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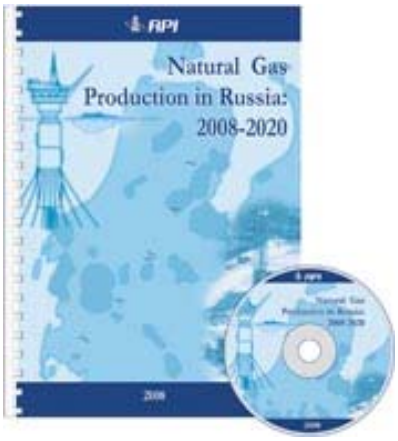

Natural Gas Production in Russia: 2008-2020

July 2008

RPI

NATURAL GAS PRODUCTION IN RUSSIA

Research Study

With global demand for natural gas on the rise, the issue of stable supplies is closely tied to gas reserves being available and monetized. Russia is the world's largest holder, producer and exporter of natural gas - as well as the largest single supplier of gas to European markets - and Gazprom is its sole gas exporter to international markets. Given Gazprom's importance as a key supplier, concerns are frequently and predictably raised about whether Russia could be counted on as a sustainable gas exporter.

Natural Gas Production in Russia, the second study within RPI's **Eurasian Gas Research Service 2008**, reviews this standpoint by giving a comprehensive and detailed analysis of the current status and development outlook for Russia's gas industry up to 2020.

For the period of 2001-2007 gas production in Russia increased from 581.9 to 654 bcm, primarily due to Gazprom's bringing onstream new fields (including the start of commercial production at the Yuzhno-Russkoye field in December 2007). By 2020, Gazprom alone plans to produce 650-670 bcm per year. Gas growth to 140-150 bcm by the same year is expected to come from other gas producers, such as LUKOIL, Novatek, Rosneft, TNK-BP, etc.

Nevertheless, Russia's gas industry is challenged by substantial reserves depletion at traditional fields with subsequent rise of gas recovery costs and by the necessity in huge investments to develop new gas provinces. Most frequently, these issues lie at the root of reservations about Russia's ability to satisfy rising gas demand internationally and domestically.

Key issues **Natural Gas Production in Russia** addresses are:

- Evaluation of Russia's production potential to 2020
- Analysis of strategies of Russian gas producing companies

- Assessment of gas production capital expenditures needed to meet the growing gas demand locally and on global markets
- Analysis of the supply/demand scenarios

Together with a comprehensive in-depth analysis of the Russian gas industry and an examination of production prospects at currently developed fields, the study provides outlook for implementation of upstream strategies by Gazprom and other gas producing companies up to 2020.

Key questions addressed in the study:

- What was the dynamics of natural gas production in Russia for the period of 2000-2007?
- What is the legal and tax regulation of the Russian gas industry's upstream segment?
- What is the production potential of Gazprom and independent gas producers at traditional gas fields up to 2020?
- What is Gazprom's strategy with regard to independent producers?
- What are the opportunities for Russian gas producing companies to sustain and increase current production rates?
- What capital expenditures are needed for further development of natural gas upstream segment?
- What is the calculated price of natural gas coming from different fields at the Russian border and how could it change?
- What are the key factors expected to influence natural gas production in Russia?

Natural Gas Production in Russia examines the current status and prospects for gas production by Gazprom's 17 subsidiaries, affiliated companies and 6 independent gas producers.

The study is unique in providing a **cost-plus assessment** of supplies from a field to the Russian border for major Russian gas assets forecasted to 2020. Combined with the netbacks for 42 importing countries to the Russian border to 2020 forecasted in the study **Russian Gas on Global Markets: Potential, Strategies and Outlook** *(released*

by RPI in March 2008) it completes the picture of Russia's gas supplies competitive ability on global markets.

