eds, 2012, Oil and Governance. Table 1.1 is based on information from Wood Mackenzie's Pathfinder Database; www.woodmacresearch.com

1 cubic meter = 35.314667 cubic feet

| Additional gas data |        |        |
|---------------------|--------|--------|
| Bcf/yr              | Bcf/yr | Bcf/yr |
| 1936                | 49.44  |        |



Share of Russia's natural gas exports by destination, 2010



Source: Eastern Block Energy, U.S. Energy Information Administration  
EIA Country Studies, Russia, viewed April 2013.

| Gazprom Proven reserves | Bcm    | Bcf       |
|-------------------------|--------|-----------|
|                         | 35,578 | 1,256,439 |

Gazprom in Figures, 2009, page 12.

| EIA data        | FSU dry gas |
|-----------------|-------------|
| Eurasia         | Bcf, 1992   |
| Armenia         | -           |
| Azerbaijan      | 275         |
| Belarus         | 10          |
| Estonia         | -           |
| Former U.S.S.R. | --          |
| Georgia         | 1           |
| Kazakhstan      | 286         |
| Kyrgyzstan      | 4           |
| Latvia          | -           |
| Lithuania       | -           |
| Moldova         | -           |
| Russia          | 22,616      |
| Tajikistan      | 4           |
| Turkmenistan    | 2,020       |
| Ukraine         | 738         |
| Uzbekistan      | 1,511       |
| Total "FSU"     | 27,465      |
| Percent Russia  | 82.34%      |

| Bcm  | Bcf |
|------|-----|
| 9.00 | 318 |

| Russia of FSU | US BuMines data |                                       |
|---------------|-----------------|---------------------------------------|
| Bcf/yr        | 1960-1971       |                                       |
| 1,444         | 1,754           |                                       |
| 1,872         | 2,273           |                                       |
| 2,311         | 2,806           |                                       |
| 2,661         | 3,231           |                                       |
| 3,205         | 3,892           |                                       |
| 3,763         | 4,570           |                                       |
| 4,208         | 5,110           |                                       |
| 4,612         | 5,601           |                                       |
| 4,973         | 6,039           |                                       |
| 5,317         | 6,457           | USSR gross prod'n for comparison only |
| 5,816         | 7,063           | 6,860                                 |
| 6,133         | 7,448           | 7,520                                 |
|               |                 | 7,900                                 |
| 6,858         | 8,328           | interpolated                          |
| 7,583         | 9,208           | interpolated                          |
| 8,307         | 10,089          | interpolated                          |
| 9,032         | 10,969          | interpolated                          |
| 9,757         | 11,849          | interpolated                          |
| 10,482        | 12,729          | interpolated                          |
| 11,207        | 13,610          | interpolated                          |
| 11,931        | 14,490          | interpolated                          |
| 12,656        | 15,370          | EIA USSR gas data                     |
| 13,529        | 16,430          | 1980-1991                             |
| 14,558        | 17,680          | Billion cf/yr                         |
| 15,585        | 18,927          |                                       |
| 17,082        | 20,744          |                                       |
| 18,698        | 22,707          |                                       |
| 19,923        | 24,195          |                                       |
| 20,881        | 25,358          |                                       |
| 22,391        | 27,192          |                                       |
| 23,148        | 28,111          | % Russia of USSR                      |
| 23,700        | 28,782          | 1991/1992:                            |
| 23,569        | 28,623          | 82.34%                                |

