



*Deeper, further, colder*

# in pursuit of Russia's natural gas

The world's largest producer of natural gas, Gazprom, plans to significantly expand its extraction activities by 2020. To this end, new gas fields are to be developed in remote regions under challenging climatic conditions. Together with their modern technologies, European partners are welcome to join in, as long as they accept Gazprom's terms.



The German-Russian company Achimgaz extracts natural gas from deep geological formations in the Urengoy gas field. Photo: Wintershall

| by *Stefan Schroeter*

At the Urengoy gas field in western Siberia, the temperature remains below freezing 250 days of the year, dropping in winter to 60 degrees below zero. For 30 years the “Gasoviki” have been producing natural gas under these conditions for the domestic market and Europe. Rich rewards have been reaped from Russia’s largest gas field to date: 6,000 billion m<sup>3</sup> are said to have been extracted already. However, during the last years the production rate has dropped significantly. So far, the wells drilled by the gas field workers reach down as far as the layers of sandstone that lie 1,200 metres below the surface. In the meantime, there are good prospects for the extraction of big gas reserves from the sandstone layers at depths of 3,500 metres.

In July 2008, the German-Russian company ZAO Achimgaz began test operations for natural gas production in the first section of the Achimov horizon in the Urengoy field. Here, the joint venture between the German company Wintershall and Gazprom is operating a gas processing

plant and three gas and condensate wells. A total of 531 million m<sup>3</sup> of gas and 188,700 tons of gas condensate is to be produced by the end of 2008.

In developing the Achimov formation the two partners complement each other through their specific fields of expertise. At the start of operations, Hans-Ulrich Engel, Chairman of the Board of Executive Directors of BASF SE, Wintershall’s parent company, noted that ‘Gazprom specialises in producing gas in the extreme north, while Wintershall has many years of experience working in challenging geological conditions. In this ideal

Wintershall, each holding an equal number of shares, to develop the first section of the Achimov horizon in the Urengoy field. Over a projected development period of 43 years, which will require investment in excess of €1 billion, a total of 200 billion m<sup>3</sup> of gas and 40 million tons of condensate are to be produced. Annual production of up to 7.5 billion m<sup>3</sup> of gas and 2.8 million tons of condensate is anticipated.

As project manager, Achimgaz owns the infrastructure on this section of the gas field, while the extraction licence, all rights of title and distribution rights relating to the products extracted are owned by Gazprom. Profits will be shared by the

*The Shtokman gas field is the largest of its kind in the world*

partnership risks and rewards are equally shared.’

Achimgaz was founded in July 2003 as a joint venture between Gazprom and

partners 50:50. Gazprom sees this model as a template for building relationships with foreign companies, according to Chief Executive Alexei Miller.

Achimgaz has done the pioneering work to develop other major energy reserves. The administration of the Yamal-Nenets region estimates potential reserves in the Achimov horizon of the Urengoy region at 12,600 billion m<sup>3</sup> of natural gas, 4 billion tons of crude oil and 2.8 billion tons of gas condensate. 'We regard these deposits as reserves for extraction in our region,' explained Vladimir Rylkov, a representative of the regional administration, at the Russian Petroleum & Gas Congress 2008 (RPGC) held at the end of June in Moscow. The Yamal-Nenets region is by far the

most important area for the extraction of Russian natural gas. Gazprom is obviously already developing additional sections of the Achimov formation of Urengoi. As the company has announced, by 2010 the annual extraction is to rise to 16 billion m<sup>3</sup>.

Wintershall and Gazprom are already partners in gas production in the newly developed Yuzhno-Russkoye gas field, which began in October 2007. The operator there, SevernefteGazprom (SNGP), is gradually increasing gas production, so as to reach the planned annual volume of 25 billion m<sup>3</sup> by 2009. Wintershall holds a 25% stake minus one share in this Gazprom subsidiary and also holds one privileged share without voting rights, giving it a 35% interest in future profits. In return, Gazprom has been able to increase its access to the German and European market, boosting its own holdings in the jointly owned gas partnership Wingas from 35% to 50% minus one share. It has also received a 49% stake in a Wintershall subsidiary that produces crude oil in two concession regions in Libya.

The gas produced in Yuzhno-Russkoye is fed into Gazprom's nationwide transportation network and brought to market by Gazprom via a company called Yurgm Trading, which sells half the gas at Russian domestic prices and the other half at the export prices applicable at the German border. To date, SNGP has invested €850 million in opening up gas fields. Wintershall is currently anticipating total costs of €1.9 billion, of which the company will bear 35%. Surprisingly, the two partners are giving quite different details of the natural gas deposits available in Yuzhno-Russkoye. While Wintershall puts the extractable gas reserves at 600 billion m<sup>3</sup>, Gazprom cites measured gas reserves of 825 billion m<sup>3</sup>, estimated reserves of 209 billion m<sup>3</sup> and crude oil reserves of 5.7 million tons. According to Gazprom, the difference is accounted for by recently measured or estimated reserves.