Key data in each producing company profile covers:

- Current reserves base
- Historical production
- Transportation routes for gas produced
- Production potential to 2020
- Capital expenditures for further development
- Cost plus assessment from field to current and/or potential exit points at Russian border *(for major assets only)*

Similarly structured is the examination of **new gas fields and provinces**:

- Yamal Peninsula: Bovanenkovskoye and Kharasaveiskoye fields
- Shtokmanovskoye field
- Ob-Taz Bay fields
- Eastern Siberia fields
- Russian Far East fields *(including Sakhalin)*

Cost plus assessments for some of these regions appear in published research **for the first time**.

Natural Gas Production in Russia develops **two scenarios** for gas production in Russia in 2008-2020 based on:

- Demand for natural gas in Europe, CIS, North-East Asia, North America
- Gazprom's contracted and supplied export volumes, current and projected
- Projected gas prices on export markets
- Economic feasibility of developing new fields
- Transportation capability for delivering gas from field to local and international consumers
- Gas producers' plans for tapping new fields

The scenarios also take into account forecasts of gas production capital expenditures by Gazprom and other producing companies

Natural Gas Production in Russia is an essential analytical support tool for:

- energy policy-makers
- integrated energy companies
- gas producers
- gas transportation and trading companies
- financial and investment institutions
- contractors and equipment suppliers

Natural Gas Production in Russia

Release: July 2008
Languages: English, Russian
Volume: 366 pages, more than 270 charts and graphs
Price: 9,500 EURO

See enclosed detailed table of contents and sample gas producer profile
To order the study, please fill in the order form on the last page.

Other RPI's studies and reports focused on Russian/FSU/European gas:

- FSU Oil and Gas Statistic Yearbook 2008 (June 2008)
- Russian Gas on Global Markets: Potential, Strategies and Outlook (March 2008)
- Oil and Gas of Uzbekistan (December 2007)
- Russian LNG Projects: Reality and Prospects (July 2007)
- Oil and Gas of Eastern Siberia and Russian Far East (May 2007)
- South Eastern Europe in the Big Eurasian Gas Game (March 2007)
- Kazakhstan's Oil and Gas Upstream (November 2006)
- The Independent Gas Producers in Russia (March 2006)

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Gazprom Dobycha Orenburg (former Orenburggazprom)

Orenburggazprom is a wholly-owned subsidiary of Gazprom. Orenburggazprom includes the largest integrated gas processing plant in Russia, which is one of the principal suppliers of helium to the European markets, and of ethane and pentane-hexane to the Russian market.

The company was organized for the development of the Orenburgskoye oil and gas condensate field discovered in 1966. Two plants – a gas processing plant and a helium plant – were built to process the extracted gas.

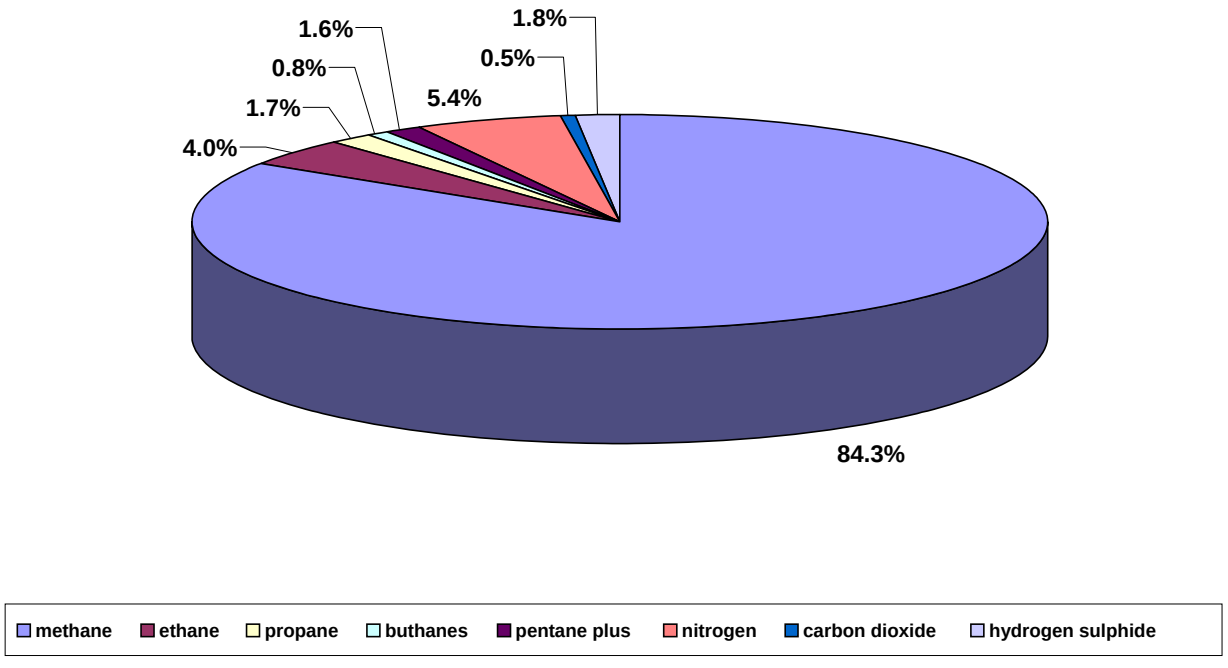
In the early 1980s, Orenburggazprom began developing the Karachaganakskoye gas condensate field in Kazakhstan. Subsequently, the experience gained helped the company to develop the Astrakhanskoye gas field.

