EUROPEAN PARLIAMENT

DG INTERNAL POLICIES OF THE UNION

Policy Department Economic and Scientific Policy

# EU Gas Markets

## Workshop, Brussels 10 October 2006

## Report

**(IP/A/ITRE/FWC/2005-60/SC3)**

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# Contents

# PART I Summary of proceedings

**(Produced by EASAC on behalf of the European Parliament, November 2006)**

## Workshop summary

On 10 October 2006, the European Parliament Committee on Industry, Research, and Energy hosted a workshop entitled "The European Gas Markets—Price-setting, structures, and future prospects." The aim of the workshop was to provide background information on EU gas markets and to give advice on important current issues facing them. Eight speakers, with diverse backgrounds ranging from academia to business, spoke on these topics. MEP Lena Ek chaired the workshop.

The speakers of the workshop spoke on three themes: the structure of European gas markets; gas pricing and related issues; and the appropriate regulatory role for national and European governments. Some of the main issues raised were:

- European gas markets are going through a time of unprecedented change. While demand for gas continues to expand, EU supplies are dwindling, resulting in an ever-increasing need for imports: by 2020 it is estimated that there will be a 150 to 230 billion cubic meter supply gap. New investments in the infrastructure needed to bring gas to Europe are urgent.
- At the same time, the future direction of the EU gas market is unclear, making gas companies hesitant to undertake the very investments that Europe requires. Long-term contracts have provided the basis for most of Europe's imports up until now, but whether policy makers continue to approve of their use remains an open question. Moreover, the regulatory environment for promoting competition is not yet in place. Establishing the framework for enforcing existing Gas Directives and promoting the efficient transportation of gas across Europe is a pressing need.
- Competition itself might stifle large investment projects if different market players cannot sufficiently co-ordinate their activities. On the other hand, if competition is not properly managed, an unregulated market might produce a few dominant companies, also stifling investment. Evidence of this possibility comes from the UK.
- At the same time, market developments offer exciting possibilities for the future. As Europe continues developing its gas exchanges, prices may fall substantially in line with production costs. Liquefied natural gas, while currently a small part of the European gas market, promises to increase in importance and could possibly aid the creation of a European, or even global, gas market.
- Europe will certainly not have an integrated and competitive gas market by 1 July 2007, as the EU Gas Directives mandate. Intelligently examining how to change the status quo is crucial, since the liberalisation project offers too many potential benefits to consumers to give up.

# 1. Introduction

The ITRE Committee wished to continue its considerations in the energy field by debating the parallel issues of price-setting in the gas markets within the EU single market and hence on 10 October 2006, hosted a workshop entitled "The European Gas Markets—Price-setting, structures, and future prospects."

These proceedings are the summary of the points made by the speakers at that workshop. The briefing papers prepared by the speakers are attached in the annex and copies of the slides used during their presentations may be found on the European Parliament intranet.

The speakers were players in the gas markets, from industry and consultants to consumers and regulators. The views presented at the workshop and in this proceedings report are the views of the individual speakers. EASAC was contracted to organise the workshop.

The speakers were:

| | |
|---|---|
| *Aad Correljé* | Delft University of Technology, Professor at Faculty of Technology, Policy and Management |
| *Ralf Dickel* | Energy Charter Secretariat, Director for Transit, Trade and Relations with Non-signatories |
| *Bob Handley* | Gas Strategies, Senior Associate |
| *Alexandre Clauwaert* | Suez, Vice-president, corporate strategy & development |
| *Michael Gillis* | Eurogas, Head of Internal Affairs Taskforce |
| *Thomas Briggs* | BP, Regulatory Affairs Advisor, Gas, Power & Renewables |
| *Nina Grall* | The European Regulators Group for Electricity and Gas (ERGEG), Gas Department |
| *Allan Asher* | CEO Energy Watch (UK energy consumer council) |

## 2. Structure of the EU gas markets

*Aad Correljé* gave an introduction to gas market structure, and several other speakers also gave useful background information. Key points included:

- Europe is in a transition period between state-owned gas monopolies and a fully integrated, competitive gas market.
- The gap between Europe's demand for gas and domestic production is currently large, and will continue to grow.
- New investments are vital for maintaining security of gas supply.
- Co-ordination is important in achieving necessary investment levels.

Correljé outlined how natural gas production requires three main stages.

- First, producers extract gas from the ground.
- Second, gas travels through pipelines to the vicinity of consumers.
- Finally, retailers take gas from pipelines and sell it to end-users.

Traditionally, state-owned monopolies were the only gas companies in the EU. These companies controlled all aspects of the supply chain within their borders. The EU Gas Directives of 1998 and 2003 seek to create a Europe-wide gas market in which consumers can choose among competing suppliers and different companies produce, transport, and sell gas.

Gas produced in the EU is in steady decline, while demand for gas will continue to increase for the foreseeable future due to its relative cheapness and environmental friendliness. According to Bob Handley, however, demand growth will be uneven. In most markets where gas is sold to end users, the markets for residential, chemical feedstock, commercial and industrial uses are growing at less than the rate of GDP. The electricity generation market is the only gas consumer with the potential for significant growth.

Michael Gillis explained that this combination of factors means that Europe now depends heavily on foreign producers for its gas supplies, notably Norway, Russia, and Algeria. The EU already imports more gas in absolute terms than any other major world region. Moreover, import growth in the EU will exceed that of all regions except China and India in the next fifteen years. In the year 2020, it is currently estimated that there will be a 150 to 230 billion cubic meter supply gap (the difference between demand and currently contracted or prospectively contracted supply). To put this figure in context, large new pipeline projects can move 30 billion cubic meters of gas per year. According to Gillis the problem is not available supply - global gas reserves are easily large enough to meet global demand - but lack of transport capacity.

Correljé believes that one of the biggest challenges facing the European gas market is to undertake the investment needed to maintain and build infrastructure that will deliver gas from producers to consumers. Providing the market structure conducive to these investments is a challenge. Gas producers and transporters face inherent uncertainty from the consumer market about demand and price. Furthermore, gas investments are specific to a geographical location and to a particular purpose. They also require large up-front costs, and take a long time to complete. This, combined with supply chain risks, makes co-ordinating the market as a whole important. Without proper co-ordination, investment will not reach necessary levels.

Two primary means exist to achieve co-ordination: either the market provides sufficient information, liquidity and flexibility to reduce these investment risks; or alternative means of co-ordination are required, like vertical integration (meaning that one company controls production, transit, and consumer sales) and long-term contracts in which companies' secure guaranteed prices and quantities for their products over many years.

In short, Correljé's point was that striking a balance between competition and co-ordination is important, and that Europe would benefit from a more sophisticated regulatory approach that recognizes companies' need for some market power when undertaking large investments under uncertainty.

Finally, liquefied natural gas (LNG) provides an alternative to standard gas, and is forecast to make up an increasing share of total gas supplies in Europe. The LNG supply chain starts with gas extraction, and continues with liquefaction, shipping, and re-gasification. LNG offers more flexibility than traditional natural gas because it does not rely on pipelines for transportation. It therefore allows for a more diverse range of suppliers. As of now, however, LNG remains a small part of the overall gas market.

# 3. Pricing

*Ralf Dickel*, *Bob Handley*, and *Alexandre Clauwaert* discussed the pricing of gas. Key points included:

- In the past, long-term contracts priced most gas. They continue to be the dominant means of pricing imported gas.
- Long-term contracts are a potentially important instrument for maintaining a stable gas supply during the current period of uncertainty.
- As gas markets become more competitive, trading should determine gas prices.
- After liberalisation finishes, the price of gas has the potential to be substantially lower than it is today.

## 3.1. The structure of long-term contracts

Even though the EU is currently importing increasing amounts of gas from outside its borders, most EU countries have a long history of importing gas from other European countries. Only a few countries (for example, the UK) ever had significant amounts of domestic production.

Dickel and Clauwaert explained that, historically, long-term contracts (LTCs) dominated the pricing of gas imports. Today, LTCs price 90% of EU gas imports. LTCs first arose over forty years ago as a means of pricing gas produced at the super-giant Groningen field in the Netherlands. LTCs work well for both sides. They allow exporting countries to maximise their income from selling a finite resource and to finance the necessary production and transportation infrastructure. For importers, LTCs ensure secure supplies and the marketability of gas.

According to Dickel and Clauwaert, LTCs have the following features:

- The export price at the border of the exporting country is based on the maximum price that gas consumers are willing to pay taking into account the price and quality of alternative energy sources (replacement value principle).
- The price actually charged at the border of the exporting country is the maximum price that gas consumers are willing to pay reduced by the costs of bringing the gas from the export point to the customers in the importing country (net back principle).
- The pricing provisions can be adjusted by the parties at regular intervals to follow market developments.
- LTCs obligate gas buyers to purchase a minimum volume of gas and gas suppliers to provide reliable quantities.

In practice, most LTCs explicitly link the price of gas to the price of oil, its primary substitute.

## 3.2. Long-term contracts and competition

Dickel emphasized that LTCs are not in themselves incompatible with competition. For example, recent LTCs to the UK from Norway and from the Netherlands use UK spot market gas prices instead of alternative fuels in the price formula. Nevertheless, the impact of liberalisation on LTCs is unclear. Existing contracts will certainly remain in place and be observed; however, the attitude of the EU to future long-term import contracts may cause concerns for gas exporting countries.

Dickel argued that a clear commitment by the EU to the continued use of LTCs for the import of gas would signal to countries like Russia that gas market liberalisation will not increase their risk of committing gas to the EU market and will give them the necessary security to make the infrastructure investments needed to meet anticipated demand growth.

## 3.3. Competition and pricing

In contrast to the other speakers, Handley focussed on how competition would change the determinants of gas prices. He explained that in competitive gas markets, trading determines the price of gas (as opposed to formulas in LTCs). The UK has already reached this stage, with gas prices determined on the National Balancing Point, a gas exchange. Gas supply costs, demand for gas, and the balance between supply and demand drive prices on gas exchanges.

Currently, most EU countries are at an intermediate stage in which some limited price competition arises from small suppliers slightly undercutting dominant incumbents in local markets. The speed at which these countries move to a system of hub pricing will depend on the pace of liberalisation. Handley's firm Gas Strategies predicts that hub pricing could dominate in around 5 years given a continued impetus towards market liberalisation.

Future gas supply costs have the potential to be quite low. Gas Strategies estimates that the long-term marginal cost of gas supply (LTMCS) for the quantities required by the EU are around $2.50-3.00 per million BTU, substantially lower than the current price of gas. If prices are set by gas on gas competition on exchanges, then the price of gas could be expected to fall towards the LTMCS. The completion of several pipeline projects into the EU in the next five

years as well as development of liquid natural gas (LNG) re-gasification terminals will pressure prices towards the LTMCS. However LNG also opens the opportunity for gas prices in America to influence gas prices in Europe through arbitrage tending to increase prices somewhat.

### 3.4. Other pricing issues

Handley pointed to a few other notable features of the gas pricing system. End-user gas prices show more variability across the EU than do wholesale gas prices. For one, taxation differs markedly across different countries, meaning tax harmonisation has a long way to go. Also, smaller users impose higher transportation costs on suppliers, so they get charged more.

Gas sold to the electricity generation market competes with coal, the primary alternate fuel. All other things being equal, the volume of gas burnt for power generation would depend mainly on the price of gas coal and $CO_2$. Gas has an advantage over coal as it emits less $CO_2$ per unit of electricity generated; however, future movements in these prices are difficult to predict.

## 4. Regulatory issues in the EU gas market

*Michael Gillis*, *Tom Briggs*, *Nina Grall* and *Allan Asher* spoke on regulating the EU gas market.

Gillis and Grall suggested several ways of improving the current situation. These included:

- Not implementing further legislation until the current legislation is properly enforced through a coherent regulatory framework.
- Improving market integration through mandating co-operation across national transmission grids.
- Continue pursuing the unbundling of transmission grids from gas retailing.

