

**International Energy Forum**



**International Gas Union**



**IEF-IGU First Ministerial Gas Forum**

Vienna, Austria 24 November 2008

**The world gas markets going from regional to global**

**Background paper**

## **1 - Introduction**

The 11<sup>th</sup> International Energy Forum was held in Rome, 20-22 April 2008, under the central theme of 'Energy dialogue to respond to global challenges'. Among other issues of importance to the producer-consumer dialogue, the Forum noted the growing reliance of consuming countries on natural gas exports, increasing the interdependence between energy producing and energy consuming countries. The Ministers noted the emerging trend toward globalization in the gas market and encouraged the IEF Secretariat to work with other relevant international organizations to address the key challenges facing the natural gas industry.

This IEF-IGU First Ministerial Forum is an important step forward. To organize this Ministerial forum on gas we could not have thought of a more appropriate institution, IGU, the world's largest international organization for the natural gas industry with more than 100 members covering 71 countries which represent over 95 % of the gas traded in the world. IGU plays the role of the worldwide gas industry spokesman, through cooperation with governments, policy-makers and international energy-related organizations. IEF and IGU share common interest in many energy-related topics and act to promote and enhance a dialogue between natural gas producing and consuming countries.

Indeed, natural gas has become a fuel of choice in many countries. The share of natural gas in the global fuel-mix is increasing. Its 'availability', environmental qualities in the context of climate concern, economic and efficiency advantages and its expanding infrastructure are the main reasons behind this increasing importance of natural gas.

Gas reserves are sufficient to meet future demand - subject of course to adequate and timely investment to bring them to market - ; they are even larger than they were 20 years ago despite two decades of increasing global consumption. The natural gas reserve to production ratio is of more than 60 years at current global demand.

The power generation sector is - and is expected to continue to be - a driving force of natural gas demand. Gas-fired power generation plants are more flexible in operation, higher in energy efficiency and more environmentally-friendly.

Plus, natural gas can combine with less flexible and less reliable renewable energies to provide optimum solutions for power generation, heating and cooling.

Clearly, natural gas demand is expected to continue growing in the future – although at a slower pace - in traditional markets and newly emerging consuming countries (Middle East, China, India) on the back of expanded infrastructure, technological innovations, and the liberalization of energy markets.

## **2 – Outlook for natural gas trade in the major economies**

Natural gas consumption and trade have been growing at a rapid pace, during the last two decades. Demand for natural gas in the major economies of the world is growing on the back of new investments in the gas-fired power generation and increasing environmental concerns.

Global gas demand grew by 2.6 % per year over 1980-2006. However gas demand has been affected in recent years by increase in prices compared to coal and other fuels, rising by only 2.3 % between 2000 and 2006; and is expected to grow by only 2.1 % over 2006-2015. The power sector is the main driver of gas demand, especially in developing countries. New power stations are projected to absorb over half of the increase in gas demand over the projection period. The growth is expected to come mainly from non-OECD countries particularly the Middle East (due to ample supply availability), China and India. Middle East countries are emerging as a centre of demand growth, underlining the need to improved energy efficiency and to price reform. In Asia demand is growing rapidly, as gas is gaining market share from coal in the power generation.

Except in the OECD, global natural production is expected to expand, mainly in the Middle East, Africa and Latin America. For major OECD countries (US, EU, Japan) and emerging economies (India, China), the gap between local production and demand is widening, resulting in an increased dependence on imports. Natural gas international trades are therefore increasing faster than demand, experiencing an era of sustained growth, with inter-regional trade projected to grow from 13 % to 17 % in 2015, underlining a clear trend towards globalization in the gas market.

A growing demand in a context of market liberalization, an increasing number of buyers and sellers and new investment along the natural gas value chain, have fostered natural gas exchanges and LNG trades in particular.

Long term investment projects are planned or on the way, underlining a long term position of gas in the energy- mix.

As natural gas remains the largest used fuel for power generation, links with the electricity markets are growing in many parts of the world, natural gas-electricity convergence is increasing and many power generators are adding natural gas to their portfolio.

Advances in technology all along the natural gas value chain have served as major triggers for the development of natural gas markets; increased natural gas reserves, innovative methods in liquefaction plants, shipping and regasification. Economies of scale have also helped enhance efficiency in LNG plants and shipping by increasing the capacity.

These important changes in the gas markets brought new challenges to trade players: an increased interdependence between producing and consuming countries. Gas importing countries are increasingly dependent on import, which is one side of the coin; the other side is that exporting countries are becoming increasingly dependent on the revenues of exports. There is nothing wrong with increasing interdependence between producing and consuming countries, provided we are able to foster its potential as a cohesive factor rather than a source of tension and anxiety.