Since February 2003, Orenburggazprom has been headed by Sergei Ivanov, who had prior experience working for Vietsovpetro, Chernomorneftegaz, and held the position of Minister of Fuel and Energy of the Autonomous Republic of Crimea (Ukraine). In 2007, during the period of internal reforms in Gazprom, the company was renamed to Gazprom Dobycha Orenburg.

Reserves Base

The Orenburgskoye oil and gas condensate field has ABC_1 reserves of 820 bcm and C_2 reserves of about 60 bcm. More than 1 trillion cubic meters have been cumulatively produced during its development. The field's gas contains up to 2% of hydrogen sulphide. The principal reservoirs occur at depths ranging from 1,300 to 2,600 m.

Figure 1. Composition of gas of the Orenburgskoye field



Source: Gazprom

Field Development

The gas production division of Orenburggazprom produces gas, condensate and crude oil from the Orenburgskoye oil and gas condensate field.

The development of the Orenburgskoye field started in the early 1970s. In the period from 1971 to 1979 eleven gas processing facilities (GPFs) were commissioned in five construction phases on a-step-by-step basis. GPF 6 was commissioned in 1973, GPF 7 started the work in April 1974, GPFs 8, 3, 9 - in 1975, GPF 1 - in December 1977, and GPFs10, 12, 14 and 15 were completed in 1978.

In 1979, the subsidiary reached peak production of 48.7 bcm of gas. In the 1980s, Orenburggazprom operated at annual design capacity of 45 billion cubic meters of gas and 3.2 million tonnes of gas condensate, which allowed to utilize the full capacity of both the gas processing plant and the helium plant, the latter almost entirely servicing the defense industry.

In 1986, the Orenburgskoye field entered the phase of declining production, characterized by decline in formation pressure, high temperature of extracted gas, changes in gas quality, etc. During this phase, the compressor-free operation of the field ended, making necessary the construction of gas booster stations GBS-1 and GBS-2.