Briggs focussed on how to regulate liquid natural gas facilities. He concluded that:

- Leaving European liquid natural gas facilities unregulated as in America was not necessarily appropriate given the lack of robust competition and well-developed cross-border transmission networks in Europe.
- Traditional regulatory solutions, while helpful in theory, might not have much effect in the liquid natural gas market.

Allan Asher pointed out several potential dangers with the current regulatory approach:

- Without strict merger regulations, competition might result in a few dominant companies controlling gas markets and undermining consumer welfare.
- Greater transparency and third party access to new investments are necessary to ensure market liberalisation works in consumers' interest.

### 4.1. Promoting competition and co-operation

Observers concur that most EU-15 countries will not have fully competitive gas markets by 1 July 2007, although EU legislation has set this date as the target for achieving liberalisation.

Gillis said that rather than come up with a new set of measures to correct problems, the European Parliament should seek fully to implement existing legislation, which is still highly ambitious. He maintained that the focus should be on achieving further European market integration, but that constructing an effective regulatory framework presents a challenge. From suppliers' and users' perspectives, rules that ensure non-discriminatory access based on appropriate tariff structures and capacity allocation and congestion management rules to optimize use of existing infrastructure are essential. System users must be able to move their gas through networks quickly and efficiently, on the basis of market signals.

Gillis also pointed out that while detailed technical discussions on topics such as quality and inter-operability take place away from the political limelight, they are nevertheless crucial for the development of a single EU gas market. Finally, a more coherent, pan-European approach to market regulation, as opposed to the current situation in which different countries have different regulations, would make the transition to a competitive single market smoother.

To hasten the realization of a competitive gas market, Grall recommended that policy makers fill regulatory gaps with respect to cross-border activities and enforce co-operation across national transmission grids. The current legislation does not empower national regulators to take steps to improve cross-border gas trading. In practice, when trade difficulties arise between two countries, neither of the respective national regulators can resolve the problem.

Unlike Gillis, Grall endorsed new legislation that would explicitly mandate the co-operation of European transmission grid operators to promote greater gas market integration within the EU. The current system of fragmented national operators cannot provide a truly European transmission network capable of supporting a competitive market.

Grall also suggested prioritising ownership unbundling of the transmission grid from the other components of the gas supply chain. In many situations, gas is available for trade at the border between two countries, but trade does not take place since national companies that control both transmission and end-user supply have little incentive to compete. Furthermore, in the UK, which has undergone ownership unbundling, the transmission service operator actively contributes to competition and efficient system use through, for example, buying back capacity.

## 4.2. Regulating LNG facilities

While most speakers dealt with issues relating to the gas market as a whole, Briggs addressed the more narrow—but important—issue of regulating liquid natural gas (LNG) re-gasification facilities. Although the regulations governing the traditional gas supply chain are relatively well defined in the European Gas Directives, those governing LNG facilities are not. Establishing a clear regulatory framework for LNG facilities is an important factor in stimulating investment.

One precedent for the regulation of LNG re-gasification facilities comes from America. There, the federal energy regulator explicitly exempts them from regulated third party access provisions. The rationale is that the US has an efficient grid of pipelines that allows gas to move anywhere in the country; supplier competition is robust; and attracting new gas imports is better served without regulations.

These arguments are less appropriate for the European context, in which significant obstacles exist for transporting gas and competition. If exemption from regulation is not justified, the issue becomes how to regulate LNG facilities. One option is to require LNG facilities to hold open capacity for new entrants (such as in Italy, where the required share is 20 per cent). However, the LNG spot market may lack sufficient robustness to utilize open capacity, making the regulation equivalent to a tax on LNG facilities and undermining investment incentives.

Briggs pointed out that another possibility is to hold open capacity in LNG facilities, as well as transport facilities, for independent local distribution companies. This kind of regulation would enhance competition by creating a rival firm to the incumbent. New LNG suppliers would in turn have the choice to sell among alternative buyers, leading to a more vigorous and diverse LNG marketplace.

### 4.3. Caveats about the regulation of competition

The first three speakers on regulation looked at ways in which policy-makers can bring about competition. By contrast, Asher used his presentation to undermine the idea that achieving full market opening would inevitably benefit European consumers. He used the UK, the country that has come closest to meeting the conditions of the Gas Directives, as an example of how competition can actually undermine rather than promote consumer welfare.

By 2002, the fact that North Sea production was in precipitous decline was well known, and yet the regulatory action and price signals necessary to address the situation did not come until 2005, three years too late. Ten thousand jobs have been lost as a result of this failure, gas prices have increased by 80 per cent and electricity prices by 50 per cent. One to three million households live in fuel poverty (defined as homes that spend over 10 per cent of income on fuel), a figure that will raise to 4 million by 2010 if current circumstances prevail.

Asher argued that, although deregulated, the UK does not have a truly competitive energy market. Over half the gas produced in the UK comes from a small number of vertically integrated firms. Upstream production is dominated by a small number of multinational oil companies. Just 6 companies control 99.99 percent of the retail market, compared to 22 prior to deregulation in 1999. The present situation has come about through lax merger regulations. In the UK and other parts of the EU, governments have consistently overruled regulators in approving mergers.

According to Asher, two major regulatory policies could alleviate the problem. First, strict imposition of third party access for new investments would promote competition without threatening the amount of projects undertaken. Second, the lack of transparency in gas markets is the problem that is easiest to fix and the most urgent. Requiring firms to divulge how much they produce as well as their storage capacity would greatly aid new entrants.

## 5. Discussion

In the discussion following the presentations, a number of questions were posed and the speakers were asked to give some brief and frank pieces of key policy advice that the European Parliament may consider in its future work:

1. *Who pays for excess supply on new pipelines?*

   - Investors pay for excess capacity in new projects, but they pass the cost onto their shippers who pass the cost onto consumers. (Mr. Gillis)
   - Long-term contracts pay for excess capacity in new infrastructure. Another possibility is to cover for it in the regulated asset base. (Ms. Grall)

2. *Is liquefied natural gas committed to certain uses or free to move to the market with the highest price?*

   - Most liquefied natural gas is committed to wholesale markets, which then goes to the highest priced retail market. (Mr. Handley)

3. *What is the role of the TSOs versus the role of the regulator in addressing transmission grid issues?*

   - TSO decisions are driven by external conditions, which are part of the regulatory environment. (Professor Correljé)
   - Maintaining third party access to networks is the responsibility of regulators, not TSOs. (Ms. Grall)
   - All actors should work together to co-ordinate supply and demand plans. (Mr. Clauwaert)

4. *What can the Parliament do to improve the functioning of the market?*

   - Network capacity is important in promoting competition. Parliament should direct its focus to this issue. (Professor Correljé)
   - Long-term contracts are proven instruments for attracting non-EU suppliers and investment. Parliament should endorse their use. (Mr. Dickel)
   - Laws that force major purchasers of gas (for example, cities) to tender multiple bids for gas contracts and choose the one with the lowest price would help. (Mr. Handley)
   - Creating market conditions where there is an ample supply of both commodity and capacity creates the best conditions for competition. (Mr. Gillis)
   - The EU needs to improve the interoperability of its transmission systems, and new legislation can achieve this goal. (Mr. Briggs)
   - Forcing national regulators and TSO operators to co-operate through new legislation will improve competition. (Ms. Grall)
   - Parliament should implement the recommendations of the Kroes competition review. The quickest way to reform the gas market is to make companies provide information on flow rates, reserves, and access arrangements. (Mr. Asher).

# PART II Programme

**DG INTERNAL POLICIES OF THE UNION**
**Directorate A - ECONOMIC AND SCIENTIFIC POLICY**

## Workshop on EU Gas Markets
**Programme**

10 October 2006
European Parliament Brussels
Room ASP 3E3
14.30h – 18.00h

## Chaired by Lena EK, MEP

**14.30-14.45 Introduction by the Chair**

**14.45-15.15 Structures of European gas markets**
The speaker will address the issue of security of gas supply and will outline the changes to the markets in recent years, what market structures mean and what the future holds.

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|---|---|---|
| Expert | *Aad Correljé* | Delft University of Technology, Professor at Faculty of Technology, Policy and Management |

**15.15-16.30 Pricing**
The speakers will outline the main determinants for pricing mechanisms; discuss current and potential pricing mechanisms and drivers, including security of supply, diversification and new future investments.

| | | |
|---|---|---|
| Experts | *Ralf Dickel* | Energy Charter Secretariat, Director for Transit, Trade and Relations with Non-signatories |
| | *Bob Handley* | Gas Strategies, Senior Associate |
| | *Alexandre Clauwaert* | Suez, Vice-president, corporate strategy & development |

– followed by debate –

**16.30-17.50 The regulatory role**
The speakers will discuss the question of liberalisation, infrastructure and third party access in the context of a EU regulatory framework. Also discussed will be the development of a European Grid, financing of infrastructure investments and the role of regulators.

| | | |
|---|---|---|
| Experts | *Michael Gillis* | Distrigaz/Eurogas, Head of Regulatory & Public Affairs, Distrigaz SA and Chairman of Eurogas Internal Market Taskforce |
| | *Thomas Briggs* | BP, Regulatory Affairs Advisor, Gas, Power & Renewables |
| | *Nina Grall* | The European Regulators Group for Electricity and Gas (ERGEG), Gas Department |
| | *Allan Asher* | CEO Energy Watch (UK energy consumer council) |

– followed by debate –

**17.50-18.00 Conclusions by the Chair**

# PART III Briefing notes

A. Structures of European Gas Markets
A.1. Briefing note by Aad Correljé

B. Pricing
B.1. Briefing note by Ralf Dickel.
B.2. Briefing noted by Bob Handley
B.3. Briefing note by Alexandre Clauwaert

C. The regulatory Role
C.1. Briefing note by Michael Gillis
C.2. Briefing note by Thomas Briggs
C.3. Briefing note by Nina Grall
C.4. Briefing note by Allan Asher

**Aad Correljé, TU Delft, Faculty Technology,**
**Policy and Management and Clingendael International Energy Programme.**

## 1. Why structure matters…

It is clear that the policy towards the functioning of gas markets and the safeguarding of the public interest involved is an urgent concern. In complex, specific, networks, like the gas systems, essential facilities are involved, through which the controlling party is able to obstruct any serious competition by other (potential) suppliers, while exploiting its monopolistic position *vis-à-vis* the consumers. At the same time, natural gas projects are delicate ventures as a consequence of their high sunk costs, long repayment periods and vulnerability for variations in supply and demand. The underpinnings of the regulation of the gas industry, since the end of the 1970s, underwent a shift from a traditional neo-classical view on the functioning of markets, towards paradigms that were based on monetarist and public choice theories. Recent insights suggest that regulatory approaches could be drawing on institutionalist perspectives to a much larger extent. Indeed, it can be doubted whether the current challenges to the industry can be addressed fruitfully by using the regulatory toolbox of today.

In the different perspectives on regulation the notion of structure and the way in which it matters differs considerably. The different implications following from the notion of structure have a significant impact in the regulatory approaches taken and the choice of specific instruments. This paper will explain a number of main developments in the gas industry in terms of a broader institutionalist notion of 'structure'. This offers a wider regulatory solution-space, than the classical approach, as will be shown.

### *Neo-classical views*

The standard neo-classical approach justified state intervention in the gas and power industry on the basis of the concepts of *market failure* and *public goods*, in which Pareto-optimal decision-making was not to be expected in these sectors. Traditionally, the *natural monopoly* character of such industries justified regulation and public ownership. So, the state had to jump in, to remedy imperfections and failures, including problems of excessive market power, externalities, lumpy investments, spill-over, etc. In the US, privately owned utilities where regulated by sector specific federal and state agencies. In Europe, the utilities where owned by the state, municipalities or other regional bodies. The regulators in the US and public ownership in Europe also secured the *public interest* elements or *public values* associated with these services, involving issues of safety, security of supply, acceptable prices for specific types of users, objectives of local and sectoral development, the supply of jobs, and - more recently - sustainability and environmental protection.