### **3 - Natural gas regional markets, main trends**

The three natural gas regional markets are changing. The EU is undergoing a liberalization process, the US is becoming an important importer and in the Asian market India and China are emerging as new LNG importers. Regional gas markets become more integrated as LNG trade is expanding. Inter-regional natural gas trade is expected to grow from 435 bcm in 2006 to 588 bcm in 2015, a growth of more than 35 % over the period. Most of the increase in the exports will come from the Middle East and Africa, mainly as LNG, Russia and the Caspian being the other main exporting regions.

(1) - EU market: The European market is undergoing structural changes resulting from the liberalization process that is taking place. European gas demand has been covered mainly by pipeline gas. Decline in domestic production, increase in demand, combined with deregulation of European energy markets have created new opportunities for LNG. In 2007, LNG imports represented 13 % of total gas needs in Europe and are expected to increase to 30 % by 2015-2020.

Cross border pipelines and cross border trades have grown slowly in the EU. Gas pipeline investment is relatively low compared to North America. Several projects to expand internal cross-border capacity in Europe were announced, many proposals remain at the planning stage. An integrated gas transportation network would reinforce both security of supply and gas transport efficiency in the region.

(2) - US market: The US gas market is characterized by a growing demand, an extensive pipeline grid and numerous options for transportation and trading. In 2007, US consumption grew by 6.5 % compared to 2006. This consumption was largely met from domestic sources and imported pipeline gas from Canada. US LNG imports (mostly short term contracts), although they represent only 3 % of the natural gas consumption, are in absolute term, increasing fast, they reached a record high of 22 bcm, in 2007, 32 % higher than the previous year and they are projected to grow significantly on the back of declining domestic production and expected decline of exports from Canada. The US market is open, transparent and growing and has therefore attracted in recent times a large volume of spot and short-term contract LNG from

diverse exporters. 51 pipeline projects have been completed in 2007 adding 155 bcm per year of pipeline capacity, 18 % higher compared to 2006 and almost double those of 2005.

(3) - Asia-Pacific market: the largest LNG importing region. Japan is the major LNG importer. LNG has been mostly traded under long-term contracts. India and China the latest new emerging LNG importers, are expected to become important LNG importers and will certainly change the dynamics of the region. An increase in the number of LNG importers in this region may create more opportunities for the spot transactions.

In the three regional markets, cross-border and inter-regional trade is expected to continue to grow, as most countries become increasingly dependent on imports, subject that the adequate investment all along the natural gas value chain, are made in a timely manner.

#### **4 - Investment**

If natural gas reserves are amply available, huge investments are needed to develop and process gas resources, transport them to market, store and finally deliver the gas to consumers. Timely and accurate investments all along the supply chain are important for the efficient and secure functioning of markets.

The most recent estimates indicate that we may need a total of \$ 4.2 trillion investment in the gas sector up to 2030. On an annual basis, this amounts to almost \$ 170 billion investment. This staggering amount of investment is needed in a context of a huge cost escalation and a shortage of skilled labour. Plus, the above mentioned projections are based on a number of assumptions surrounded by large uncertainties. The rate of economic growth in the next decade is a key factor in determining the increase of energy and gas demand. The difference in investment resulting from existing scenarios can be enormous. The IEA calculations show that in a 'high growth scenario' the needed investment in the gas sector would increase by \$ 83 billion. Energy policies and its potential impact on the global energy and gas demand is another important uncertainty when estimating investments, as different scenarios could result in substantial variations. Energy conservation and energy efficiency policies could dampen fossil fuel demand and lower gas investment by over \$ 250 billion. Deciding on future investments projects in this context is obviously highly risky, thus underlining the need for a frank and honest dialogue between producing and consuming countries on what should be done to unpack and reduce key uncertainties that hamper investment.

#### **5 - LNG trades, changing dynamics**

LNG trades are witnessing rapid changes, with increased volumes, new suppliers and new importers entering the markets, increased short-term and spot trade and a more transparent US market with a gas-gas competition. The LNG trade is growing and globalizing very fast,

driven by improving cost competitiveness and proved record of reliability. LNG is also becoming increasingly flexible with diverse suppliers, increasing number of customers and greater market access.

During the period 1990-2006, world gas consumption grew by 42 %, world gas trade by 62 % and LNG trade by 191 %. The share of LNG trade in world gas consumption grew from less than 4 % to 7 % and its share in total gas trade grew from 14 % to 25 %.

Major expansion is underway both in liquefaction and regasification facilities. Some 80 bcm/y of liquefaction capacity is planned to be added by 2009, representing a 30 % increase and taking the global liquefaction capacity to 330 bcm/y. Another 60 bcm increase in the liquefaction capacity is projected by 2012 bringing the total capacity to close to 400 bcm. A 180 bcm is projected to be added in regasification capacity during the next two years expanding the global capacity by a third to more than 700 bcm/y.