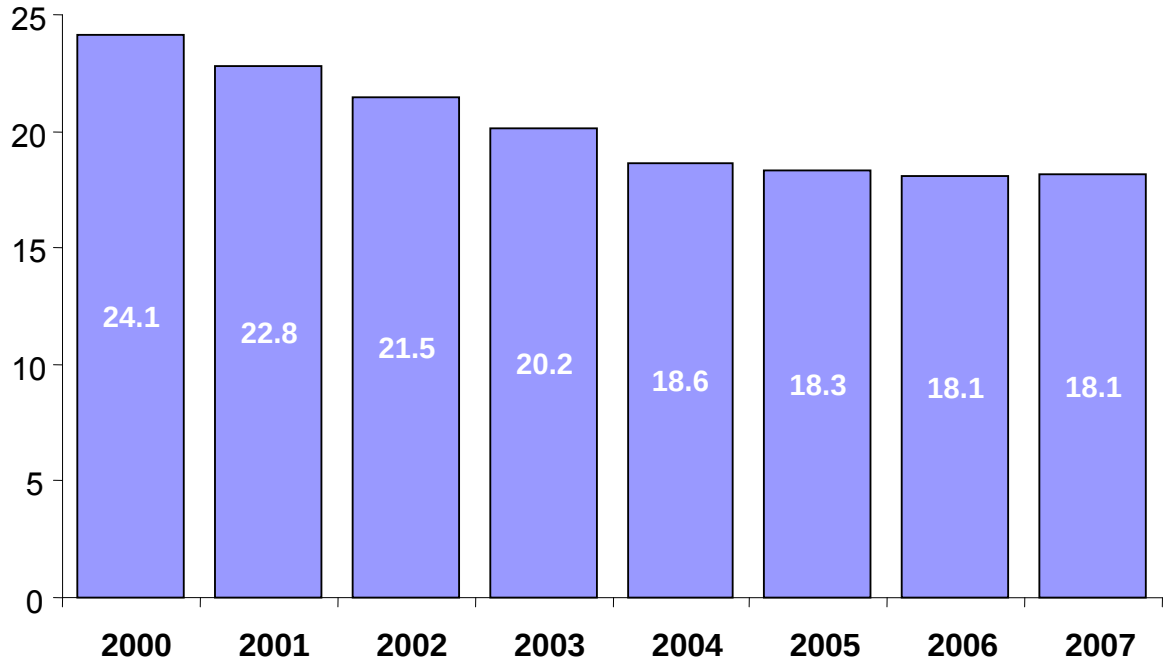
In the early 2000s, the Orenburg Integrated Gas Chemical Plant produced its trillionth cubic meter of gas. The current gas producing well stock consists of a total of 739 wells.

In the period from 2000 to 2007 gas production from the field reduced considerably, to 18 bcm per year. Today, the field operation is aimed at maintaining planned production level from the principal reservoir and at tapping undeveloped reservoirs of oil, to be supplied to the existing production facilities of the Orenburg Integrated Gas Chemical Plant.

In 2006, gas booster station 3 was built to stabilize gas production at 18 billion cubic meters per year. CCGT-10PKhG 5 gas-turbine units by Permskiye Motory were ordered to build GBS 3. Moreover, GBS 1 and 2 are being switched to the second compression stage.

Apart from gas production and processing, the company expects to start producing and refining crude oil. Reservoirs of the Orenburg field contain 230 million tones of crude.

Figure 2. Gas production of Orenburggazprom from 2000 to 2007, bcm



Source: InfoTEK

Gas and Condensate Processing

The huge reserves of the Orenburgskoye gas condensate field and the uniqueness of composition of gas (hydrogen sulphide, methane, ethane, propane, butane, pentane, helium, mercaptans) and gas condensate (aromatic, naphthene and methane hydrocarbons), led to the construction of the Orenburg Gas Processing Plant (OGPP).