By the late 1970s, this perspective was replaced by the kind of 'liberalism', associated with the late Ronald Reagan and Margaret Thatcher. Efficiency, economic reform and political power were sought through a reduction of taxes, "rolling back the state" and by bringing market-driven competition into so-called 'gold-plated' industries. Indeed, perfect competition - modelled after the revised economic textbooks - was to be imposed upon public sectors wherever possible. Gradually, and initially only in a number of Anglo Saxon countries and Chile, free access to consumers and markets, competition in production and retail sectors and privatization were introduced as the basic objectives of structural change in the energy sector. After the adoption of the Single European Market objective in 1985, these objectives became the points of departure for the European Commission, initially as main instrument to tear down the prevailing barriers to trade, later on as objectives as such. Under this paradigm, the perspective evolved of the gas supply system as an unbundled liberalized market, with competition in the production, services and retail segments, and regulated essential facilities.

More recently, particularly through the developments in the UK deregulation of utilities, the so-called 'Austrian' school of economics has become involved as an important source of wisdom, providing the basis for dynamic regulation. In contrast with the traditional static equilibrium approach, the Austrians focus on the dynamic process in competitive markets. Price cap regulation (RPI-X) entices operators to bring down their costs, while letting them keep the increased revenues for some time. Yardstick regulation of costs, tariffs and quality and efficient trading and auctioning arrangements are being applied in the gas and electricity industry. Moreover, a further requirement for 'dynamic' competition and for harvesting its advantages is that new concepts and solutions can enter the market. So, the success of competition is often defined as the number of (new) competitors in the market. All new entry is seen as beneficial and, thus, incumbents must be obliged to sell their products and services as if they were a standalone business, on equal footing with each new entrant.

The economic theories, referred to above, consider the *structure* of markets as being a crucial driver for the *conduct* of firms and the eventual economic *performance*. The configuration and relative size of the firm itself was seen merely as a means to acquire economies of scale and scope through vertical and horizontal integration, to the end of achieving market power in up or downstream markets.

***Institutionalist views***

The institutional, transaction costs, approach takes a much broader perspective in respect of the rationale of vertical integration. It considers the shape of firms and the associated structure of the markets as alternative arrangements of internal and market governance, to deal with the risk involved in transacting. The adequacy of particular arrangements is seen as dependent on the attributes of individual transactions of goods or services between buyers and sellers in a specific market and how that affects the overall cost of a transaction. Transactions costs include the direct costs of writing, monitoring and enforcing contracts, plus the costs associated with the risk of *ex ante* investments having an *ex post* performance that is lower than anticipated, as a consequence of contractual hazards of various types and of the costs associated with internal organization of the transactions.

Preferable governance structures are those that best fit the character of the transactions involved and the broader context in which these take place. Main characteristics involve, on the one hand, the extent to which parties to a transaction are locked-in, as a consequence of asset *specificity*. On the other, attributes like uncertainty, product complexity and information asymmetries play a role. In respect of asset specificity in the gas industry, it can be argued that:

- a large portion of the investments are *site specific*, often linking up buyers and seller in tight relationship over the use of the asset.
- *Physical asset specificity* may be relevant as well, particularly when looking at the relation between suppliers and end-users, which have invested in boilers and appliances to burn gas of a specific type and composition, or investments in, for example, gas storage or treatment capacity.
- *Dedicated assets* involve the investment by a gas supplier in a remote field to sell a significant amount of gas to a particular (set of) customer(s) at a specific level of revenues, justifying the investment.
- The realization of lower sales or lower prices would imply an *ex post* hazard, not anticipated in the investment decision *ex ante*.

In essence, the idea is that by selecting the right form of governance, either involving the spot-market, a specific contract or a vertically integrated structure, the parties to a transaction will be able to modify the costs of the transaction and of the exposure to *ex ante* risks. Figure 1 below provides a simplified summary of the relationship between asset specificity, uncertainty and governance structures, as suggested by transactions cost theory. When *ex ante* it is considered that these costs are not manageable at an acceptable level, most likely, the

transaction or investment will not materialize. In respect of the natural gas markets, a main question would be to what extent the regional/local governance regimes in place reflect the characteristics of the several types of transactions in the gas markets. Referring to these characteristics, it may emerge that the efficient development of markets of a different nature, maturity and risk profile may require different structures of governance, instead of one single *market design* geared towards a fully competitive market.

| | | **Asset specificity** | | |
|---|---|---|---|---|
| | | *Low for both parties* | *High for both parties* | *High for only one party* |
| **Uncertainty** | *High* | Contract or vertical integration | Vertical integration | Vertical integration |
| | *Low* | Spot contracts | Long-term contract | Vertical integration |
| Based on Joskow (2003) | | | | |

**Figure 1 Asset specificity, uncertainty and governance structures**

**2. What structure means: competition and coordination**

As regards the regulatory perspective, the question seems to arise as to how this new institutional paradigm can contribute to the future gas market regulation to a greater degree. Currently, much of the regulator's toolkit plus the framework for competition policy is based on the former paradigm of 'full unbundling' and maximum entry in competitive segments in support of a competitive market.

Nevertheless, in the daily practice of regulation, elements of the transaction cost-based approach are already incorporated, like the conditional allowance of exemptions via open season procedures, large scale mergers and long-term contracts with price-indexation components. Also the art of *regulation*, as such, seems more advanced in incorporating elements of the transaction cost approach.

A further question would be whether there may exist a trade off between the several components of a governance structure, like the degree of integration or unbundling, the regulated or "free" determination of contract prices and tariffs, destination clauses and access conditions, ToP provisions, etc. Is it possible to arrive at particular 'packages' of measures so that a 'workable' balance between the required investments, the anticipated profits and risk and the costs of governance can be struck, while preferably maintaining a 'credible' pressure of the dynamically competitive market?

**3. Where do we come from?**

Crucial to the development of the European system – and different from conditions elsewhere – was the ability to produce flexible load curves from the Groningen field in the Netherlands. Because of its geological structure and because of large investments in wellhead production capacity, the field had a capacity of about 100 bcm annually. Daily capacity was sufficient to supply the required peak demand for the whole of the northwest European gas system, in the early 1970s. On this basis, the European supply system was developed. Initially, the Netherlands supplied the lion's share of all requirements, to be sold to Germany, Belgium and France.

Yet, over the 1970s, new foreign suppliers appeared, attracted by the high revenues on gas sales in Europe. The *producers* in those countries undertook the exploration and production activities and sold the gas produced to the state-owned wholesale buyer and *exporters*, such as Gasunie in the Netherlands, British Gas, GFU in Norway, Gazprom in Russia and Sonatrach in Algeria. These firms coordinated the production and sales both nationally and abroad with

other suppliers. They sold the gas at the borders to *transmission companies*, and/or *traders*, that took care for the transport of the gas through Europe and the supply of the local, or national, gas distribution companies and large industrial customers. With exception of Germany, every country in Europe had one transmission company, operating the whole national high-pressure transport system. The local, municipal or regional, distribution companies operated and owned the local, low-pressure network, through which the gas was transported to the small domestic users and businesses.

Trade between the several parties in the gas chain was arranged through medium to long-term contracts. The producers delivered the gas via long-term contracts, of 15 to 20 years duration, to transmission companies. These had medium-term contracts (one to five years) with the local distribution companies and large-scale users. The small users had exclusive supply agreements with their local distribution companies. Everywhere in Europe, the transmission companies and local distribution companies had been given a local monopoly for pipeline operation and distribution.

By means of concessions, public ownership, indicative planning, cost plus pricing and regulated prices, the producers and distributors were able to coordinate purchase and sales volumes of gas, and prices. Through these contractual provisions, the risk involved in the funding of the expensive production and transport facilities over the longer-term was reduced. This, of course, stimulated enormous investment in the expansion of the system, as long as gas could be produced and transported at such a cost that the end-use price allowed for a reasonable profit. An important element to the contracts were the so-called take-or-pay clauses, obliging the distributor or consumer to pay, even when the whole volume of gas agreed upon had not been taken from the system, for example, because of lagging demand development.

The only competition to gas emerged from the threat that consumers would switch to other energy sources, of which oil was the most relevant. Yet, the end-use gas prices were always slightly below local prices for substitutable oil products. Crucially, the contracts contained destination clauses through which the volumes of gas were committed to a specific area and could not be sold elsewhere at a higher profit, or undercut official sales. The revenues to the producers were, thus, dependent on the retail prices for oil products to the several types of end users (the netback principle). The transporters and distributors were remunerated with a fixed fee, which was dependent on the cost of the pipeline and the negotiation position of its operator (normally having a monopoly position).

**4. Towards a new structure…**

Restructuring in the gas industry envisages reducing the costs of supply, to enhance quality and to enhance the overall efficiency of the gas supply system. Competition can be achieved by altering the structure of the market, as is suggested by economic theory. Whereas the traditional perspective denied the feasibility of competition in the whole of the gas industry, ideas about structural change start from the hypothesis that the introduction of competition would be possible in some segments and that unbundling would improve the performance of the whole system. Actually, only the pipeline transportation and distribution segments of the industry are accepted as being a natural monopoly, because of economies of scale and scope, high fixed costs of pipeline construction and relatively low variable costs. The other segments, production and wholesale and retail trade were considered to be potentially competitive markets. There may be discussion about the position of LNG facilities, underground storages and conversion plants, depending on their position in the local market.

By changing the ownership structure of the sector and by dividing the competitive segments into a number of different firms, competition could be introduced into the sector. Unbundling is expected to create a level playing field for participants in the market. A number of supply companies will purchase natural gas in the wholesale market and resell it downstream, using

the transportation systems of pipeline and distribution companies. By providing the consumers, or traders, with a choice in respect of their suppliers and the type of contracts they prefer, the customer is in a position to select the supplier with the most attractive conditions. It is assumed that suppliers will try to gain, or protect, their market share by improving supply and price conditions. The traditional whole-sale traders and distribution companies will have to develop new strategies and adjust their organisations, as they will lose both their secured market shares and the integration and coordination between their several types of activities in the supply chain. These firms will also adjust their structure and operations – through mergers and acquisitions – so that their size and activities fit the requirements of the newly emerging competitive market.

As competition among suppliers reduces excess margins and forces the pass-through of cost savings to the end users, the need for stringent price regulation at the wholesale and retail level will be reduced. In this model, new flexible short-term trading and contractual arrangements will balance supply and demand and give market participants the flexibility they need. Liquid spot markets are expected to emerge, yielding prices that continuously reflect the market value of natural gas at a specific location.

The advantages of such an efficient market may be offset, though, by transaction costs, by high risks and by high volatility in volume and price. This increases the uncertainty of demand for gas and for transportation services.

Moreover, structural change in the gas market requires complex organisations and administrative systems to carry out and control all transactions. Strict and independent regulatory oversight is required to keep owners of transport, conversion and storage facilities from abusing their dominant economic positions.

In addition, current developments in supply chains, which reach out far beyond the regional borders of the consumer areas and cross several transit jurisdictions, raise the question of the interaction between several regulatory regimes, based on radically different traditions, with different interests and roles in the value chain. As gas supply is becoming increasingly dependent on long-distance cross border pipelines, conflicts of interest and difficulties to arrive at mutually acceptable regulatory regimes along the value chain will arise.

Finally, the maturity of the national gas systems and basic geo-physical aspects varies strongly. This begs for the question as to what extent regulatory arrangements are uniformly applicable to all stages of development of the gas market. The question is how such issues fit into the general, ‘one-size-fits-all’ approaches and recipes for structural reform and market liberalization proposed by the EU.

