

ABOUT FUTURE MARKETS FOR NATURAL GAS, CONVENTIONAL AND UNCONVENTIONAL

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(1) Overview

Natural gas comes from both conventional and unconventional gas reserves. Unconventional gas is more expensive and more difficult to extract. At present, the biggest natural gas exporters are Russia (pipeline has) and Qatar (LNG). Shale gas revolution in the USA has caused the drop of natural gas prices in Northern America. Depending on its spread across the globe, it may cause competition between conventional and unconventional gas producers in future. Before shale gas revolution the long term future markets would be driven by the geography of major reserves of conventional gas (see Yegorov & Wirl, 2011). Only 3 countries (Russia, Iran and Qatar) have more than 10% (each) of global conventional gas reserves. However, the major reserves of non-conventional gas are located in different countries, with significant part among former importers of natural gas.

Transport costs are very important for natural gas markets, and they are mostly responsible for the absence of unique world gas price (Yegorov & Wirl, 2010). At present, those prices are regional, with important price gap between Asia, Europe and America, that is not eliminated by arbitrage (Dehnavi & Yegorov, 2012). If shale gas will enter future markets at large scale, it can change this price pattern significantly. Shall we observe more or less competition in future gas markets? This depends both on cost structure for extracting remaining reserves and on strategic behavior of major producers of both types of gas in future.

(2) Methods

Our methodology of analysis is based on consideration of different scenarios with the use of equilibrium (or game theoretical) approach for each scenario. The basic initial driver is the geographical distribution of reserves. While about two thirds of conventional reserves are located in CIS countries and Middle East, major unconventional gas reserves are located in Northern America and Pacific Asia, who import natural gas today. The second crucial factor is the cost curve as the function of global cumulative gas production. Since it is very uncertain (especially for shale gas), we consider both optimistic (many low cost reserves) and pessimistic (few low cost reserves) scenario. The critical level is about \$6-8 per mBtu; most of conventional gas can be extracted and delivered to consumer at cost below that. While the USA has a lot shale gas reserves below this threshold that will compete with conventional gas, Europe is unlikely to produce it at the cost below \$8-10 at large scale. The third factor driving the future market will be behavior of producers. We study both the case of high competition and gas cartel formation.

(3) Results

The first result is driven by geography. There will be less movement of gas between continents than it would be in the case of prohibitively expensive extraction of shale gas. Hence, higher fraction of transport will be by pipeline (at the same continent it is feasible) and the trend towards more LNG might be reversed. We will observe self-sufficiency of American continent, also because adding non-conventional reserves would triplicate the reserves not only of Northern, but also of Southern America.

The major uncertainty will be on Eurasian continent. China will definitely be the future gas market with the fastest growth, but with unclear cost. In optimistic case China may become self-sufficient, and in the longer run Russia will compete for European markets with Middle East (mostly Qatar and Iran). Then Russia is likely to delay its exploitation of expensive Northern shelf, while relatively more gas will come from Middle East, especially from South Pars-North Dome, the largest world deposit of conventional gas. Eurasian gas prices will remain relatively low. In pessimistic case China will delay its expensive shale gas production, and both Russia and Middle East will increase their outputs to satisfy the future Eurasian demand, growing at high rate. While Middle East is likely to have cost advantage, more expensive Russian gas from Arctic shelf will also be demanded, and that cost will determine the future gas price in Eurasia. There will be no pronounced differences in gas prices between Europe and Asia, because most of it will be supplied by pipelines and because LNGs from Qatar will work as arbitrageur.

(4) Conclusions

We show that shale gas revolution will bring substantial changes to the future markets for natural gas. The global distribution of shale gas reserves will diminish reserve disparity across continents, and relatively more trade will be inside continents.

The major uncertainty comes from the future cost of shale gas extraction in China. If it will be low, China will be self-sufficient, like the USA today. In this case there will be more competition in Eurasia, prices will remain moderate and production from more expensive gas deposits will be delayed. In the case of costly shale gas in China the future gas prices in Eurasia will increase. If gas producers will form a cartel, regional prices in Europe and Asia might remain above American also in the long run. America is not likely to influence Eurasian market due to relatively high trans-oceanic transport costs.

References

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