New LNG importers are entering the market, the case of China, India and Mexico. Argentina and Brazil are expected to start receiving LNG in 2008.

Traditional LNG projects were underpinned by long-term sale and purchase contracts. More recent projects have been endorsed with new business models: upstream stakeholders purchasing and marketing output through capacity acquisition in regasification terminals or direct sales to buyers. These flexible deals are underpinning forecasts of more spot/short-term sales.

As the gas trades become more global, producers will be looking at diversifying their markets to ensure security of demand. In order to secure demand and create value, exporters are investing downstream of the gas chain value. Consumers are also diversifying their supply between different sources and also between pipeline and LNG to ensure security of supply. With the aim of securing stable and reliable sources, international companies are developing gas reserves in various parts of the world and getting involved in downstream joint venture projects in producing countries. National companies are acting 'internationally' trying to expand into downstream markets (case of Petronas, Sonatrach and Qatar Petroleum). Different business models are emerging for LNG terminals.

## **6 - The world gas market, going global?**

Gas markets have been regional until recent years, but the trend is moving toward globalization with interactions becoming more common as new supply routes are developed. The expansion of LNG trades and the flexibility offered by sea transport is the main driver of this emerging globalization in the gas market. LNG-short term contracts and spot transactions are going to be more and more important.

More producing and consuming countries, growing dependence on imports in major OECD countries, increasing volumes of spot and short-term LNG, encourage global interactions.

Flexible LNG (spot and short-term) played a greater role in inter-regional market balancing in 2007. Liquidity on European hubs has grown considerably; such liquidity promotes more flexible market response, more transparency and more accurate price signals. Increasing flexibility in trades and multiple routes enable wider exchanges of gas. LNG portfolio and secondary marketing strategies are increasing short-term transactions at the end of the chain.

From a straight-line-chain model LNG trade is evolving to the multiple-destination or flexible network model.

Major expansion is underway globally in regasification capacity well in excess of liquefaction capacity. This excess capacity could be a source of flexibility. As long as short-term demand continues to fluctuate in various regional markets, flexible LNG supply is expected to be diverted from one market to another depending on regional demand.

So what are the implications of a globalizing LNG sector on the global natural gas market?

Will a liquid spot market for LNG develop?

How the growing US LNG market will impact the Asia-Pacific?

How the gas pricing will develop and will the prices of the three regional markets be linked?

What are the potential impediments to the global market development?

These questions and many others related to the evolution of the gas market and the challenges it faces, will be discussed by the two panels.

But clearly, a global market is emerging, gas business is moving steadily toward open markets. It is already noticeable in the LNG industry, expanding and changing rapidly, connecting the three long-established regional markets. Grid interconnection, advances in technology, the emergence of the US as a potential major LNG importer and the entry of emerging economies such as China and India is changing the natural gas market architecture. Increasing diversity of suppliers and customers provides a flexibility that ensures gas to where it is needed when it is needed.

## **7- Increased interdependence, market transparency and enhanced dialogue**

Energy security is a major issue, security of supply for consumers and security of demand for producers. Natural gas trade history has proved to provide reliability and security to both parties. The gas business depends on shared interests and mutual trust.

In recent years we have seen more cross interaction between gas consumers and producers, adding interdependence between them. Natural gas exporters are entering activities in consuming countries such as receiving terminals, LNG transportation and distribution networks, while some gas importers are being involved in upstream gas field development, natural gas transportation and liquefaction plants. This cross interaction between exporters and importers guarantees security of supply for the consumer and security of demand for the producer. Plus, going beyond the buyer-seller relationship, this enables the two parties to jointly explore and develop new opportunities for partnership and cooperation and to identify potential synergies.

Natural gas trade will continue to be a major cooperation vector, securing long term dialogue between producers and consumers, focusing on practical ways to develop concrete actions, in particular in the areas of improving the transparency in oil and gas markets and investments framework in the oil and gas industry.

When it comes to improving the transparency in the oil market a lot has been achieved through the Joint Oil Data Initiative (JODI) which is coordinated by the IEF Secretariat. The IEF in Doha called for extending JODI to 'other sources of energy'. 'A priori', natural gas seems to be an obvious candidate for extension. As for oil, gas market players would benefit from more transparency on prices and flows. The IEF Secretariat is currently investigating the feasibility and practicality of extending JODI to natural gas in order to improve the transparency in the gas market. However we should not expect any quick and spectacular results from this exercise, natural gas markets are much less transparent than oil markets and there are significant issues of confidentiality of data to be addressed. The IEF-IGU First Ministerial Forum can be an important step in this regard. The panel in session 1 will discuss the relevant questions: would a mechanism of gas data reporting similar to JODI enhance gas market transparency? What are the barriers to achieving this goal? And how can this issue be addressed? The IEF Secretariat would welcome any guidance on the subject.