**5. What are the main changes…**

- The consumption of natural gas has grown rapidly over the past decade and it will remain the fuel of choice for technical, environmental and – to a lesser extent - economic reasons.
- The growing contribution of LNG may bring about a more direct economic integration of the, so far, separated, regional gas markets in the US, EU, Asia and Latin America, via arbitration, etc. This development will influence investment in production facilities and the creation of new outlets.
- All large regional consumer markets, in the US, the EU and in Asia, face the dependence on imports of increasing volumes of natural gas from sources in the Middle East, Russia and Africa. The consequent dependence between suppliers and consumers, the imminent conflicts between their interest and the growing linkage of gas supply to the political economy of the world oil market may imply the emergence of an increasingly politicized gas market.

- As a consequence consumer governments focus on (external) supply security. This inspires policies to underscore the growth in gas consumption with assurances and guarantees in supplies, most likely involving long term contracts.
- The issue arises as to what extent the political circumstances and E&P regimes in producer countries allow for the necessary investments to maintain and enhance production levels. The distribution of incentives, rents and risks is of fundamental importance, while geopolitical considerations and local socio-political conditions are essential determinants of supply security.
- The long-haul supply lines necessary to transport the gas to consumer markets will face more and more transition issues. Here a question arises about adequate transit regimes and the position of transit markets.
- The supply of long haul gas, via pipelines as well as LNG, generally implies large and constant throughput factors for the infrastructures in place. This requires that the seasonal, weekly and daily demand patterns may have to be satisfied from the 'local' provision of storage and other forms of supply flexibility.

**6. Restructuring: Who cares…**

Main issues that arise out of the structural changes sketched above have to do with market design and regulation, risk allocation, price formation and investments.

First, to what extent, and how, is the existence of various national regulatory regimes along the gas value chain of influence in the development of adequate, cross-regional supply chains. How can this variety be incorporated in notions of market structure, underlying gas market regulation. What are the consequences of this situation for the effect of the necessary mechanisms of coordination within the chain?

Secondly, the traditional institutions for gas market coordination, like long-term contracts with Take or Pay provisions, destination clauses and oil price parity pricing, joint horizontal and vertical ownership over production facilities and pipelines, are being removed to a varying extent in the several regional markets. Natural gas projects, given their high sunk costs and long repayment periods, are said to be suffering from uncertainty about the future regulatory framework, while the fragmentation of value chains and markets is creating noise in the information flows, delaying signals that invoke new investments. Is there a ratio in allowing 'alternative' structural coordinative devices, such as large cross European conglomerates and joint-ventures?

Thirdly, the need to construct additional supply infrastructures, like pipelines, LNG terminals and storage and treatment facilities raises the question what parties will invest and operate these facilities. How much market and how much "essential facility", involving TPA-rules and exemption policies, are necessary to balance investor's requirements with those of an effective and efficient competitive market?

Fourthly, is it possible to define region- or country specific regulatory menus, through which an efficient, or 'workable', balance can be struck between excessive market power and a sufficient degree of coordination within the market that facilitates timely and adequate investments? This may involve, on the one hand, *ex ante* regulatory concepts, like the degree of integration or unbundling, regulated or 'free' determination of contract prices and tariffs, destination clauses and Take or Pay provisions, etc.; while on the other hand, *ex post* solutions based on competition policy may play a role.

Finally, is it possible to free *ex ante* regulatory concepts and *ex post* competition policy from their rigid *structure-conduct-performance* embedment and to replace this by elements from a more dynamic, context- and institution-specific, framework of analysis and regulatory action.

# The pricing concept of long term gas import contracts and its implications

**Ralf Dickel, Director Transit, Trade and Relations with Non-Signatories, Energy Charter Secretariat**

## Introduction

This paper is based on a draft report of the Energy Charter Secretariat on "International Oil and Gas Pricing Mechanisms" which will be discussed in the meeting of the Trade and Transit Group of the Energy Charter on 26 / 27 October 2006. The present paper describes the concept and the development of long term gas import contracts for the supply of EU Countries on the Continent. It explains the background and techniques of the main pricing provisions of long term import contracts. They should be distinguished from domestic pricing mechanisms, although the gas import price forms a major share of the final gas price and the domestic pricing mechanism have repercussions on the pricing of imports.

Except for UK, the impressive development of the EU gas industry was based on gas imported under long term contracts (LTCs). Today, the predominant part of gas imports into EU – more than 200 bcm per year - is under long term contracts whose remaining terms are up to 20 years (e.g. Troll gas from Norway) and even beyond (some Russian contracts). The principles of LTCs cover both the interest of resource owning countries in reliable revenue from exporting their resources as well as the interest of consuming countries in long term secured supplies at competitive prices. Resource owning countries will always seek to maximize the rent income from the export of their finite resources. This can be realized by selling at spot prices into a deep and liquid gas market (US and UK case) with the option to redirect gas to higher price markets or by selling long term under a net back pricing approach based on the replacement value concept (Continental EU). Given the remaining duration of LTCs and the preponderance of most important gas suppliers to Europe to sell under long term contracts - demonstrated by recent contract prolongations - LTCs and the pricing mechanisms embedded in them will remain the dominant gas import feature for a long time. Gas export projects to the Chinese or Indian market or to the US compete now for additional new gas supplies with EU. EU should therefore consider what signals to send to its main suppliers which have repeatedly emphasized their interest in keeping the balance between secure supply and reliable revenue as provided by long term contracts.

## Major determinants of gas pricing:

*(1) import dependence, ( 2) the composition and price elasticity of gas demand and (3) downstream and upstream regulation.*

*(1)* Countries whose gas consumption is predominantly covered by domestic production have regulatory control of supply (upstream) and demand (downstream) and thus a major influence on the resource rent taking and the gas pricing mechanism. They can opt for cost plus pricing which gives the resource rent to the consumer, establishing of a market place for gas which shares it between producer and consumer or a replacement value concept which gives the resource rent to the resource owner (i.e. the treasury of the Government).

By contrast import dependent countries have little influence on the supply side and thereby the management of the resource rent. The main supply decisions are taken by the exporting countries, usually the governments of the countries. Their obvious objective is to maximize their resource rent from gas exports. The upper price limit for gas is given by its competitive situation on the export market, in any case by competition with substitute fuels. This is addressed by the concept of

netback prices based on the replacement value in the import country, which allows for competitive marketing of the gas and for the maximum revenue for the exporting country.

*(2)* Demand for gas by the residential and commercial sector and by smaller industry depends on temperature, while price elasticity is low. Gas price demand elasticity comes mainly from gas demand for power. The role of gas for power generation varies strongly between EU countries as national power policies and the fuel mix in power generation depend on availability of domestic resources for power generation.

For a combination of domestic and external reasons, imported gas tends not to be used for large scale power generation, except for countries which have no domestic or quasi-domestic (nuclear) energies suitable for power generation. Exporting countries have been hesitant to sell to the segment of large scale power generation, where domestic resources for power generation exist. Contrary to UK, the increase of gas use for power generation was limited in Continental Europe, except for Italy, where substantial capacity of new CCGTS was installed during the past 5 years.

*(3)* The successful cases of liquid gas market places (In US the most prominent hub is Henry Hub in Louisiana, while in UK all of the gas system is organized as a single hub, the National Balancing Point) were developed based on domestic resources. The first steps of deregulation were in both cases to free gas production from price controls in US and in UK from the monopsony of British Gas and then to foster access to the customers by introducing TPA. Thus the market forces to develop upstream production in line with market signals were successfully unfettered. This was boosted in UK in the 90s and in the US in the beginning of this decade by strong demand from the power sector.

By contrast, the regulatory reach by EU is limited to the downstream: abolishment of exclusive concessions, removing the restrictions on the use of gas for power, introduction of mandatory TPA and of organizational unbundling. Upstream, EU has only limited influence on the regulation of its supply countries even within the EU. The influence of EU on the upstream is by being attractive for gas exporting countries.

Apart from the UK National Balancing Point (which has now a churn ration of about 10, down from 15 some years ago) Gas hubs were developed by the gas industry at Zeebrugge, Bunde and with regulatory support in the Netherlands, however so far with a limited liquidity (churn ratio of about 5).

While gas market reforms of the EU changed the regulatory domestic frame, long-term import contracts – which go back to the export of Groningen gas - persist as the predominant import arrangement, now complemented by some LNG imports on a spot basis to UK and Spain and by arbitrage deals via the Interconnector. Except for the adaptation of the pricing formula to new competitive situations and some modifications of the size of volumes, term and more flexibility regarding the delivery point new export projects kept with the principles of long term import contracts, which can coexist with different domestic market structures.

**The Groningen concept**

Gas from the super giant gas field Groningen, explored in the early 60s, was the first major gas export project worldwide. In order to maximize the rent income from the Groningen field, the Dutch Government together with Esso and Shell developed the concept of replacement or

market value pricing (which was also applied domestically) and for exports the concept of long term contracts with a minimum pay clause, with net back pricing based on replacement value prices and with regular price review possibilities.

Under the concept of replacement value pricing the gas would be priced so that it was just competitive with the next best alternative energy. Compared to a cost plus pricing that concept provided the incentives to build up a large gas supply and distribution infrastructure while keeping the gas attractive for consumers.

The concept of long term contracts aimed at maximizing the rent income of the exporting state, while keeping the gas marketable. To allow the buyer to pay for the infrastructure and to market the gas all costs incurred to bring the gas from the delivery point to the customer would be deducted (netted back) from the revenue achievable from the customer.

**Long Term Contracts following Groningen**

The Dutch export contracts served as the point of reference for almost all gas export contracts to Continental Europe which followed over the next four decades, today, altogether an annual volume of more than 200 bcm a year.

The major elements incorporated in gas export contracts are:

- A long term supply obligation balanced by a long-term offtake obligation (ensured by the take-or-pay concept): the seller would commit a certain amount of gas reserves as well as gas delivery capacity and the buyer would commit a certain market volume via the take-or-pay provisions;

- Pricing based on the concept of net back value calculated on the basis of the value of competing energies backed to the border of the buyer's country by deducting the costs of transportation, distribution and modulation to bring the gas from the delivery point to the customer;
  - Under this concept the price of gas would be recalculated at regular intervals (monthly or quarterly) in line with the absolute price movements of the competing energies. While gas oil and heavy fuel oil are the most common competing fuels, the concept works also with a reference to other competing energies, like coal or electricity but also gas itself in case of a liquid gas market.
  - Under this concept, the delivery point and the reference point for the price could be different; in fact all Dutch gas is delivered on the border of the Netherlands, however with compensation for different transportation costs where necessary (for exports to France, Italy and Switzerland);
- The possibility to review the price provisions at regular intervals (typically every three years) to adopt them under defined criteria to changed circumstances in the market, ensuring that the gas would remain (just) competitive;

- The possibility to invoke arbitration in case of disagreement on the price adjustment.

This concept would ensure a reliable sales volume for the seller at prices as close as possible to what can be sold in competition with other energies in the market. This way the netback calculated back to the well head provides for the maximum specific rent which can be obtained from the market supplied without losing competitiveness. On the other hand it allows marketing of the gas while offering a reasonable margin to the buyer. Risks related to price movements of the competing energies are mainly carried by the producer or rather by the producing country. The seller takes the price risk, the buyer the volume risk linked to marketing. All costs of the infrastructure to bring the gas to the customer is deducted from the

revenue from the customer and reduces the revenue of the seller of the resource, i.e. the resource owning country.

Crucial elements of this concept are the price formula and the price review clause.

A stylized example of the price formula is given in the box below:

***BOX***

Stylized Price Formula under the Net Back Concept of Long term Contracts:

Pm = Po + 0.60 x 0.80 x 0.0078 x (LFOm - LFOo)
+ 0.40 x 0.90 x 0.0076 x (HFOm -HFOo)

(i) The gas price Pm, applicable during the Month m is a function of
- the starting gas price Po in month o
- and the price development of competing fuels compared to the reference month

(ii) 0.60 and 0.40 are the shares of gas market segments competing with respective fuels, in the example Light Fuel Oil and Heavy Fuel Oil

(iii) 0.80 and 0.90: Pass through factors (no dimension):
- Sharing risk and reward of the price development between seller and buyer
- Most of risk and reward for the seller (0.80 / 0.90)

(iv) 0.0078 and 0.0076: Technical equivalence factors to convert the units of prices for fuel into units of gas price

(v) LFO, HFO: Price quotations of competing Fuels reflecting their market price

(vi) Determination/negotiation of Po reflecting the net back to the point of delivery, determining the margin needed to cover the cost between the delivery point and the customer.