**US Energy Information Administration, International Energy Statistics**  
www.eia.gov/emeu/internationalenergy.html  
Updated April 2013

| USSR / Russia     | USSR / Russia   | USSR / Russia   | USSR / Russia    | USSR / Russia | USSR / Russia |
|-------------------|-----------------|-----------------|------------------|---------------|---------------|
| Prod Marketed Gas | Dry natural gas | Vented & Flared | Flaring of gross | Reinjected    | Gross Prod'n  |
| Bcf per year      | Bcf per year    | Bcf per year    | %                | Bcf per year  | Bcf per year  |
| NA                | 15,370          | -               | -                | -             | NA            |
| NA                | 16,430          | -               | -                | -             | NA            |
| NA                | 17,680          | -               | -                | -             | NA            |
| NA                | 18,927          | 380             | -                | -             | NA            |
| NA                | 20,744          | 375             | -                | -             | NA            |
| NA                | 22,707          | 400             | -                | -             | NA            |
| NA                | 24,195          | 350             | -                | -             | NA            |
| NA                | 25,358          | 321             | -                | -             | NA            |
| NA                | 27,192          | 706             | -                | -             | NA            |
| NA                | 28,111          | 689             | -                | -             | NA            |
| 29,142            | 28,782          | 113             | 0.38%            | -             | 29,823        |
| 28,980            | 28,623          | 424             | 1.44%            | -             | 29,404        |
| 22,616            | 22,616          | 390             | 1.70%            | -             | 23,006        |
| 21,814            | 21,814          | -               | 0.00%            | -             | 21,814        |
| 21,450            | 21,450          | -               | 0.00%            | -             | 21,450        |
| 21,005            | 21,005          | -               | 0.00%            | -             | 21,005        |
| 20,235            | 19,865          | -               | 0.00%            | -             | 20,235        |
| 19,257            | 18,901          | -               | 0.00%            | -             | 19,257        |
| 19,914            | 19,554          | -               | 0.00%            | -             | 19,914        |
| 19,953            | 19,593          | -               | 0.00%            | -             | 19,953        |
| 19,692            | 19,335          | -               | 0.00%            | -             | 19,692        |
| 19,579            | 19,222          | -               | 0.00%            | -             | 19,579        |
| 20,126            | 19,685          | 177             | 0.87%            | -             | 20,303        |
| 20,963            | 20,507          | 194             | 0.92%            | -             | 21,157        |
| 21,450            | 20,991          | 494             | 2.25%            | -             | 21,945        |
| 21,698            | 21,224          | 528             | 2.38%            | NA            | 22,225        |
| 22,220            | 21,736          | 551             | 2.42%            | NA            | 22,771        |
| 22,150            | 21,595          | 597             | 2.62%            | NA            | 22,746        |
| 22,051            | 21,515          | 706             | 3.05%            | NA            | 23,174        |
| 19,901            | 19,303          | 688             | 3.34%            | -             | 20,589        |
| 22,372            | 21,536          | 618             | 2.69%            | -             | 22,990        |
| 23,686            | 23,686          | NA              | -                | -             | 23,686        |

| Russia flaring | Bcm   | Bcf |
|----------------|-------|-----|
| World Bank     |       |     |
| 50.0           | 1,766 |     |
| 52.3           | 1,847 |     |
| 42.0           | 1,483 |     |
| 46.6           | 1,646 |     |
| 35.2           | 1,243 |     |

| OGJ production estimates |         |
|--------------------------|---------|
| Gazprom                  | Gazprom |
| liquids million bbl      | gas Bcf |
| 230.7                    | 16,297  |
| 245.3                    | 17,961  |

|              |                |                |
|--------------|----------------|----------------|
| <b>Total</b> | <b>277,091</b> | <b>813,080</b> |
|--------------|----------------|----------------|

1960-1988 1960-2010

**Cell:** H9

**Comment:** Rick Heede:

Natural gas lanterns were first lit in Russia on the Aptekarsky Island of Saint Petersburg back in 1819. The history of "big gas" in the Soviet Union began in 1946 upon commissioning of the Saratov – Moscow gas trunkline. Gazprom State Gas Concern was established in 1989 on the basis of the USSR Gas Industry Ministry. In 1993 the Concern laid the foundation for setting up Gazprom Russian Joint Stock Company, which was renamed in 1998 as Gazprom Open Joint Stock Company. [www.gazprom.com/about/](http://www.gazprom.com/about/)  
The Soviet Union created a natural gas ministry in 1965 to help develop the USSR's natural gas industry.  
Also see the history section of: Victor, Nadejda, & Inna Sayfer (2012) "Gazprom: the struggle for power," in Victor et al, eds, Oil and Governance, pp. 655-700.