### Surprises |

The Düsseldorf-based group Eon is also currently in negotiation with Gazprom over

a minority stake in Yuzhno-Russkoye. The Germans have proposed that the Russians take a holding in power plants in various western and central European countries as well as in underground gas storage facilities. So far the companies have failed to reach agreement over the value of these holdings. In June 2008, Gazprom's export executive, Alexander Medvedev, pointed out that the price of oil had risen from US\$40 a barrel to US\$130 since negotiations began. In his view, these market conditions had to be taken into account.

The level of natural gas production envisaged by Gazprom until 2010 is to be secured by means of the Yuzhno-Russkoye and Achimgaz projects alongside new plants at existing production sites. 'After 2010 the company plans to expand to new strategic areas of gas production on the Yamal peninsula, the Barents Sea shelf, the Ob and Tazov bays, in Eastern Siberia and the Far East', explained Miller at the general meeting held at the end of June.

Gazprom has expanded its exploration of new natural gas reserves considerably in recent years. Nevertheless, the company keeps some surprises up its sleeve. Miller was first to deliver the good news to shareholders at the general meeting that 'our exploration work increased our gas reserves in 2007 to 592.1 billion cubic meters, which exceeds our production by more than 7%'. Miller permitted himself a swipe at 'many other world oil and gas companies, whose average reserve replacement ratios in recent years are less than 90%'. The bad news about Gazprom reserves only becomes apparent by looking at the annual report, which shows that reserves have actually fallen slightly to 29,785 billion m<sup>3</sup>. This is partly because the company had to surrender 144 billion m<sup>3</sup> of natural gas from the Shtokman field to the state reserve fund for licensing reasons.

Whether further adjustments will be made to Gazprom's reserves may also depend on the results of the survey carried out by US engineering firm DeGolyer & McNaughton. So far, the firm has examined 95% of Gazprom's reserves in accordance with the PRMS international standard (Petroleum

## Russia's natural gas in 2007

Production: 654 billion m<sup>3</sup> (-0.3%)

Reserves: 47,800 billion m<sup>3</sup>\*

\* According to Russian measuring standards

Source: Gazprom

### Gazprom 2007

#### Natural gas production:

549 billion m<sup>3</sup> (-1.3%)

#### Natural gas sales:

576 billion m<sup>3</sup> (-0.4%)\*

#### Natural gas reserves:

29,785 billion m<sup>3</sup> (-0.2%)\*

#### Production of crude oil and gas condensate:

45 million tons (±0)

#### Reserves of crude oil and gas condensate:

2,722 million tons (+5%)\*

#### Turnover:

2 390 billion roubles  
(€65 billion, +11%)\*\*

#### Profit after tax:

695 billion roubles (€19 billion,  
+9%)\*\*

#### Number of employees:

436,100 (+1%)

\* According to Russian measuring standards

\*\* According to IFRS



Resources Management System) and has arrived at a figure of 20,820 billion m<sup>3</sup>. On the question, what the reason is for the significant difference to the official reserves, Gazprom didn't give an answer. One possible explanation is that the Russian statistics focus solely on geological criteria, while PRMS also analyses the economic efficiency of extraction.

All the same, Gazprom plans to significantly expand geological exploration. Miller has announced that investment in this area is set to reach RUB 70 billion by 2010 (€1.9

now, Gazprom has the capacity to expand production by a further 40 billion m<sup>3</sup> if needed, he explained. By 2020, even volumes of up to 670 billion m<sup>3</sup> are to be achieved.

A considerable contribution to these rising production volumes will have to come from the 26 gas fields that have already been surveyed on the Yamal Peninsula in north-western Siberia. According to Gazprom, they have reserves totalling 10,400 billion m<sup>3</sup>, allowing an annual production of at least 250

Gazprom is developing another major project in collaboration with foreign partners in the Russian area of the Barents Sea, which is part of the Arctic Ocean. Six hundred kilometres from the coastal city of Murmansk, where the icy water is up to 340 metres deep, experts from the Russian exploration firm Sevmorneftegas have so far measured 3,800 billion m<sup>3</sup> of natural gas and 31 million tons of gas condensate. The Shtokman gas field, first drilled in 1988, is the largest of its kind in the world. Gazprom, spent a long time negotiating with international oil and



At Yuzhno-Russkoye, Wintershall was the first German company to successfully enter the natural gas industry in western Siberia. Photo: Wintershall

billion) in Russia alone, representing a 250% increase. In addition, Gazprom is already carrying out exploration activities in Vietnam, India, Venezuela, Libya, Uzbekistan, Kyrgyzstan and Tajikistan.

