

Sadek Boussena, Catherine Locatelli and Silvana Mima
EUROPEAN GAS MARKET : STAKES AND PERSPECTIVES

Sadek Boussena: Professor at the Grenoble II University, UPMF, Grenoble
Catherine Locatelli: Researcher at « Laboratoire d'Economie de la production et de l'Intégration
Internationale–Département Energie et Politiques de l'Environnement, Grenoble (LEPII-EPE) »
Email. catherine.locatelli@upmf-grenoble.fr
Silvana Mima: Resercheur at (LEPII-EPE)

Overview

Over the last ten years, the world demand for gas has grown rapidly for several reasons : price competitiveness, environmental advantages over other fossil fuels and abundant resources. The rise in gas consumption has been particularly remarkable in the power generation sector. According to POLES model, the Reference case projects the continuation of this trend through 2050 – although at a lower pace by the end of the projection period. It is worth asking how the projected growing market for gas, combined with the decline of gas production in Europe, will affect the outlook of gas supplies to 2050 and what the impacts will be on the security of supply in the European Union.

The POLES model provides a good description of a balancing gas market for the enlarged EU27. It is commonly accepted that projecting global energy trends to 2050 involves considerable uncertainties not only in the supply but also in the demand side.

For example, we will examine:

Uncertainties on the growth of the gas demand: What would be the consequence of a more rapid growth of the price on the gas demand?

Uncertainties on the gas supply: Strategies of the main gas suppliers in term of production and production capacities.

The conditions of gas supplying (Is there a potential competition between the three main gas markets?).

This paper tackles this issue by producing a series of alternative scenarios corresponding to different assumptions on the availability of gas resources, on gas prices, on the strategies of the main gas suppliers in term of production and production capacities. This paper describes the results of these alternative outlooks and describes the impacts of alternative assumptions on these factors, in terms of variations compared to the Reference Scenario.

Methods

In this presentation we will use a systemic approach to attempt to identify the interrelationships between European gas demand and the fundamental realities of the global gas supply situation. The POLES model provides a valuable tool for addressing the above issue. Its world dimension makes explicit not only the linkages between the gas demand growth and the decrease in gas production in the EU, but also the demand for gas in the other world regions and the characteristics of the regional gas markets (e.g. prices, pipeline and Liquefied Natural Gas transport routes between the producing and consuming regions). The dynamics of the model is based upon a recursive simulation process, in which energy demand and supply in each national or regional module respond with different lag structures to international prices variations in the preceding periods. In each module, behavioural equations take into account the combination of price effects, technic-economic constraints and trends.

The POLES model identifies forty seven world regions or countries, with a full description of the energy systems of the European Union and of the largest countries. For each region or country, the model articulates four main modules dealing with final energy demand, new and renewable energy technologies, electricity and other energy transformation sectors, and

primary energy supply. Gas supply profiles in the largest world producing countries are dealt with a discovery process model.

The integration of import demand and export capacities of the different regions are ensured in the international energy market module, which balances the international energy flows. One world market is considered for oil (the 'one great pool' concept), while three regional markets (America, Europe/Africa, and Asia) are identified for gas and coal so as to account for regional differences in cost and market structures. The changes in international prices of oil, gas and coal are determined endogenously in this module. The international price equations take into account the relevant variables associated to short-term adjustments in price levels, such as the Gulf capacity utilisation rate for oil, and to medium and long-term variables such as the Reserve on Production ratio for oil and gas, or the trend in productivity and production costs for coal.

- In this presentation we will use also a qualitative approach concerning the questions of the EU gas market liberalisation and the strategies of the main suppliers (for example development of new gas capacities).

Some Results

The EU gas market is rapidly expanding and growth is expected to continue in the next 50 years. The expansion of gas in the EU is determined principally by the surge of gas use for power generation.