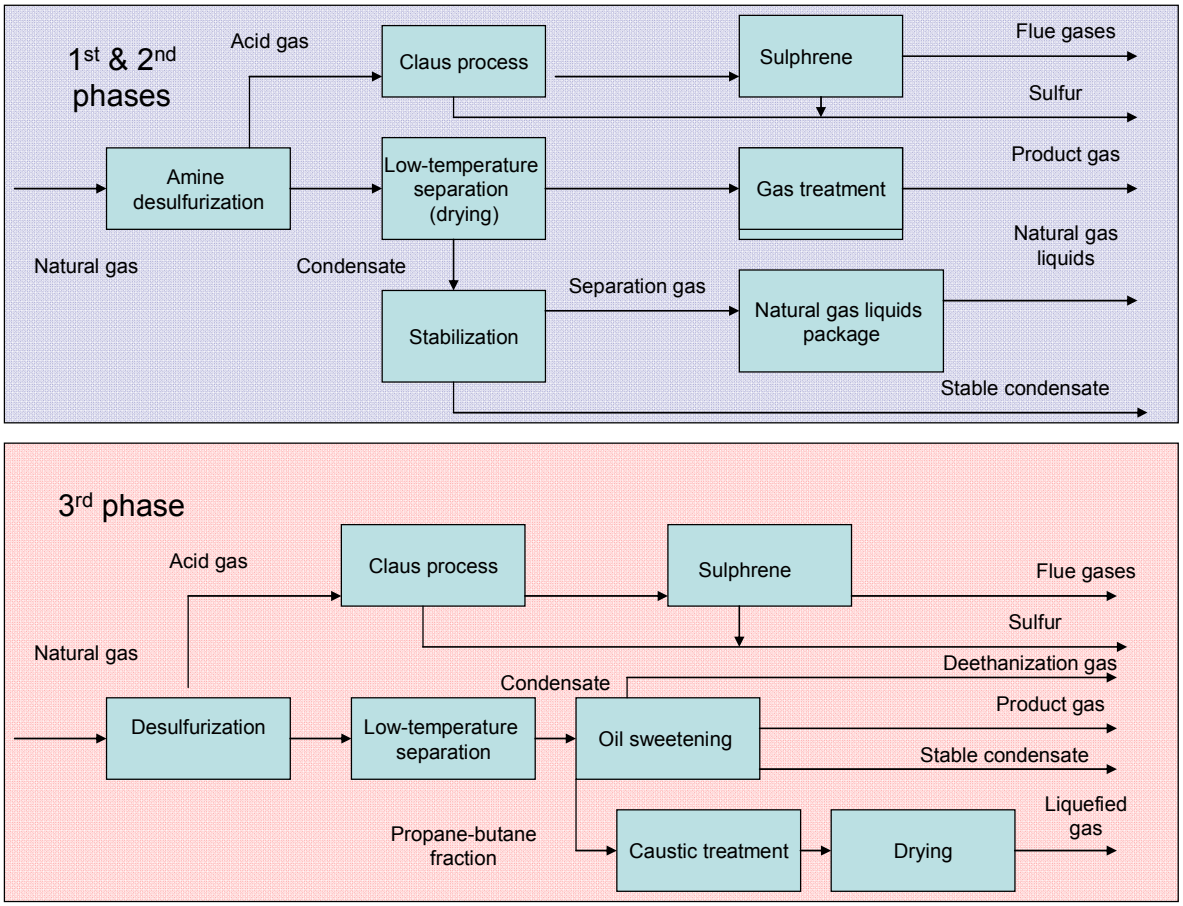
The plant was constructed in the period from 1971 to 1978. The design annual capacity of the plant was 45 bcm of gas and 6.26 million tonnes of unstable condensate and crude oil. The current-production capacity of the plant is 37.5 bcm of processed gas and 6.26 million tonnes of unstable condensate and crude oil per year.

The gas processing plant consists of 3 primary and 13 secondary units. Each primary unit is a separate production facility including a set of process plants. The integrated plant provides a broad range of hydrocarbon processing services.

The principal commercial products of the integrated plant are as follows:
- dry gas;
- liquefied petroleum gas;
- stable condensate and crude oil;
- natural gas liquids;
- technical propane-butane;
- ethane;

- helium (gaseous, liquid);
- odorant;
- sulphur (liquid, block, pellets);
- liquid oxygen;
- liquid nitrogen.