**Cell:** N9

**Comment:** Rick Heede:

The Russian Govt owns a controlling share, 50.01 percent. Wikipedia, Apr12.

Victor & Sayfer state 49 percent publicly owned. Russia's privatization, via a 1992 presidential decree, stipulated voucher auctions of formerly state-owned enterprises with ownership limited to workers and Russian citizens. Gazprom was established as a joint stock company. Along with similar oil companies such as Lukoil, Rosneft, and Yukos, a required 38 to 45 percent of shares would remain in government hands for the first three years, ending in 1994 (note: the government ownership excludes shares owned by the company and its managers; in 2000, Gazprom managers' official stake was ~35 percent, "leaving about 20 percent in other, hidden hands." Victor and Sayfer, page 693, fn 4, citing Black et al, 2000, "Russian Privatization and Corporate Governance: What Went Wrong?" Stanford Law Review, vol. 52:1731-1808).

In Gazprom's case, 40 percent of its shares were in government hands, and 9 percent set aside for foreign ownership. In the second stage of privatization beginning in 1995 Gazprom was spared further privatization because gas prices were too low to make Gazprom a viable commercial enterprise and Prime Minister Chernomyrdin did not want to further weaken his control by introducing new competitive pressures. In 1998, President Yeltsin approved the sale of a further 5 percent of the government's shares in Gazprom. Foreign participation was increased to 14 percent, but only a 2.5 percent stake was sold to Ruhrgas for \$660 million. President Putin sought to increase control over the oil and gas sectors, and, after taking control over Gazprom, signed amendments to a federal bill that allowed the state to have a controlling interest in the gas monopoly, by holding 50 percent plus one share. "In 2005, as a result of state-owned Rosneftegaz's purchase of a 10.74 percent stake in Gazprom, the government's stake in Gazprom increased to 50.1 percent."

Victor, Nadejda, & Inna Sayfer (2012) "Gazprom: the struggle for power," in Victor et al, eds, Oil and Governance, at pages 656-665, and 674.

World Bank, 2008b, page 221: "Gazprom is the world's largest gas company basically focused on geological exploration, production, transmission, storage, processing and marketing of gas and other hydrocarbons. The state owns a 50.002 percent controlling stake in Gazprom." World Bank (2008b) A Citizen's Guide to National Oil Companies, Part B: Data Directory, World Bank, Washington, & Center for Energy Economics, Bureau of Economic Geology Jackson School of Geosciences University of Texas, Austin, 764 pp.

**Cell:** H12

**Comment:** Rick Heede:

Total net worldwide crude oil plus natural gas liquids produced by each company or state-owned enterprise. Where data is available, we list gross production (before royalty production is netted out). More often, however, oil companies report production net of royalty production.  
Crude production includes natural gas liquids (NGL) unless noted.

**Cell:** O12

**Comment:** Rick Heede:

Natural gas is typically reported as dry gas; natural gas liquids are reported under crude oil.  
Carbon dioxide is normally removed from the gas flow at the production site (see "Vented Carbon Dioxide").  
"SCM/d" = standard cubic meters per day. "cf/d" = cubic feet per day.

**Cell:** J49

**Comment:** Rick Heede:

Gazprom Neft was created under the name Sibneft in 1995 by Presidential Decree #872, issued on 24Aug95. A government resolution was signed on 29Sep95, and the State Property Committee on 11Oct95 ordered that the state's shares in oil producing enterprise Noyabrskneftegas, the Omsk Refinery, exploration enterprise Noyabrskneftegasgeophysica and marketing company Omsknefteprodukt all be transferred to Sibneft.

Sibneft initially combined Russia's largest oil refining complex in Omsk (dba Omsky NPZ), an oil and gas production enterprise based in the city of Noyabrsk in the Yamal-Nenets autonomous district (Noyabrskneftegas), a geological exploration enterprise and an oil products distribution network.