**Price reviews**

The concept of regular price reviews resulted in permanent adjustments of the price formulas to the changing role of gas in the market. In the beginning the competitive situation of gas was characterized by heavy fuel oil used by large customers who were needed as an anchor for the developing gas market. With increasing penetration of gas in the residential and commercial market, the mix shifted to light fuel oil. Today a gas import price formula would typically have a share of 60-65% pegged to light fuel, with the rest pegged to indices reflecting the competitive position in the industrial and power sector, mainly against heavy fuel oil. In the mid 90s when the EU directive banning the use for large power generation was abolished the sellers accepted a share of about 10% linked to coal prices to reflect the competition for gas in power generation. With the Internconnector becoming operational in 1998 the issue of gas to gas competition was tackled in the price reviews by introducing a limited share in the formula reflecting gas on gas competition.

Except for the dispute on Heimdal gas with Marathon Oil and very few cases linked to long haul gas, which were referred to arbitration, all review negotiations were concluded by compromise between the parties, even though some cases took up to 5 years to finalize.

**The perspective of Long Term Contracts**

The concept of long-term contracts with the possibility of price reviews has proven to be a successful instrument to create security of supply and reliability of income. It was able to adapt to the substantial changes which took place since its development for the export of Groningen gas in the 60s. It coped with extreme price developments like the two oil price shocks in 1973/74 and in 1979/80 and with the reverse oil price shock in 1985/86, as well as

with major geo-political changes, like those triggered by the fall of the Berlin Wall. The concept of long term contracts was also successfully applied to deliveries into markets with gas-to-gas competition as recently demonstrated by the long term contracts concluded by Centrica with Statoil for the supply of Norwegian gas via the Vesterled pipeline and with Gasunie for the supply of Dutch gas via the BBL pipeline.

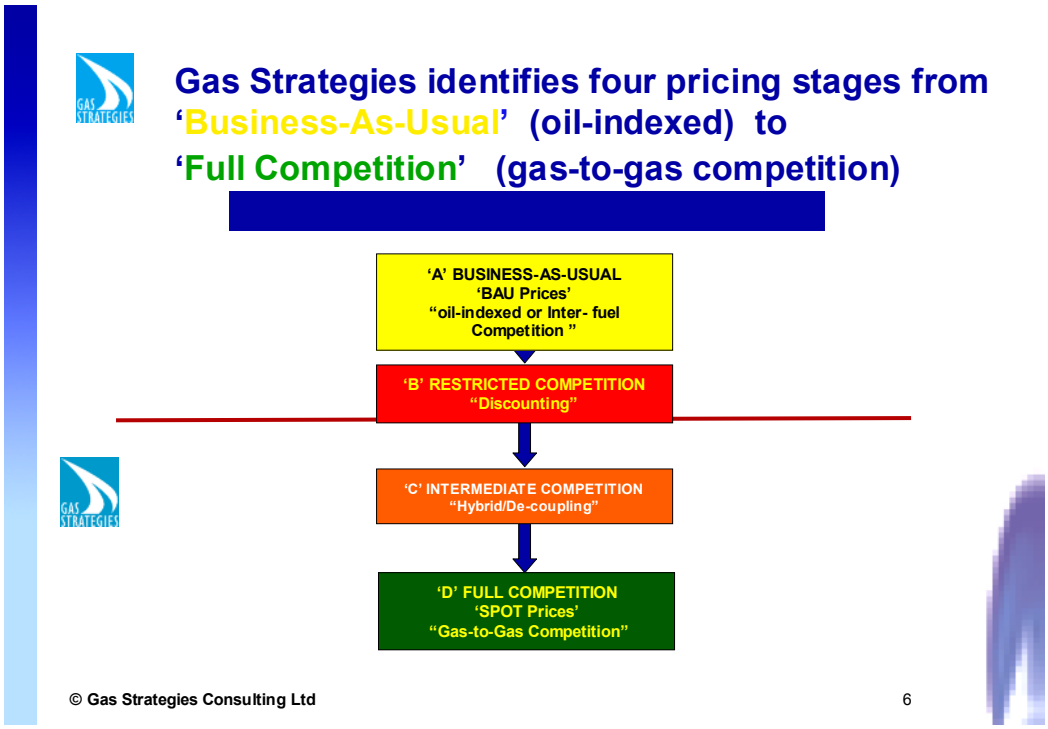
The question remains about the relation between long term import contracts and the concept of opening of the internal gas market. Existing long term export contracts would certainly be respected (pacta sunt servanda). The future role of long term contracts is addressed by item 25 of the Whereas clause of the 2nd EU Gas Directive: "Long-term contracts will continue to be an important part of the gas supply of Member States and should be maintained as an option for gas supply undertakings in so far as they do not undermine the objectives of this Directive and are compatible with the Treaty, including competition rules. It is therefore necessary to take them into account in the planning of supply and transportation capacities of gas undertakings." This text may however, not give the comfort on long term contracts to gas exporting countries they are looking for.

The political question is what signals EU will send to major gas exporting countries in order to remain attractive for new gas supply projects, especially in a situation of global tight gas and energy supplies.

**Price Setting - By Harry Cavill & Bob Handley**
**Gas Strategies Consulting, A Division of Gas Strategies Group Ltd.**

# 1. Brief Historical Review

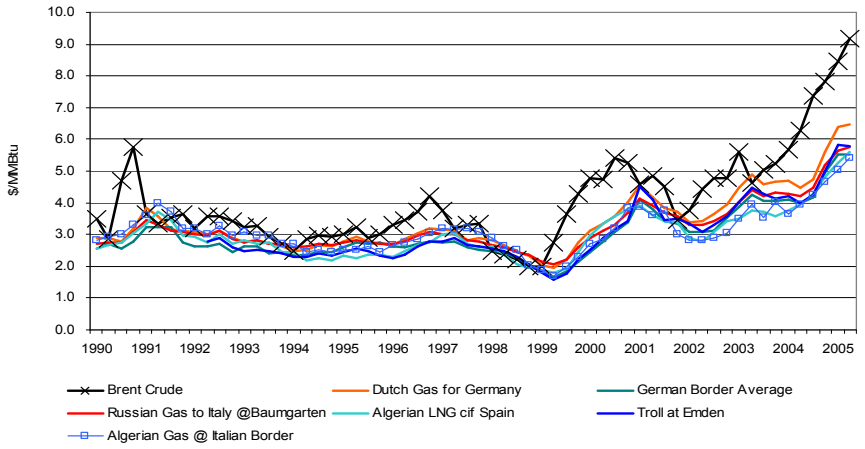
Historical gas prices in Europe form part of a continuum which is proceeding in stages as shown in the slide below:




The UK has already reached the final stage 'D', Full Competition, with gas prices set by 'spot' prices at the virtual National Balancing Point (NBP) hub. There are other less mature 'spot' hubs in Europe which are increasing in importance as price-setting mechanisms but which have not yet replaced the traditional oil-indexed contracts. Currently countries in the European continental market are at differing stages, with the majority broadly at a stage shown by the red line. Most of these countries in western Europe have gone through the historical Business-As-Usual ('A' 100% oil-indexed) 'BAU' stage and are now in (or leaving) the discounting phase 'B' of Restricted Competition. Some price minor portions of gas based on the newer 'spot' hubs described above. The more successful ('liquid') ones are at Zeebrugge in Belgium and the TTF virtual hub in the Netherlands. These three hubs are showing signs of price convergence.

However these 'BAU' oil-indexed gas prices still form the bulk of all existing contract types, both at the wholesale and end-user level. The wholesale prices are illustrated in the slide below. The effect of recent oil price rises on lagged gas prices is clearly seen. Border or wholesale prices from producers in Russia, Algeria, and Norway (Troll contract) show reasonably close paths. This is partly due to 3-yearly price re-negotiations which allow the parties to re-base their prices if they drift from the market and because they contain no taxes. Border prices in Q2 2006 were about $8/MMBtu or €21/MWH.

## Historical ('BAU') European Border/Wholesale Long-Term Contract Gas Prices

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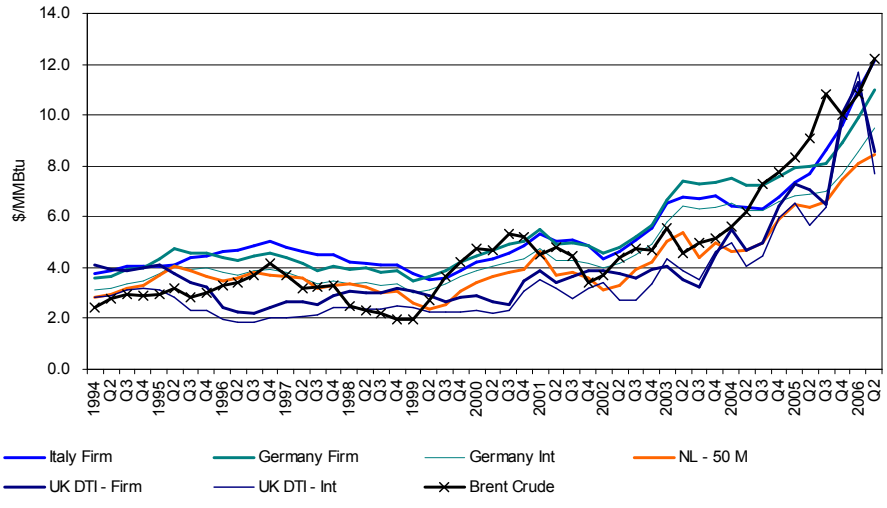
A sample of eligible large end-user prices is shown in the slide below and demonstrates a much wider divergence of values, e.g.$8-11/MMBtu or €21-29/MWH in Q2 2006. A large portion of the variance is due to different taxation levels, but is also due to structural differences by country. Tax harmonisation therefore has a long way to go. For future discussion purposes in this paper we will adhere to wholesale gas prices only.

## Historical ('BAU') European Large End-User Gas Prices

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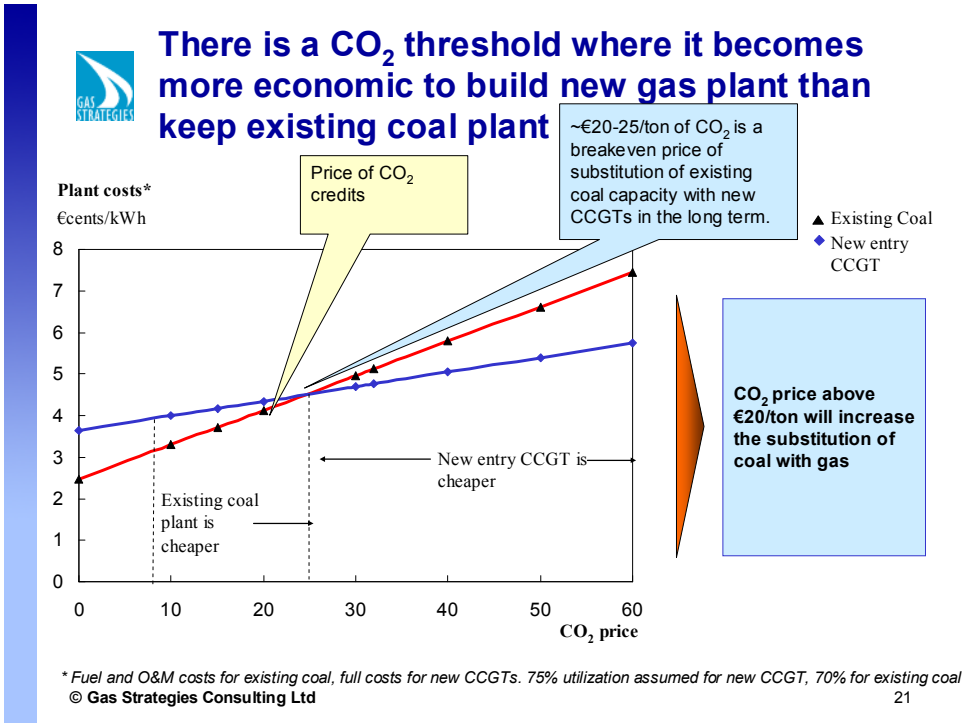
# 2. Main Drivers of Gas Price

The main drivers of gas price are listed in the slide below.

