

# **REPLACEMENT OF MINERAL RESOURCE BASE - THE TARGET CHALLENGE FOR MATURE AND EMERGING REGIONAL GAS MARKETS OF EURASIA**

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At present European, Asian, South American and North American (the oldest one) markets are the major global markets of natural gas. As for regional gas markets of Eurasia, mature markets of Western and Eastern Europe (including the developing market of South-Eastern Europe) can be singled out; as for Asian-Pacific region – emerging markets of Central and South-Western Asia (Azerbaijan, Turkmenistan, Iran, Pakistan, India) and South-Eastern Asia (China, the Republic of Korea, Japan).

Global gas reserves scarcely changed in 2007, they grew by only 0,05% and by January 1, 2008 accounted for 175160 billion m<sup>3</sup> (according to OGC). The share of natural gas reserves of the leading world countries continues to reduce due to the intensive growth in the countries outside the first ten - Angola, Malaysia, Peru. Last year the maximum reduction of reserves was in Indonesia, Qatar, Papua New Guinea. For the last decade global gas reserves have grown by 31 trillion m<sup>3</sup>, average annual growth accounted for 3% with pace of growth in 1998-2003 – 3,6% and in 2004-2008 – 0,5 %.

The region that experienced the major reduction of reserves is West Europe. It affected the majority of West European countries, except Austria, Germany, Greece and Spain. The Great Britain (reduction by 69 billion m<sup>3</sup> or 14%) and Norway (by 90 billion m<sup>3</sup> and 4%) were the leaders. The total reduction accounted for 5%. According to preliminary estimations, the growth of gas reserves in Russia will account for 670 billion m<sup>3</sup>, which by 2,5% exceeds gas production. Since 2005 the replacement of gas reserves has been exceeding gas production, for the third year in a row.

After the significant growth in 2006 (by 138 billions m<sup>3</sup> or 5%) global gas production has increased by only 0,8% in 2007. This was conditioned by gas production decrease in the Great Britain, Iran and several other countries. Natural gas production in 2007 confirmed the forecasts and accounted for 2858 billion m<sup>3</sup>.

Natural gas production in Western Europe has reduced by nearly 6%. The production in Great Britain has decreased by nearly 8% and has been compensated by only 4%. The production in the Netherlands has reduced by 8% as well (replacement of reserves equals the production); the production in Norway has considerably grown – by 2%, though its reserves have reduced due to field reassessment and writing off.

Russia remains the leader in gas production - 656,2 billion m<sup>3</sup> in 2006 and 654,0 billion m<sup>3</sup> in 2007 (reduction by 0,4% compared with the previous year). The Ministry of Industry and Energy predicts that the production in 2008 will grow by 3% and account for 673 billion m<sup>3</sup>.

Eastern Europe and CIS occupy the second place in the world according to gas production - 850 billion m<sup>3</sup> (Western hemisphere – North and South America - occupy the first place - 939 billion m<sup>3</sup>), Asian-Pacific region is on the third place (363 billion m<sup>3</sup>). Western Europe and the Near and the Middle East produce a little more than 280 billion m<sup>3</sup>. Algeria (94 billion m<sup>3</sup>) produces more than one half of all gas in Africa (sixth place, 146 billion m<sup>3</sup>).

According to the preliminary scenario, primary natural gas consumption will grow in the world energy sector up to 2030 from 2,8 trillion m<sup>3</sup> in 2007 to 3,6 trillion m<sup>3</sup> in 2015 and 4,7 trillion m<sup>3</sup> in 2030. Global gas demand will grow by a average 2% per year (less than 2,6% in 1980-2004).

Gas consumption is already increasing in Western and Eastern Europe, but the major growth is in China, India and some other countries of the region. Annual world gas production will also increase by nearly 1,9 trillion m<sup>3</sup> or 2/3 by the year 2030. The Near East, Central and North Africa (except Russia) are expected to contribute to this growth. Europe is

the only region that will see the reduction of gas production at the completion stage of field development in 2010-2020.

Thus, interregional gas trade between Asia and Europe will continue to develop due to the geographic inconsistency between demand and distribution of resources and reserves, which provide the corresponding production level. According to the refined materials of the International Conference on Gas Resources (USA, Colorado, Vail, 1994), initial total world gas resources are valued at 619 trillion m<sup>3</sup>, the share of Russia accounts for 249, the Near East – 137, Asia-Pacific region – 51 trillion m<sup>3</sup> (fourth place after North America). Possible and probable reserves are valued at 342 trillion m<sup>3</sup> (Russia -173, the Near East – 60, Asia-Pacific region- 34 trillion m<sup>3</sup>).

Main gas consumption regions become increasingly import-dependent. Undoubtedly Europe and Asia-Pacific region will see the major import growth in the world. The import of liquefied natural gas (LNG) will boost as well on the background of global interregional trade.

The Near East and Africa provide nearly 1/3 of the global interregional natural gas export. Europe and the USA receive the main part of export from these regions. Russia is the major regional gas supplier in Europe. In future it is planned to increase gas supplies from Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan through the Russian territory to Europe by constructing a new Pre-Caspian gas pipeline and reconstructing Central Asia – Centre and Bukhara – Ural trunk gas pipelines and also by the participation of Russian companies in gas production projects of Central Asia. However, Russia is capable of rapidly boosting the production and maintaining and even increasing the current export volumes to Europe. Moreover, Russia can start exporting gas to Asia (China, the Republic of Korea, Japan). According to expert evaluations, by 2020 China alone will need 70 billion m<sup>3</sup> of Russian natural gas. The most promising global sources of energy feedstock are Western and Eastern Siberia, the Far East of the Russian Federation.

At present four projects of pipeline laying to China are considered. The first one (Irkutsk – Daqing) is designed for transmission of 30 billion m<sup>3</sup> gas per year. The second one (Urengoy – Lunan), called also Altay, is of 2800km length and throughput capacity of 30 billion m<sup>3</sup> per year. The third project, Sakha, is the longest one, with maximum throughput capacity of 38 billion m<sup>3</sup> per year. The last pipeline, Sakhalin – China, 125 billion m<sup>3</sup> per year, should be completed by 2010. These trunk pipelines are designed to supply 80 billion m<sup>3</sup> of gas per year to China.

Various authoritative sources state that the gas demand in Asia-Pacific region will grow by 2010 up to average 500-520 billion m<sup>3</sup> per year, by 2020 – up to 730-750 billion m<sup>3</sup>, the supplies from regions outside Asian-Pacific region should increase correspondingly up to 170-190 and 410-420 billion m<sup>3</sup>.

The identified trends in regional gas production and consumption reflect relative resource volumes and their locations regarding main markets (other factors are also considered, including depletion of reserves, development expenses, gas injection into formations to increase oil recovery, transmission safety, geopolitical considerations). Production volumes will most considerably grow in the Near East, Russia and Africa. These countries will ensure performance of the regional markets in Eurasia.

The forecasted growth of primary natural gas consumption in all industrial branches of Eurasia in the following 20 years will be fully provided for by the existing gas production mineral resource base, though the share of gas in the primary energy will not increase considerably (23% in 2030). In 2020-2030 European OECD will remain the largest mature market (except North American) and South-East-Asian market will remain the largest emerging one.

PGC C: emerging markets; 8. B – emerging markets of natural gas