In 1996-1997 Sibneft was privatized through a series of Loans-for-Shares' auctions, and it was acquired by Roman Abramovich and Boris Berezovsky for US\$100 million, bidding through several front companies that they set up for the purpose.

Sibneft twice attempted a merger with Yukos, to form Russia's largest oil company YukosSibneft. The first attempt in 1998 failed due to a dispute over management. The process was well under way the second time in 2003 when the federal government cracked down on Yukos, and Sibneft's shareholders called off the merger in November of that year.

In September 2005, Russia's largest corporate takeover occurred when Gazprom bought 73% of Sibneft's shares for US\$13.1 billion. Later, Sibneft was renamed Gazprom Neft.  
[en.wikipedia.org/wiki/Gazprom\\_Neft](http://en.wikipedia.org/wiki/Gazprom_Neft)

**Cell:** J53

**Comment:** Rick Heede:

Gazprom owns the largest pipeline system in the world, which totaled 159,500 km at year-end 2008. The system includes 219 compressor stations with a capacity of 42 GW.  
Victor, Nadejda, & Inna Sayfer (2012) "Gazprom: the struggle for power," in Victor et al, eds, Oil and Governance, pp. 655-700. At page 680.

**Cell:** F56

**Comment:** Rick Heede:

CMS assumes a constant proportion of NGL production to natural gas production for 1989 - 1998. No data available from Oil & Gas Journal, or Gazprom data.

**Cell:** L56

**Comment:** Rick Heede:

We estimate Gazprom's natural gas production for the years in which we do not have Gazprom annual reports (1989-1998) by (a) estimating Gazprom of Russian gas production total: 98.34 percent in 1999).

In addition, for 1989-1991 only, we also apply a factor of 82.3 percent in order to estimate Russia's portion of total FSU gas production (82.34 percent in 1991).

**Cell:** M56

**Comment:** Rick Heede:

Gazprom estimates for 1989-1998 are equal to EIA dry gas production data for Russia times the fraction of Russian production that is known to have been Gazprom in 1999, namely, 92.5 percent of Russia total.

**Cell:** L61

**Comment:** Rick Heede:

We estimate Gazprom's natural gas production for the years in which we do not have Gazprom annual reports (1989-1998) by (a) estimating Gazprom of Russian gas production total: 98.34 percent in 1999).

**Cell:** G62

**Comment:** Rick Heede:

We assume, for lack of production data from either Sibneft or Oil & Gas Journal, that Sibneft produced crude oil 1995 to 1997; we conservatively estimate that 1995 production equaled 40 percent of the known production in 1998, 1996 = 60 % of 1998, and 1997 = 80 percent of 1998. Sibneft's production likely exceeds these estimates.

Gazprom

**Cell:** E63

**Comment:** Rick Heede:

Sibneft varies its bbl per tonne conversion factor: "Miller & Lents used a 7.21 conversion factor to convert tons into barrels from 1996 through 2001. From 2002, the conversion factor used in audits is 7.436." Sibneft Modeling Databook, p. 9.

**Cell:** D66

**Comment:** Rick Heede:

Gazprom (2004) Annual Report for 2003, pp. 8 & 42-43. [www.gazprom.com](http://www.gazprom.com)  
Oil and condensate production averages ~92+ percent condensate, e.g., 10.8 of 11.0 million tonnes in 2003.

**Cell:** J66

**Comment:** Rick Heede:

Gazprom (2004) Annual Report for 2003. [www.gazprom.com](http://www.gazprom.com)

**Cell:** M66

**Comment:** Rick Heede:

1999 data from Gazprom Annual report -- converted from 1.495 billion SCM/d to 19,268 Bcf/yr.

**Cell:** M67

**Comment:** Rick Heede:

Data from OGJ100 for Gazprom 2000-2003.