### Foreign partners |

Although in the financial year 2007 Gazprom's production fell slightly to 549 billion m<sup>3</sup> due to a mild winter, Miller is confident that volumes will easily reach 563 billion m<sup>3</sup> this financial year, climbing to 615 billion m<sup>3</sup> by 2015. Even

million m<sup>3</sup> after 2020. Gazprom hopes to bring the first section of the major Bovanenkovskoye field, with an initial annual extraction volume of 15 billion m<sup>3</sup>, into operation in 2011. In the long term, Bovanenkovskoye will provide 140 billion m<sup>3</sup> of natural gas each year. This way it would reach a similar size as the major field Zapolyarnoye, located more in the south. Zapolyarnoye went into operation in 2001, reached a production level of 100 billion m<sup>3</sup> in 2004 and will be expanded by another 30 billion m<sup>3</sup> by 2010.

gas companies on the joint development of the area before finally deciding to go it alone in October 2006. However, foreign companies are welcome as technology partners in the first phase of the ambitious Shtokman project. The French energy group Total holds a 25% stake in the infrastructure company Shtokman Development and the Norwegian StatoilHydro group holds a 24% stake. After 25 years of extraction, Total and StatoilHydro will assign their shares back to Gazprom.

Gazprom puts gas production in the initial development phase at 23.7 billion m<sup>3</sup> per annum. Deliveries of gas are set to commence in 2013. Annual production could later rise to up to 94 billion m<sup>3</sup>. This is approximately equivalent to natural gas consumption in Germany. Part of the Shtokman gas is intended for Europe. To this end, a new 2,000-km-long pipeline is to be built through the Murmansk region to the Russian Baltic port of Vyborg. From there, the gas will be transported on to Germany and other European countries via the Nord Stream pipeline through the Baltic Sea. Another part of the Shtokman gas is to be marketed globally as liquefied natural gas (LNG). To this end, a gas liquefaction plant will be built, which is to produce 7.5 million tons of LNG each year from 2014. A final decision on the investment required is due in the second half of 2009.

Through the smaller-scale Norwegian projects at Ormen Lange and Snohvit, StatoilHydro already has experience of natural gas extraction in deep marine environments and under harsh climatic conditions. For Bengt Lie Hansen, President of StatoilHydro Russia, Shtokman opens up a whole new dimension. 'I call it the "mother of all projects",' he said at the RPGC in Moscow. 'It includes all the challenges I can dream of. But I also think that we have the background to develop it in a proper manner.'

Work on the project is already under way. In July, the Vyborg Shipbuilding



Gazprom Chief Executive Alexei Miller plans to significantly expand the geological exploration of new natural gas reserves. Photo: Stefan Schroeter

waves up to 32 metres high. The platforms are capable of performing exploration and production drilling oil and gas wells of up to 7,500 metres at 70-500 metres water depth.

#### Eastern Siberia |

Gazprom is also the coordinator of a largescale state programme to develop the gas industry in eastern Siberia and the Far East. A unified system for extracting, transporting, supplying and exporting natural gas is to be created in both regions. The investment needed has

fields in the Krasnoyarsk region. Known fields in the Irkutsk region include the Kovykta field with reserves of at least 2,000 billion m<sup>3</sup> of natural gas. In June 2007, following lengthy negotiations and state intervention, Gazprom essentially reached agreement with the British-Russian company TNK-BP regarding the takeover of the Kovykta field. However, there is no final contract to date. Instead, an acrimonious dispute has flared up between the Russian shareholders and BP.

In all four centres, regional systems for processing and supplying gas are to be established. In addition, plans are also in place for natural gas to be exported via pipeline from Sakhalin and Yakutia to the Asia-Pacific region. Exports of LNG are also envisaged from Sakhalin. It will also be possible to feed the gas from the fields in Irkutsk and Krasnoyarsk into Russia's existing gas transportation system (GTS). The ministry responsible is confident that more than 27 billion m<sup>3</sup> of natural gas will be consumed in eastern Russia and 35 billion m<sup>3</sup> will be fed into the GTS by 2020. In addition, 25-50 billion m<sup>3</sup> of natural gas

## Gazprom sees Achimgaz as a template for building relationships with foreign companies

Plant started assembling the first of two semi-submersible platforms for drilling production wells on the Shtokman field. The platforms are designed to operate in a harsh natural and climatic environment, and to withstand low temperatures and

been put by the responsible authorities at RUB 2,400 billion (€65 billion) to 2030. As part of the project, four new centres for gas production are envisaged: Sakhalin, Yakutia, with its major Chayanda field, the Irkutsk region and the several



will be piped to China and Korea, as well as exports of 21 billion m<sup>3</sup> of LNG to the Asia-Pacific region.