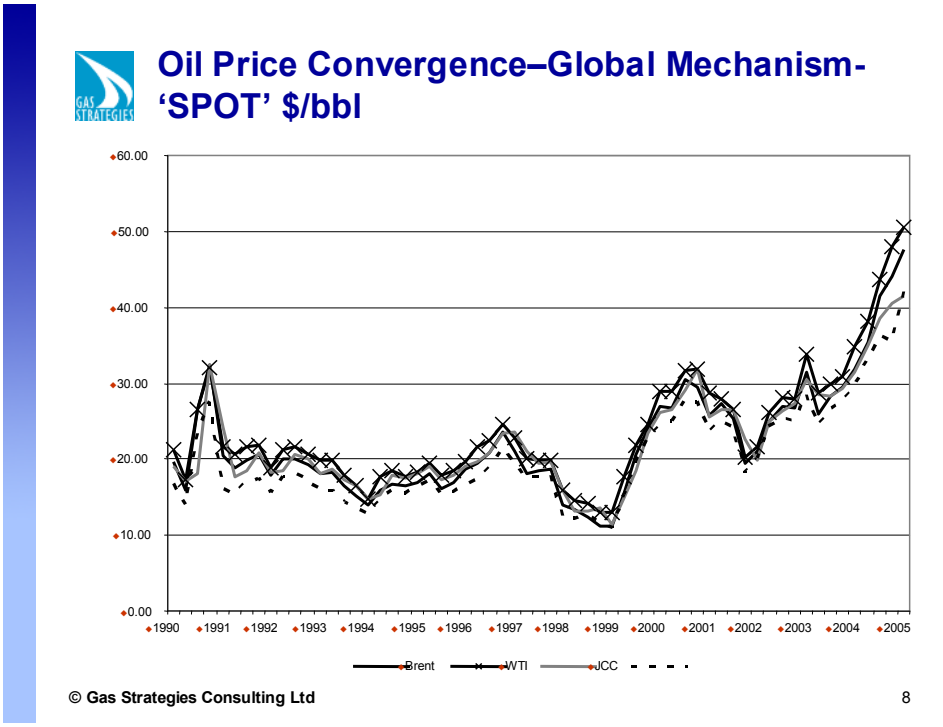

**Oil prices** explicitly drive gas price formulae in stages 'A' and 'B'. (They may also influence gas prices in later stages.) In stage 'D' of Full Competition where gas prices are assumed de-coupled from oil indexation the main driver is **gas supply costs**. The level of price here will be set by the costs together with **demand for gas and the balance against supply**, e.g. a 'tight' gas market will produce higher prices. The speed at which gas pricing moves from stage 'B' to 'D' is dependent on **liberalisation pace and progress**.

**Coal prices** will affect gas demand and prices in the power generation sector. The power sector is the most important growth area for gas and therefore the relative coal/gas price will be key. The **CO2 price** will be heavily influenced by the relative coal versus gas burn in the power sector, along with the level of commitment and discipline of the national governments in setting their National Allocation Plans (NAP's). The price of CO2 is therefore closely linked in a three-way mechanism with coal and gas prices, as shown in the slide below.




# 3. Oil Prices

As indicated above the price of gas will be affected by oil differently at various liberalisation stages. What will always be constant however is that oil prices will be set by **global** supply/demand factors in highly liquid 'spot' markets. Regional oil markets have already largely converged into a global price (separated only by quality differentials) as shown below.



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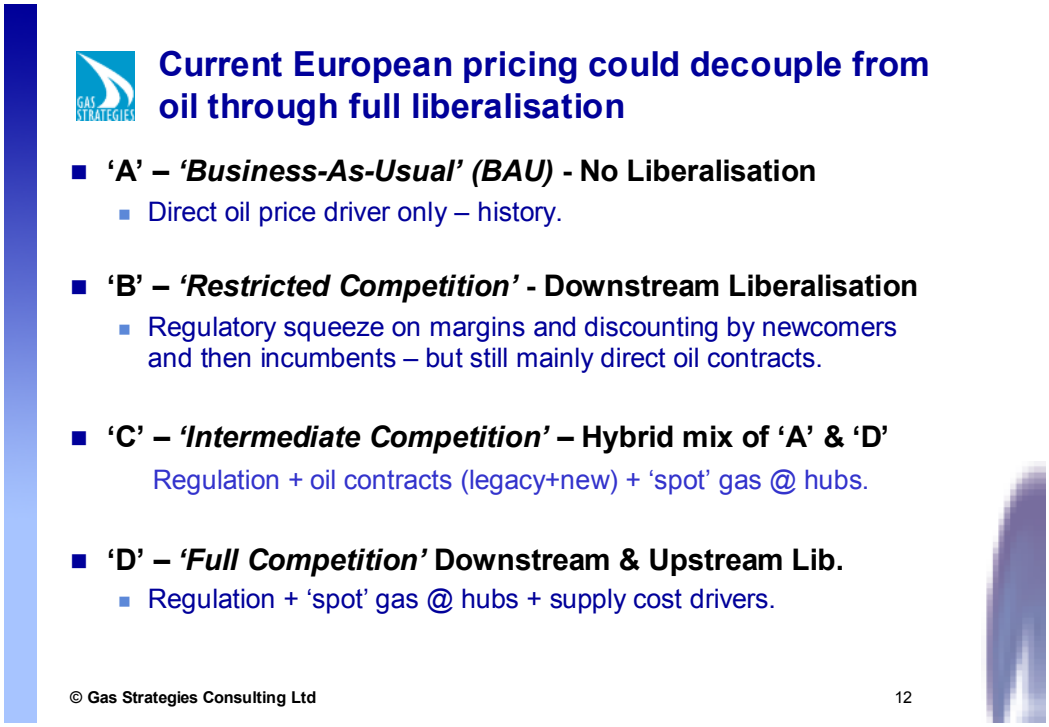
# 4. Regional Gas Prices

Gas prices are set mainly on a regional basis. Typically these would be labelled N. America, Europe and Asia/Pacific. The gas pricing dynamics are different in each region resulting in different price paths. N. America is fully liberalised (similar but not the same as the UK), Europe is in the process of liberalisation (see below) and Asia/Pacific is still proceeding on traditional oil-indexed bi-lateral long-term contracts. We assume Asia/Pacific will not liberalise in the foreseeable future. The relevance of regional pricing is the issue of whether there will be price convergence between Europe and N. America, the so-called 'Atlantic Arbitrage' facilitated by trade in LNG (see below). This raises the new possibility of the USA in particular influencing European gas prices in the future.

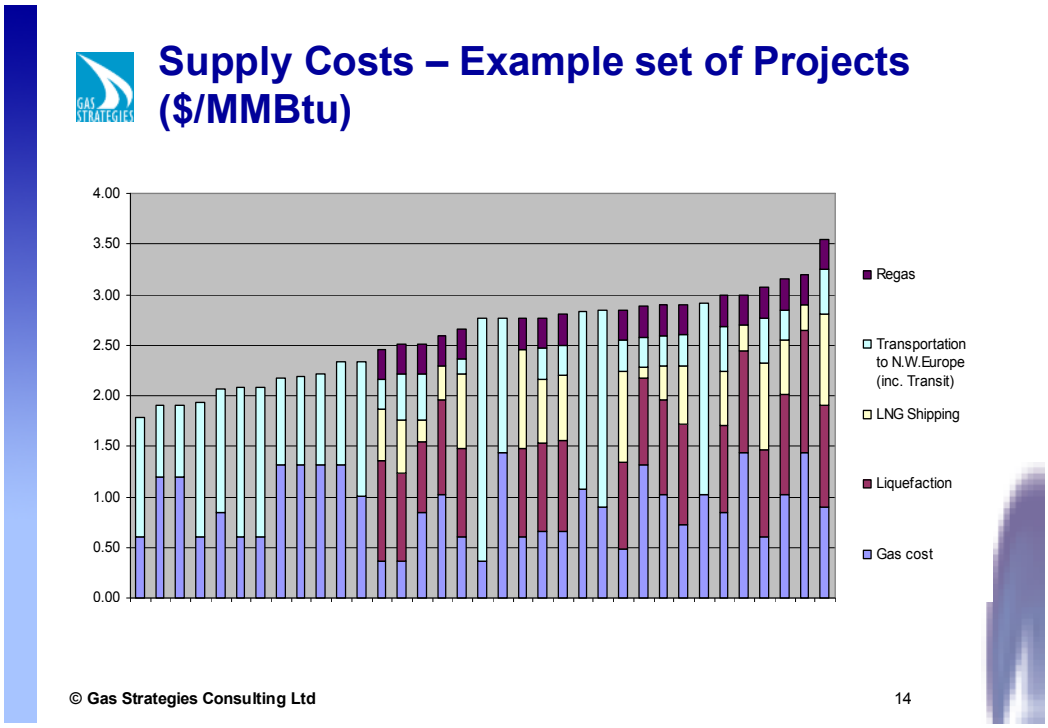
# 5. Liberalisation

In addition to oil prices we have said that the progress of liberalisation in Europe will affect the price-setting of gas, as indicated in the slide below.



# 6. Gas Supply Costs

Gas supply costs will be an important driver for gas prices in fully competitive markets in stage 'D'. To assist in assessing these competitive levels gas supply costs to Europe have been analysed for a range of both pipeline and LNG projects. These sources are from a wide area surrounding Europe as far apart as W. Siberia, Trinidad, W. Africa, Caspian and Middle East. The analysis was based on long-term technical costs of gas delivery, and excluded fiscal terms. They are indicative of long-run average sustainable levels over time. The results for a range of projects is shown in the slide below, which indicates a substantial and ample volume of gas available to Europe for 2020 and beyond at about $3/MMBtu or €8/MWH.



# 7. LNG

In N.W. Europe LNG is seen partly as a way of filling the UK's deficit and partly by new entrants as a way of gaining market access, as presented below.


# 8. Summary of Views on Main Drivers of Gas Price

Oil Price – Unsurprisingly views on long-term average values differ widely between parties. International Oil Co's (IOC's) tend to be conservative at the lower end of the range. Clearing base rates for oil & gas project approvals are in the range $25-30/bbl. BP's forecast is $40/bbl average. The oil traders show futures markets all years to 2012 and beyond above $60/bbl. Our own view is that $35-45/bbl is a reasonable central case. Liberalisation – The key outlook here is the projection of the date at which consumers have choice from a competitively functioning market. One key milestone is the year that 'spot' hubs takeover prices-setting. Some believe that long-term contracts based directly on oil market values will prevail for the foreseeable future, i.e. beyond 2015-2020.This view prevailed particularly up to 1-2 years ago. The liberalisation process in the UK took over 15 years to mature. Our central view is that hub pricing will dominate in about 5 years.

Gas Supply Costs – Long-term supply costs we have seen are broadly consistent with the discussion above although we have not been party to the methodology or detail. Our own figures are probably at the lower end of the range of estimates.