**Cell:** F69

**Comment:** Rick Heede:

Inconsistent reporting in OGJ (2004) -- 5.2 million bbl -- and OGJ (2003) -- 73 million bbl -- both for data year 2002. This is probably erroneous, considering that the higher figure agrees (though for 2001, not 2002) with both EI Top 100 and Gazprom's own data. Hence we use Gazprom data (converted from million tonnes of oil per year) into million bbl/yr at 7.3 bbl per tonne.

**Cell:** J70

**Comment:** Rick Heede:

Victor & Sayfer quote Gazprom Financial reports for natural gas sales 2003-2008 (494 Bcm, 525 Bcm, 540 Bcm, 579 Bcm, 572 Bcm, and 568 Bcm, respectively; note that we quote production data rather than sales, and sales data may include amounts purchased from producers. See Table 15.3, page 678.  
Victor, Nadejda, & Inna Sayfer (2012) "Gazprom: the struggle for power," in Victor et al, eds, Oil and Governance, pp. 655-700.

**Cell:** F71

**Comment:** Rick Heede:

OAOGazProm (2009) GazProm in Figures 2004-2008, page 28. Data in million tonnes of liquids production: chiefly condensate in 2004, ~equal in 2005, ~75 percent crude oil 2006-2008, e.g., 32 Mt oil & 10.9 Mt NGL in 2008.

Note: while Oil & Gas Journal gas production estimates agree well with GazProm data, OGJ100 are low for oil production (OGJ100 2006-2008 ~248 million bbl per year).. CMS uses GazProm data.

**Cell:** J71

**Comment:** Rick Heede (Dec09):

OAOGazProm (2009) GazProm in Figures 2004-2008, page 28. Data in billion cubic meters, gas production.

**Cell:** G72

**Comment:** Rick Heede:

Gazprom acquired Sibneft in August 2005, and 7 of 12 months are added for 2005.

**Cell:** M72

**Comment:** Rick Heede (Dec09):

Oil & Gas Journal OGJ100, various years, Bcf per year. Similar data data 2005-2008: 19,599 Bcf, 19,635 Bcf, 19,373 Bcf, and 19,412 Bcf.  
CMS uses the GazProm data from column "J."

**Cell:** N72

**Comment:** Rick Heede:

Gazprom acquired Sibneft in August 2005, and 7 of 12 months are added for 2005.

**Cell:** D76

**Comment:** Rick Heede:

Gazprom data 2005-2009

**Cell:** B77

**Comment:** Rick Heede:

While Russian energy strategies project rising natural gas production -- from about 610 Bcm in 2010 to 760 Bcm in 2030 (EIA; the Russian Energy Strategy projects production as high as 900 Bcm in 2030). About ninety percent of Gazprom's production is the Urals and Western Siberia, many of its discovered resources are not currently being produced. Additional exploration, development, and pipelines to offshore Arctic areas from Shtokman north of Murmansk and offshore Yamal Peninsula are ongoing, although cost, complexity, and markets have slowed development.

In addition, Gazprom's domestic prices are controlled, end use is frequently very inefficient as a result, 60 percent of total domestic gas consumption is used for electricity generation (to make things worse: gas-fired power plants are ~33 percent efficient), and "more than ninety percent of residential and industrial gas consumers lack meters." Victor, Nadejda, & Inna Sayfer (2012) "Gazprom: the struggle for power," in Victor et al, eds, Oil and Governance, pp. 655-700. At page 672, and 695 (fn 16).

Gazprom owns 51 percent of Shtokman Development Company; Total SA has 25 percent, and Statoil owns 24 percent.

**Cell:** H77

**Comment:** Rick Heede:

CMS uses Gazprom production of oil plus condensate (column D) in million tonnes per year. Oil & Gas Journal reports liquids production of 245 million barrels; Gazprom 320 million bbl.

**Cell:** J77

**Comment:** Rick Heede:

Gazprom website gas production, as well as oil and condensate (column D).

**Cell:** G87

**Comment:** Rick Heede:

Gazprom "working interest liquids production in 2008" at 1,124 thousand bbl per day.