Figure 3. Process flow chart of the Orenburg Gas Processing Plant



Source: Gazprom

The Orenburgskoye field is the primary supplier of hydrocarbon feedstock (more than 18 bcm of gas and about 500 thousand tonnes of hydrocarbon liquids per year) processed by the integrated plant. Over 7 bcm and about 3 million tonnes of condensate are supplied from the Karachaganak gas condensate field in Kazakhstan and up to 435 thousand tonnes of crude oil are delivered by other companies from fields in the Orenburg region.

Cooperation with Kazakhstan in the processing of gas from the Karachaganak field began as early as 1983. After the breakdown of the USSR, the Karachaganak field ceased to be an asset of Orenburggazprom, but cooperation with the new owners from independent Kazakhstan was re-established. Since 1991, the level of gas supplies for processing at the Orenburg gas processing plant increased to 7 bcm in 2003 and to 8 bcm in 2005. In the future, it is planned to increase gas supplies from Karacahaganak to Orenburg GPP to 15 bcm per year.

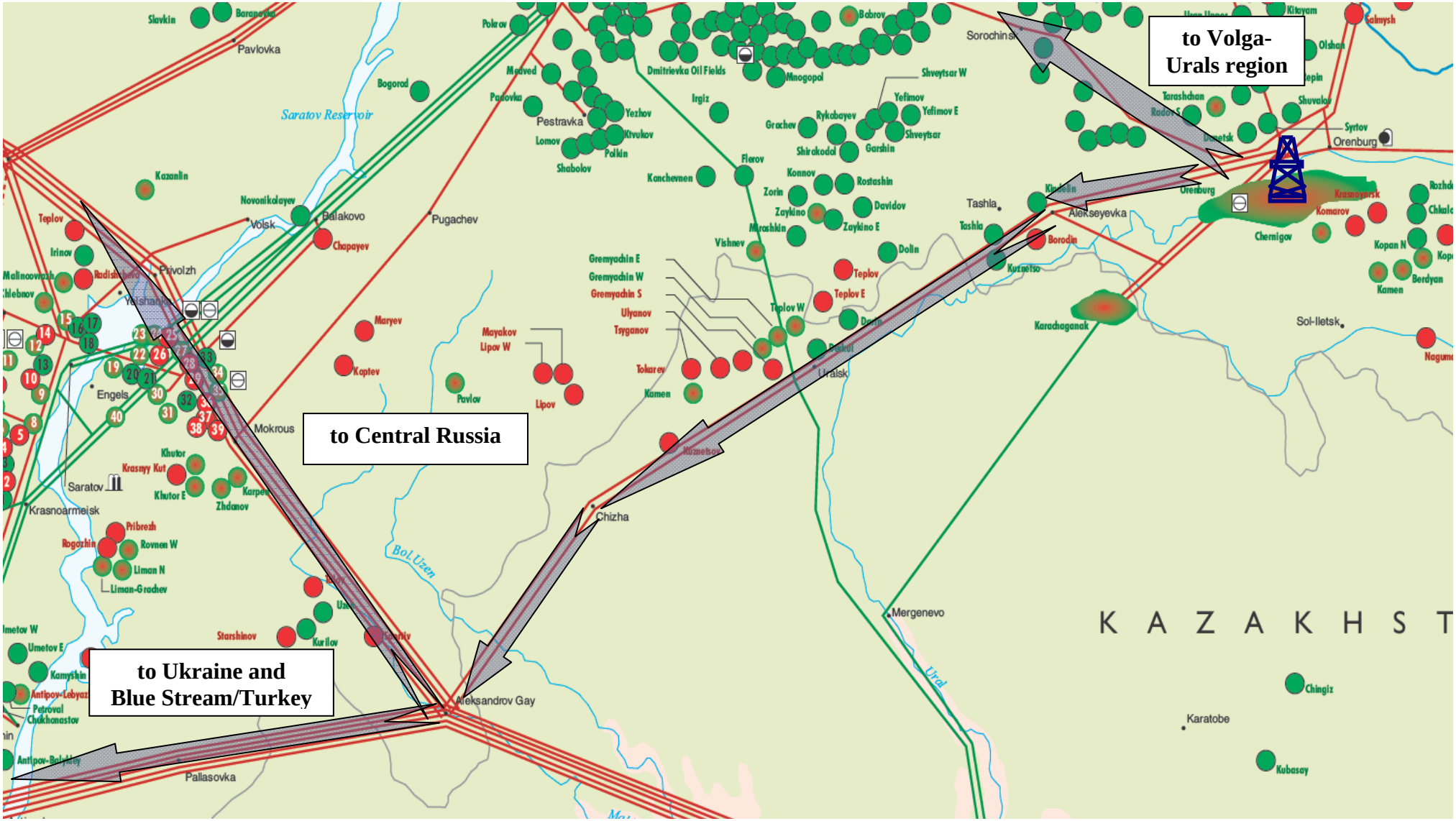
OGPP's production capacity of chemical products is 14 thousand tonnes per year. Products are used by Orenburggazprom for internal purposes, for the needs of the city and the region of Orenburg and are sold to customers in the Volga-Urals region of Russia and to Northern Kazakhstan. Construction of polyethylene and polypropylene plants is currently being considered.