## Workshop on the European gas markets – price setting, structures and future prospects
## Alexandre Clauwaert, Suez, Vice-president, corporate strategy & development

Natural gas consumption in Europe has evolved very quickly during the latest twenty years, for three reasons:

- Its clean burning characteristics, making its use far more convenient than other fossil fuels, for heating buildings, for fuelling industrial processes.
- Its availability and cost
- The emphasis developed by the European gas industry in developing the gas distribution systems, as to make gas available to the larger portion of regions.

The electricity generation market has suffered a period of uncertainty in the late 80ies, where the market players did not consider building of new large-scale power plants, since:

- Public opinion and public policies in some member countries brought nuclear investments to a halt
- Uncertainties around the future market design and European integration of networks made it difficult for market participants to evaluate large investment projects against the "mutualisation" of reserve capacity.

As natural gas driven combined cycle gas turbines (CCGT) proved to be very efficient, relatively cheap in investment and consumption at the gas prices of the moment, and required short building and start-up delays, most operators started relying on CCGT to cope with their electricity market growth.

Today this situation results in an ever-increasing gas consumption, not only from the traditional building heating and industrial processes, but also from the power-generating sector.

But as the traditional European gas supplies in the North Sea and in the member countries tend to decline, new gas needs to be imported from more distant sources, demanding huge investments in infrastructure, such as pipelines or LNG systems, inclusive of shipping. At the far end of the supply route, investments are necessary in exploration and production to secure long-term delivery of the gas.

Investments are also needed within the European gas market, since the direction of flow is changing from a north to south and west to east pattern, to new import routes, predominantly from the east to the west, and from southeast to northwest. Besides these pipeline infrastructure needs, new LNG regasification terminals are necessary to ensure sufficient diversification of gas supply between our different suppliers.

All these investments have to be looked at from a financial point of view and need sufficient risk mitigation as to go forward.

European gas supply has thus evolved from a local business, linking local suppliers ( like the Netherlands, the North Sea, Norway) to local markets ( NW Europe), to a part of a global market, where gas supply sources have the choice of exporting to Europe or to other gas consuming regions in the world. This is particularly true when considering the Russian gas exporting policies towards Europe, China and India, but is also true considering all major LNG exporters.

Traditionally, European gas market suppliers have linked their gas sales price to the gas merchants, the border price, in order to let their gas compete other fuels in the end user markets, considering all costs for transportation, storage, distribution, and sales.

Two major principles are used in pricing the market import price or border price:

- A cost plus approach, where gas is priced along some formula with oil indexes, ex supply country (FOB or entrance of transportation system) + all costs. The price risk is then borne by the buyer, i.e. if the local gas market value drops below this cost+ price, the buyer gets into trouble.
- A net-back approach, where seller and buyer convene on a delivered end user price, sometimes called burner tip price, to be competitive at all times. The market import price is then obtained by subtracting transportation, distribution, storage and costs of sale from the burner tip value.

As most gas contracts continue to be closely linked to world oil or oil product markets, the evolution of the gas prices are still very closely linked to the evolution of world oil markets.

Globally, three regional gas markets have developed, but with the ongoing globalisation of gas trade, and sharing of the same suppliers, a tendency will exist to see a world gas price emerge in the future.

This is already true in winter periods, where high prices in – for example – the US, attract spot LNG cargoes, bringing the spot prices for additional gas demand in Europe or Asia at the same levels.

In order to bring the gas to the markets, important investments are needed.

Some orders of magnitude of these investments are illustrated for an integrated LNG chain, with a capacity of 7 billion cubic meters per year, and for recent investments in sub sea links, such as the Bacton Balgzand pipeline (BBL), currently being built.

As to conclude:

The European gas market needs to remain attractive to all market players, suppliers and gas merchants, as to obtain a secure and affordable gas supply in the future.

We presently assist to the growth of an oligopoly of gas giants around the European gas merchants, which urges the need for establishing large and strong buyers (gas merchants) through consolidation of existing market players, in order to be able to participate in the huge investments needed, and in order to have the necessary strength to negotiate with giant suppliers.

Within Europe, clear, long term and stable regulations are necessary, in order to offer a reliable framework for future investment decisions and gas supply contracts.

Suez welcomed the initiative of the European Commission, the Green Paper on a European Strategy for Sustainable, Competitive and Secure Energy, which was published in March.

Suez shares the vision that the internal market has to be completed, and that the second liberalisation package is fully implemented before proposing new legislation. Suez considers that the different national regulatory and legislative frameworks should be harmonised to a greater extent. A European regulator and a European transmission coordination office would contribute to improve cross border trade, both in electricity and gas.

Suez would support an ambitious initiative such as an indicative European energy programme for gas and electricity infrastructures. This plan would contribute to give the right signals to investors.

Suez fully agrees that Europe needs a coherent external policy to play a more effective international role vis a vis our energy partners worldwide. A common external energy policy can only be reached if Member States clearly state their willingness to develop such a policy in cooperation with the Commission.

Suez shares the view that a clear policy on securing and diversifying energy supplies will be a useful instrument. In their relations with producing countries, the EU and Member States should also ensure that the economic interests of investors are well protected.

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## EUROGAS VIEWS ON THE WAY FORWARD
## by Michael Gillis

**In the ongoing discussion on energy in 2006, Eurogas considers it is timely to reassert the importance of the gas industry in contributing to a sustainable energy supply for Europe. Recently questions have been raised about increasing dependency on gas, including for electricity production, and concerns have been expressed because of security of supply considerations. It is important not to be complacent. Changes in the supply structure and considerations arising from world economic growth are bringing new significant challenges.**

**Eurogas, however, recalls that gas reserves are abundant and commercially accessible. Provided that external policy, market and regulatory frameworks are in place to keep Europe an attractive destination for the world's gas supplies then gas can make a decisive contribution to building a bridge to a more sustainable energy future for Europe.**

**The world is currently experiencing a considerable growth in energy demand**, and **growth in gas demand is particularly strong.** Gas is forecast to become the second most important fuel from 2020. Power generation is and will remain the main driver of the growth in gas demand, even if the present gas price level raises some uncertainties about the most bullish forecasts, especially when coupled with the debate about future environmental regulation, emissions trading, technology developments and the future contribution of nuclear. It is certain, however, that gas penetration in the global market will grow. Fortunately, **gas reserves are abundant** worldwide, although they are **mainly concentrated in two areas, Russia and the Middle East Region.** Therefore growth in world gas consumption will imply higher reliance on large scale development of international trade, long distance transportation, with special expansion of LNG trade, and critically, underpinning these, realisation of major investments.

**Europe will be one of the important world areas competing to gain access to these concentrated gas reserves**. Because gas consumption in Europe is increasing, but also because European domestic gas production is in decline, it is important that Europe can remain an attractive zone for new gas imports. **European gas companies will be required to meet the challenge of filling an increasing supply gap at the same time as appetites for gas in Asia and the United States are rising**.

Today Europe is fortunate to be surrounded by three major producers (Russia, Norway and Algeria), with large reserves accounting for half of its supplies. Alongside these giants, European gas companies are developing diversification of supply sources and routes: contracts have been signed with Libya, Egypt and Qatar and Nigeria; others may come with Iran. **The potential, however, for diversification is limited and given the decrease of domestic production, the outstanding position of the three major producers will not change much in the coming years**.

LNG development encompasses some very specific features, **it increases the diversification options, it paves the way for more flexible supplies** which also means spot gas prices will be the decisive criteria of destination for spot LNG cargoes. LNG trade linked to long-term contracts has proved effective in developing the infrastructure along the whole supply chain and has provided security of supply. The flexibility associated with spot trade, rerouting possibilities and excess terminaling capacities could bring optimisation opportunities.

**Gas market liberalization is profoundly changing the structure of the industry.** Customer choice and the evolution to gas-to-gas competition have obliged companies to rethink their

strategies, restructure their operations, develop new services and become more efficient. Effective unbundling gives network-users confidence their requests for network access and development will be treated in a non-discriminatory manner. But unbundling challenges previous approaches to investment decisions, the regulatory framework has not yet fully stabilised and competition development introduces some uncertainty on suppliers' future market shares. All this at a time when heavy, long term decisions, whether to build large infrastructures, whether to take large purchasing commitments, have to be taken to guarantee the security of supply of the European market. **To assess and make commitments on these large investments, market participants need to have access to the necessary information and confidence that a fair, clear, and stable allocation of risks and responsibilities has been established**.

In this context, some European gas companies - still relatively fragmented in comparison with few very powerful and often state influenced up-stream supply companies- seek to spread their risk by diversifying and entering markets in other Member States, embracing new market opportunities, having in mind also to respond to the ambitions of upstream producers to be active on the downstream European gas market.

Industry consolidation has raised questions regarding its effect on competition and on how to preserve the interests of Europe's consumers, including the right to have a real choice of energy supplier among a range of competing large and smaller supply companies and traders able to meet customers' differing needs at competitive prices. Providing this consolidation is in line with competition rules, it will bring benefits to European consumers and in addition contribute to the strengthening of the purchasing power of Europe as a whole.

**Eurogas supports the achievement of the internal gas market.** A fully functioning internal market will enhance efficiency in the customers' interests and contribute to security of supply. Customer choice leading to effective competition should bring innovation in offers and services, including energy efficiency services, and drive technological development, to improve Europe's competitiveness. Considerable progress has been achieved since the adoption of the first Gas Market Directive in 1998, but further efforts are necessary. Eurogas is keen to see improved progress and urges Member States to ensure all elements are in place to meet the 1st July 2007 target date for full market opening. **Timely and correct implementation of existing legislation and regulation and fulfilment of voluntary commitments is the immediate priority.**

**The focus has to be put on achieving further European market integration and in this respect getting the regulatory framework right presents a challenge.** The paper suggests some approaches to tackle these challenges. From the suppliers and users perspective, it is essential that the rules are in place to ensure non-discriminatory access based on appropriate tariff structures, as well as capacity allocation and congestion management rules to optimize use of existing capacity and give market signals for needed new capacity. System users must be able to move their gas through networks in a fluid way on an economic basis. **Transparency and coherence of rules leading to convergence of operators' services will be keys to further progress but a lot of detailed, pragmatic work is required to ensure removal of all obstacles.** Therefore Eurogas participates actively in the Madrid Forum which seeks to find consensus-based solutions on a range of access related issues covering tariffs, capacity, interoperability, and looks forward to contributing to the planned work of ERGEG on regional markets which can provide a useful next step to a fully integrated European market. Ways also need to be explored of improving the regulatory process.

Eurogas recalls that climate change and other environmental concerns present a significant challenge for Europe's policy makers and considers the qualities of gas have made it a fuel of choice to provide part of the solution in the energy mix. The policy framework, in particular

by supporting industry's drive towards technological developments and research and development to improve the efficiency of gas applications should be supportive.

Eurogas supports the objective set out in the Energy Green Paper of meeting the interrelated and parallel objectives of a fully functioning energy market, secure supply and an environmentally sustainable fuel mix. **European consumers will be best placed to enjoy the benefits gas brings in a competitive gas market, only if security of supply to the market is assured.**

So, beside the above considerations on the functioning of the internal market, our key messages on the way forward are very much focussed on how security of supply can be delivered within a fully functioning internal market, exploiting the environmental qualities of gas.

- Each country has developed and should retain responsibility for setting its national security of supply standards within principles set by the Directive safeguarding Gas Security of Supply. **It is important, however, that some level of Europe-wide coherence is developed for example to promote and facilitate diversification of supply, while ensuring that national security of supply standards are compatible with the development of an internal gas market.**

- Negotiation between suppliers and sellers at industry level was and is the fundamental basis for organising European gas supply. **But it is very necessary that this relation be supported by solid political relations, in bilateral and most importantly European dialogues between consumer countries on the one hand and producing and transiting countries on the other hand. This political dialogue has to be supportive of the efforts of the European gas industry**. In today's world, energy is a geopolitical issue that cannot be resolved by market dynamics alone although these must continue to be promoted along the supply chain. It is necessary for Europe to speak with one voice in a global energy market.