Victor, Hults, & Thurber, 2012, Introduction, Table 1.1, page 24, in Victor et al, eds, 2012, Oil and Governance. Table 1.1 is based on information from Wood Mackenzie's Pathfinder Database;

OilGasENL\_NorskHydro.xls

www.woodmacresearch.com

**Cell:** L87

**Comment:** Rick Heede:

Gazprom "working interest natural gas production in 2008" at 51,818 thousand cf per day. Victor, Hults, & Thurber, 2012, Introduction, Table 1.1, page 24, in Victor et al, eds, 2012, Oil and Governance. Table 1.1 is based on information from Wood Mackenzie's Pathfinder Database; www.woodmacresearch.com

**Cell:** N95

**Comment:** Rick Heede:

"A + B + C1" Gaprom Group's hydrocarbon reserves in Russia., datum for 2009. Gazprom in Figures 2005-2009, page 12.

**Cell:** E97

**Comment:** Rick Heede:

US Bureau of Mines (~1955) Minerals Yearbook 1952, Colby, Barton, & Oppegard, "Natural Gas, page 300.

**Cell:** N101

**Comment:** Rick Heede:

EIA International Energy Statistics, dry gas production in FSU states in 1992.

**Cell:** D105

**Comment:** Rick Heede:

USSR (chiefly western Russian and Ukraine) produced 9 Bcm in 1955. Victor, Nadejda, & Inna Sayfer (2012) "Gazprom: the struggle for power," in Victor et al, eds, Oil and Governance, pp. 655-700. At page 658.

**Cell:** E110

**Comment:** Rick Heede:

We estimate Russia's gas production of total USSR (FSU) based on the Russia proportion of FSU gas production in 1992 (EIA data); see calculations at right.

**Cell:** F110

**Comment:** Rick Heede:

US Bureau of Mines, Minerals Yearbook 1964, p. 348, shows USSR's "marketed production of natural gas" for 1960-1964.

**Cell:** F119

**Comment:** Rick Heede:

US Bureau of Mines, Minerals Yearbook 1971, Table 19, p. 797, shows both marketed and gross production of natural gas for 1969-1971. Russian gross production totaled 6.860 Tcf (x1.0624 of marketed production) in 1969, 7.520 Tcf (x1.0647) in 1970, and 7.9 Tcf (x1.0607) in 1971. Gross gas production includes gas that is vented or flared or re-injected; no data published to quantify vented or flared quantities in any country.

**Cell:** K127

**Comment:** Rick Heede:

USSR data for 1980-1991, and Russian Federation 1992-2011.

For the purposes of attributing a proportion of USSR, or Former Soviet Union (FSU), we calculate that 82.344 percent of FSU's 1992 dry gas production (22.62 Tcf of 27.46 Tcf) was produced in Russia. We apply this factor above in allocating a percent of Russian gas production to Gazprom for

**Cell:** F144

**Comment:** Rick Heede:

World Dry Natural Gas Production, Bcf, Russia 1994-2003p, EIA (2005) Annual Energy Review, Table 11.11. Dry gas production is a proportion of gross production (81.5 percent of world gross prod'n in 2000, EIA International Energy Annual, Table 4.1: 88,093 Tcf dry vs 108,088 Tcf gross, or gross is 1.227x dry).

In any case, we use EIA dry gas production for Russian 1994-2003 as a proxy data set for Gazprom prior to known Gazprom starting in 1999: in 1999, known Gazprom equals 92.5 percent of EIA data for 1999, and we apply this fraction to EIA data 1994-1998.

1990 to 2011 data updated April 2013 with EIA International Energy Statistics, at right.

**Cell:** L156

**Comment:** Rick Heede:

The World Bank's estimate of Russian flared gas is 1,766 Bcf (EIA's is 551 Bcf). World Bank does not estimate vented natural gas. The reason for this discrepancy is unclear; CMS has not checked the background and methodology for EIA's flaring estimates.

**Cell:** H159

**Comment:** Rick Heede:

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**Cell:** O164

**Comment:** Rick Heede:

Blank, for pagination.

**Cell:** P164

**Comment:** Rick Heede:

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Gazprom