The Orenburg Gas Processing Plant currently produces 450 thousand tonnes of propane fraction per year (the design capacity is 550 thousand tonnes per year) and 400 thousand tonnes of ethane fraction per year. The feedstock for production comes from the helium plant of Orenburggazprom.

System for Transportation of Gas Produced by Gazprom Dobycha Orenburg

Dry stripped gas from the Orenburgskoye field is supplied to the Unified Gas Supply System (UGSS) through the Soyuz, Orenburg-Novopskov, Orenburg-Samara and Orenburg-Zainsk pipelines. Gas from the field is primarily supplied to the domestic market.

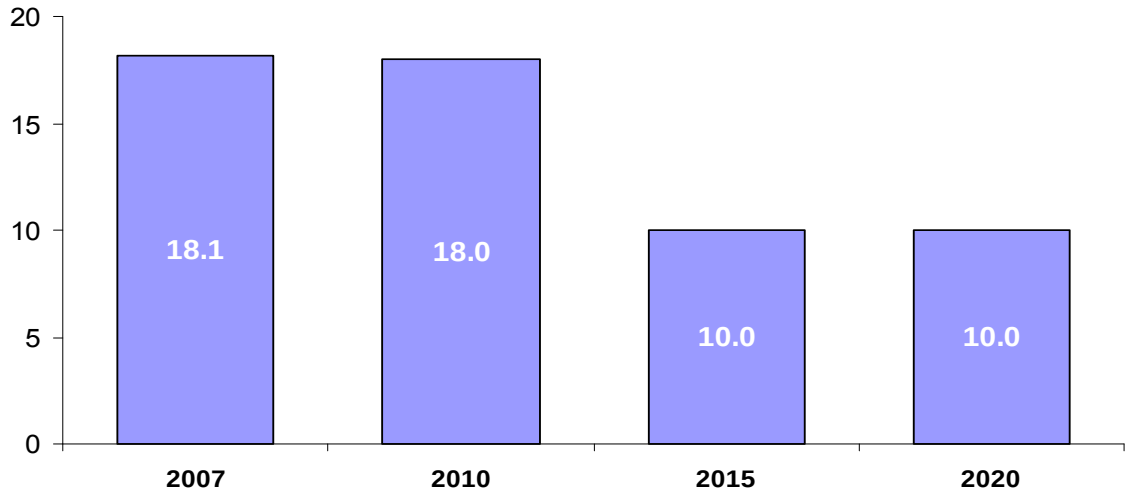
Map 1. Transportation routes for gas produced by Gazprom Dobycha Orenburg



Production Potential of Gazprom Dobycha Orenburg

In the period to 2010, the production level of 18 bcm will be maintained due to the commissioning of GBS-3. However, after 2010 the Orenburgskoye field will show further production decline. Given considerable reserves of the field, the company is expected to maintain production from the field at the level exceeding 10 bcm until 2020.