As part of the Sakhalin II project, two LNG plants with an annual capacity totalling 9.6 million tons are currently under construction. These will supply customers in Japan, South Korea and the US not later than January 2009 onwards. As is well-known, Gazprom acquired a majority stake in the project, which was developed by the oil group Royal Dutch Shell and the Japanese companies Mitsui and Mitsubishi, in April 2007. The construction of further LNG production facilities in the region with an additional annual capacity of 9.6 million tons is now being discussed.

#### Investments |

Increasing income from gas sales makes it easier for Gazprom to invest in production, transport and acquisitions. So the company has increased its current investment programme by RUB 112 billion to RUB 822 billion (€22 billion). According to earlier statements, half of Gazprom's investment flows into the development of the gas transport system. Another 30% is used for gas production. Overall, the company is planning investments of up to RUB10,000 (€272 billion) from 2007-2009.

In addition to its own production, Gazprom is also looking to buy increasing volumes of gas from producers in Central Asia. For a long time, the company was able to pay these producers significantly lower prices for their gas than it could fetch on the European market. Now that the central Asian states are increasingly exploring their own export options, Miller has improved his offer: 'We understand the need to work with European prices,' he says. Such news is music to the ears of producers in Central Asia. In the Ukraine however, this news may trigger deep concern. At present, the Ukraine buys gas from Central Asia at a price of \$180 (per 1,000 m<sup>3</sup>) as against average European prices of \$319 in 2007. Negotiations on deliveries after 2009 have been stalled for some months.

Gazprom is not giving away any further details about how much natural gas it buys each year from Central Asia at the moment. However, it is known that an annual supply of 50 billion m<sup>3</sup> has been agreed from Turkmenistan alone. According to Russian press reports, the company buys about 60 billion m<sup>3</sup> annually from Turkmenistan, Kazakhstan and Uzbekistan. So as to further expand transportation capacity from Central Asia, plans are in place for the construction of the new Precaspian Gas Pipeline in the neighbourhood of the Caspian Sea. This is

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set to transport an additional 10 billion m<sup>3</sup> of gas from Turkmenistan and 10 billion m<sup>3</sup> from Kazakhstan to Russia each year. This Caspian pipeline will compete for gas from Turkmenistan and Kazakhstan with the Nabucco pipeline that European gas providers want to build from this region to Austria.

Furthermore, several companies in Russia which are more or less independent from Gazprom are producing increasing volumes of natural gas. These include the gas producer Novatek, which extracts 28 billion m<sup>3</sup> each year, and several oil companies, such as Lukoil, state-owned Rosneft and Surgutneftegas. According to the regional administration in Yamal-Nenets, the independent producers could produce much more gas if they had better access to Gazprom's pipeline system and were able to sell their gas on the lucrative export market. 'Even today their resource base could ensure production of 130 billion m<sup>3</sup>,' Rylkov explained at the Moscow congress. His presentation showed that only half of this potential is being exploited at the moment.

Another resource to be used in gas production is associated gas, which accumulates during crude oil production. According to conservative estimates, 55

billion m<sup>3</sup> of this associated gas is accrued in Russia each year, 20 billion m<sup>3</sup> of which is flared off. Russia is still in the early stages of using methane from coal deposits. Gazprom itself is conducting a production trial in the Kusnezsk Basin, anticipating that it will be able to obtain 5 billion m<sup>3</sup> of methane per annum from 2010.

Miller explained to shareholders that an 'unusually mild winter in 2006/07' was responsible for the slight fall in Gazprom's natural gas sales to 576 billion m<sup>3</sup> in 2007 despite this production potential.

The company sold noticeably less "blue fuel", particularly in its home country. The considerable growth in sales in "foreign countries", which provided for a significant result in terms of profit, could not compensate for this domestic fall. The category "foreign countries" comprises 22 European countries, not including the countries formerly in the Soviet Union. In keeping with these lower sales, own production was also lower than the previous year at 549 billion m<sup>3</sup>.

With the transition to market prices in Russia, the domestic activities of the company could also become more important in financial terms. 'In three to four years a market will form in Russia, where revenues are twice as high as in the traditional European market,' Miller believes. It remains to be seen how the rising prices will impact sales – not to mention the consequences for domestic policy. At present, 1,000 m<sup>3</sup> of natural gas costs US\$70 (€45) on the regulated Russian market. If prices were calculated by European formulae, it would probably cost some US\$200 (€128). Miller anticipates that the rising price of gas will prompt customers to use this resource more efficiently in the future and that an appropriate price ratio between the competing resources of gas, coal and fuel oil will emerge. ■