Figure : World gas consumption by region

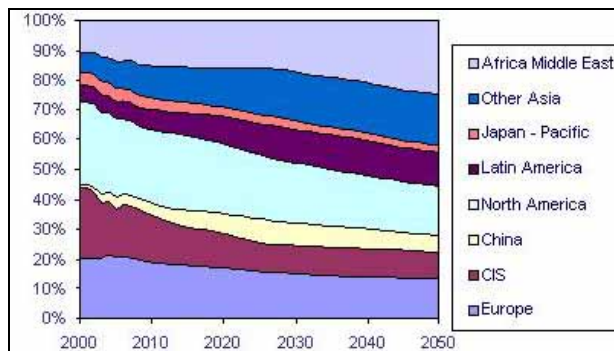
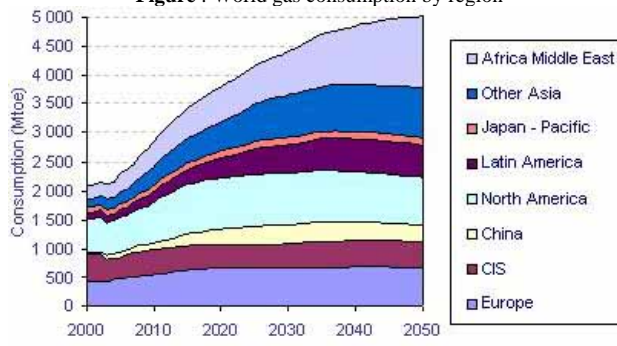
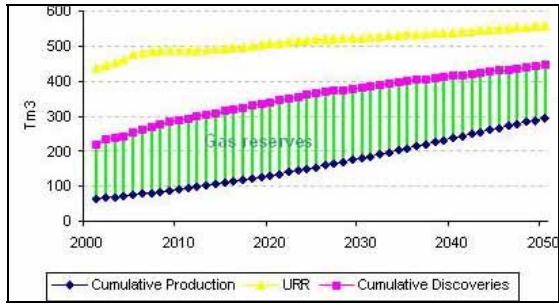
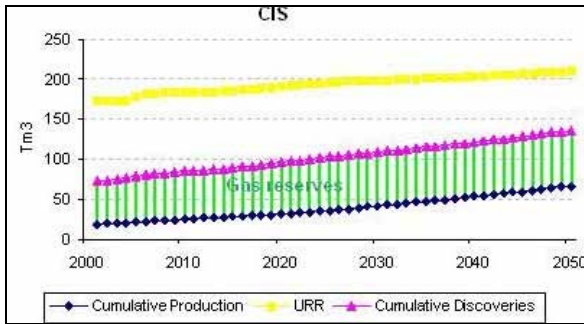
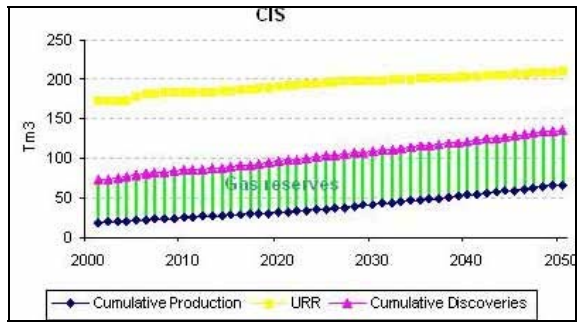
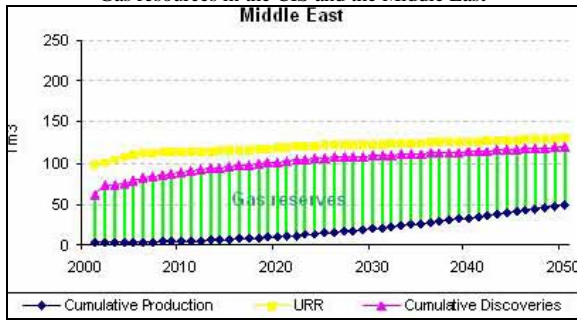


Figure : World gas resources



Gas resources in the CIS and the Middle East



It is worth pointing out that twelve largest gas producers in 2050 will ensure more than 70% of the world's total production. But contrary to oil, the ten largest gas producers in 2050 remain more evenly distributed among the different world regions, although the CIS and Middle East represent more than 50% of their total production.

This outcome may translate into higher supply risks for the EU. These risks could however be limited through different actions as outlined in the EC Green Paper, like the multiplication of gas transport routes, the further integration of the European gas network, and a continuous dialogue with gas producing countries. Long-term contractual LNG supplies are projected to move up but more moderately and from more diverse sources from Africa and the Middle East.

Conclusions

World reserves of natural gas are abundant and expected to increase up to 2050. World gas production is projected to more than double between 2000 and 2050. However, regional disparities in gas reserves and production costs are expected to modify the regional gas supply pattern in 2050: about half of the total gas production will originate from the CIS and the Middle East.

Important uncertainties remain on the EU27 gas demand and supply in the long term. For example, on one hand, the enlargement of the EU modifies the landscape. The question of the penetration of the natural gas in the energy balance is for a "new entrant" an important aspect of their energy policy. On the other hand, the liberalisation of the EU gas market may have important consequences on the strategies of gas producers like Algeria and Russia.