Figure 4. Production outlook for the Orenburgskoye field, 2007 to 2020, bcm



Source: RPI research

New Capital Investment

The principal provisions of Orenburggazprom's «Strategy for Prospective Development until 2010» are as follows:

1. Production

• Maintaining the production potential of wells through well stimulation, commissioning of new GBS, squeeze cementing, liquidation of saline deposits;
• exploration and development of new fields;
• development of oil and gas condensate deposits of the Orenburgskoye field;
• geophysical studies;
• drilling of new exploration and production wells

2. Processing and gas chemical production

Diversification of the product range, including
• reconstruction of helium units of the Helium Plant to increase ethane production;
• construction of polyethylene and polypropylene plants;
• reconstruction of the propane and butane unit of the helium plant.

In addition, Orenburggazprom is currently exploring the possibility of supplying feedstock to the Orenburg Integrated Gas Chemical Plant from the new oil and gas fields of the Orenburg region

that have potential reserves of about 2 billion tonnes of oil equivalent. The company estimates that, taking into account the potential of these new fields, there is high probability of maintaining annual production at the level of 20 bcm of gas and more than 6 million tonnes of hydrocarbon liquids from 2010 to 2030.

Capital expenditures required to support gas production from currently developed reservoirs of the Orenburg field for the period from 2008 and 2020 are estimated at USD 430 million.

Outlook for Gas Price

In the period from 2000 to 2007, Orenburggazprom's wellhead gas price has been at the level of about USD 20 per 1,000 m^3. Capital investments were primarily made in the 1970s and have left their payback period behind. Therefore, there was no considerable increase in production cost in the 1990s.

Given that the production rate will decline almost two-fold by 2020, production costs can be expected to grow due to lesser economies of scale. Other important drivers behind production cost growth will be new capital expenditures in workover of current well stock, new phases of GBS construction and inflation in respect to such components of production cost as wage level and cost of energy.

Table 1. Cost-plus* to the Ukrainian border and Dzhubga (nominal USD per mcm)**

Transportation to Ukraine	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Wellhead price	20	20	21	21.7	23	24	26	28	31.9	31.9	33	34	35	36.2
Transportation via Russia	10.0	11.3	12.7	14.0	15.1	16.0	16.8	17.7	18.2	18.7	19.3	19.9	20.5	21.1
Kazakhstan transit (380 km),	5.3	5.3	5.3	5.3	5.7	5.9	6.1	6.2	6.4	6.6	6.7	6.9	7.1	7.3
COST-PLUS, Ukraine border	**35.3**	**36.6**	**39.0**	**41.0**	**43.8**	**45.9**	**48.9**	**51.9**	**56.5**	**57.2**	**59.0**	**60.8**	**62.6**	**64.6**
Transportation to Blue Stream	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Wellhead price	20.0	20.0	21.0	21.7	23.0	24.0	26.0	28.0	31.9	31.9	33.0	34.0	35.0	36.2
Transportation via Russia	13.7	16.1	18.9	21.3	23.0	24.6	26.0	27.4	28.2	29.1	30.0	30.9	31.9	32.8
Kazakhstan transit (380 km)	5.3	5.3	5.3	5.3	5.7	5.9	6.1	6.2	6.4	6.6	6.7	6.9	7.1	7.3
COST-PLUS, Blue Stream entry	**39.0**	**41.4**	**45.2**	**48.3**	**51.8**	**54.5**	**58.0**	**61.6**	**66.5**	**67.6**	**69.7**	**71.8**	**74.0**	**76.3**

** Wellhead price plus transportation cost excluding VAT and export duty*

***Blue Stream entry point*

The study features similarly structured profiles of other gas producing companies, as well as new gas fields and provinces:
Yamal, Shtokman, Ob-Taz Bay, Eastern Siberia, Russian Far East.

NATURAL GAS PRODUCTION IN RUSSIA

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