- Large investments are necessary to bridge the gap between supply and demand; these include not only investments in distant production zones but also massive investments in Europe for transmission and gas storages. Therefore a policy framework is needed that recognizes the necessary long-term requirements and provides appropriate incentives, and **it should be a priority of the European agenda to facilitate these investments in support of all the actors involved in these projects** (financing institutions, producers, buyers, infrastructure developers, etc.). **The impact of the regulatory framework is crucial in this respect** since appropriate exemption mechanisms, the long term rate of return allowed for regulated activities, the stability of regulations, stream-lining of planning processes all play a part in ensuring the necessary infrastructure and facilities are in place.

- For suppliers, **long term take or pay contracts should remain crucial and for most companies indeed will be the backbone of their supply strategies** not only for their contribution in securing investments along the whole gas chain by the predictability they give, but also because they tie together buyer and seller with a mutually acceptable balance of risks.

- At the same time a **more liquid market supported by shorter-term contracts, spot, and hub development, has to be achieved** to complement longer-term arrangements, widen supply options by improving flexibility and enhancing portfolio optimisation.

## Regulation of LNG facilities in Europe

**Thomas C. Briggs**
**Vice President, Regulatory Affairs**
**BP Gas, Power and Renewables**

The European Gas Directive is designed to promote, among other things, supply security, reliability and competition in wholesale and retail markets for natural gas. Given the inevitable decline of North Sea production linked directly to the European pipeline network, LNG will play a significant role in promoting these policy goals. Therefore, it is essential to develop an effective and coherent policy to regulate (or exempt from regulation) LNG regasification facilities in Europe.

The Gas Directive sets forth a general process for obtaining an exemption from Regulated Third Party Access (RTPA) conditions in the Directive. However, the Directive does not go into great detail of how regasification facilities should be regulated in order to promote competition and supply security, leaving to the Member States the task of designing RTPA provisions and the process of obtaining exemptions from them.

Experience thus far in the UK (and the US) has demonstrated that traditional RTPA (or open access) regulation is not necessary and exemption from such provisions has resulted in significant LNG investment. Elsewhere on the Continent the persistence of well know competition problems will make it difficult for member State regulators to grant Article 22 exemptions, leading to the default requirement of imposing RTPA conditions. Given the structure of downstream Continental gas markets, it is unlikely that regulating third party access to LNG facilities, by itself, could foster the competitive goals of the Gas Directive.

### Gas Directive Exemption Test

Article 22 of the Gas Directive establishes a process for obtaining an exemption from the RTPA provisions of the exemption. Specifically, "major new gas infrastructures" may be exempted from the provisions of Articles 18, 19, 20 and 25 (2-4) provided that the following conditions are met:

(a) the investment must enhance competition in gas supply and enhance security of supply;
(b) the level of risk attached to the investment is such that the investment would not take place unless an exemption was granted;
(c) the infrastructure must be owned by a natural or legal person which is separate from the system operators in whose systems the that infrastructure will be built;
(d) charges are levied on users of that infrastructure;
(e) the exemption is not detrimental to competition.

Application of the Article 22 exemption test in the UK has resulted in three major facilities obtaining an RTPA exemption from Ofgem, the sector regulator. A fourth project – the Excelerate Energy project – is not subject to Ofgem jurisdiction as an "LNG import facility" due to its unique on-ship vaporisation technology.

One interesting aspect of Article 22 is the requirement to show that the facility would not be built under a regulated regime. Satisfying this criterion would seem difficult to prove given that it constitutes an indictment of the relevant regulatory regime applicable to infrastructure. Moreover, in the UK, the RTPA regime for LNG infrastructure was never defined, rendering it difficult for applicants seeking exemption to articulate why development would not take place under a regulated regime.

## Comparison of US and EU LNG Regulation Policy

The US exemption policy is similar to Article 22 given the emphasis on the competitive benefits of granting exemption from open access provisions. The only significant difference between US and EU exemption policy is that the US has made a blanket determination that traditional RTPA regulation of LNG facilities is not necessary and the EU process presumes regulation is required to promote competition unless proved otherwise on a case by case basis. Where the EU presumes regulation is required, the US seeks to avoid it.

It is useful to compare the market conditions and regulatory policy in the US and EU, especially as LNG suppliers are active in both markets.

LNG regulation policy articulated in the FERC's *Hackberry* decision (now codified in US legislation) is based on the conclusion that open access regulation of LNG facilities is not necessary given competitive features that are well rooted in the US gas market. The FERC cited a number of factors to justify exemption. Chief among them are 1) the presence of robust competition and liquidity in wholesale and upstream gas markets, 2) the efficient operation on an interconnected transmission grid allowing gas to flow anywhere in the country, 3) the need to attract new gas imports and 4) the unique nature of the LNG value chain would make application of some open access conditions inappropriate. Unlike the EU, it is not necessary to prove that the facility would not be built if regulated as it is clear that such facilities can be built in the US under regulated structures.

In the UK, Ofgem has granted exemptions to three major LNG regasification facilities, identifying a set of factors similar to the US market. Highly liquid wholesale markets, robust open access to the downstream network, and lack of downstream market concentration easily satisfy the Article 22 criteria for the new facilities being built in the UK.

However, the same cannot be said for many markets in Europe. Elsewhere on the Continent, liquid wholesale markets are not prevalent, it is extremely difficult to ship gas between networks and countries, and there is a high degree of downstream market concentration. Therefore, a new LNG supplier may find it extremely difficult to sell large volumes of LNG on a long term basis without significant assistance from downstream incumbents. In such cases, it would be difficult to argue that the infrastructure investment "enhances competition" and RTPA exemption would not be warranted.

## Regulating LNG Facilities and Promoting Competition

If an exemption cannot be granted, one should not be fooled into thinking that defaulting to regulation of the LNG facility will rectify the lack of competition in the downstream market. Providing facility access to third parties is only useful to the extent meaningful access to wholesale and retail markets is provided. The challenge for regulators is to develop mechanisms that promote competition objectives when regulating access to LNG facilities. There are a few areas of focus that may help.

The Commission and Member States must continue efforts to promote wholesale liquidity and the operation of an interconnected and inter-operable pan European grid. An LNG supplier in the Netherlands, for example, should have the ability to independently wheel gas to liquid wholesale markets throughout the immediate region. But this is not yet the case.

The environment must be conducive to investment. Infrastructure developers must be given a reasonable return on investment that is in line with associated risks. As the financial viability of the project is driven primarily by the creditworthiness of the shippers holding capacity, it is

essential that the rights of such shippers are not burdened by unreasonable conditions. For example, inappropriate application of Use-it-or-lose-it (UIOLI) provisions that impair the value of flexibility to the shippers could increase the costs of investment.

Regulators (as in Italy) could require that a percentage of capacity be held open for potential new entrants. Capacity could be held open for spot or short term use or allocated to third parties on a longer term (e.g., 5 years). However, the growing LNG spot market may not be sufficiently developed to rely on spot cargoes. It will also take considerable time for a new LNG supplier to access to large loads or build a retail portfolio that would justify the risk of holding unused capacity for longer durations. It is unlikely that a new supplier or developer would assume such speculative risk. In addition, such a requirement, if not managed carefully, would merely constitute a tax on the infrastructure developer that could discourage development.

An alternative to reserving open capacity in the facility would be to allocate firm capacity to a downstream company (or group of companies) in combination with transport capacity to key delivery points (such as LDC city gates) and to liquid trading hubs. Essentially, one would create a midstream rival to the incumbent, thus providing and alternative buyer to new LNG suppliers who may be seeking different forms of access and market exposure. Such transportation capacity can be held on a long term basis by the new entity and the cost of the transportation asset could be recovered as part of the entities regulated rate base or commodity component of it retails tariffs. This would ensure adequate credit support for the LNG developer.

## Conclusion

LNG supplies will play a more significant role enhancing European supply security. LNG supplies can also enhance competition, but only if regulators impose reasonable RTPA conditions on new LNG facilities and shippers and continue to focus on downstream access and market concentration issues.

# The European Gas Markets - Price-setting, Structures and Future Prospects

**Nina Grall (ERGEG)[1], Gas Department**

## 1. About ERGEG

ERGEG (European Regulators' Group for Electricity and Gas) is a body of independent national energy regulatory authorities, which was set up by the European Commission as an Advisory Group to the Commission on energy issues[2]. ERGEG was set up "to give regulatory co-operation and co-ordination a more formal status, in order to facilitate the completion of the internal energy market." ERGEG provides a transparent platform for co-operation between national energy regulatory authorities, and between these authorities and the Commission. ERGEG is charged with advising and assisting the Commission in consolidating the internal energy market, in particular with respect to preparing draft implementing measures in the field of electricity and gas. The objective is to help ensure a consistent application in all Member States of the Electricity (2003/54/EC) and Gas (2003/55/EC) Directives as well as the Regulations 1228/2003 and 1775/2005 on cross-border exchanges of electricity and access to gas transmission networks

## 2. Executive Summary

Rising energy demand and diminishing domestic supply have brought increased concern about the implications of any over-reliance on a single source on the security linked price development of Europe's gas supplies. The answer involves diversification of the energy mix and massive investment in the networks to allow gas to flow around an integrated European Grid as they do within national borders. Experience confirms that a liberalized energy market, where capital and investment follows market signals, is the most efficient and effective means of responding to such challenges. The European Regulators believe that we will not deliver competitively priced, secure and sustainable supplies of gas to customers if we cannot reform our fragmented energy markets.

From the point of view of European energy regulators responsible for gas network regulation the development of competitively priced, secure and sustainable supplies of gas is vitally lined to infrastructure. In this respect a comprehensive approach is necessary. We must establish the building blocks that together will deliver an effective single market. This modular approach must be developed upwards: from the infrastructure necessary to create an integrated Grid; the organisation of the companies that provide and operate it; through to the powers of the regulators to oversee it and all against an effectively functioning market. These elements are essential to the achievement of competition in a way that will ensure efficient and economic supply through to the customer.

Based on four core principles, a truly European energy market requires an over-arching EU legal, regulatory and institutional framework:

- "European" obligations on network companies
- Financing infratsructure investment
- Regulators with the necessary powers
- Diversification and solidarity between Member States
- A common energy policy

[1] Excerpt from CEER response to the Energy Green Paper.
[2] See European Commission's Decision of November 11, 2003 (203/796/EC).

## 3. Key recommandations

### 3.1. The development of a European Grid

- European Regulators support the creation of integrated European Grids for gas through the improved interconnection and co-ordinated operation of national grids.
- Network operators must develop the European standards to create and manage such grids.
- New obligations should be placed on network operators to invest in and operate their networks in the interests of "European consumers".
- The fulfilment of these obligations should be under regulatory oversight at national and EU level.

### 3.2. Financing infrastructure investments

The financing of grid investments is a complex issue. From the perspective of the investor there are basically two approaches to grid investments – the 'fully regulated' approach and the 'contract' approach. In both cases the present framework against which essential investments are made is incomplete, leading to unhelpful uncertainty.

*Contract' Investments*'
In some cases investment is required which benefits network users and consumers outside the network where the investment is made. In such cases mechanisms are needed to help ensure that costs and risks are allocated appropriately. Such "non-domestic" investments can include transit gas pipelines and electricity transmission infrastructure that cross Member State borders (particularly DC interconnectors). In gas, these non domestic investments can also include upstream transit pipelines, LNG gasification terminals (where the terminal serves a number of different "markets") and the associated LNG trains. The issue of non-domestic investment is significant in gas where around 60% of the gas consumed within the EU crosses two or more Member State borders. Traditionally, for these types of investment, the allocation of costs and risks between shareholders and users, and between different groups of users, have been achieved through contract (although non domestic investments are also sometimes supported as a result of an inter-Governmental agreement approving the investment based on inter-TSO network studies). In simple terms, promoters of non-domestic investment seek to secure a return by selling forward capacity. Often such capacity is linked to supply of gas. These contractual arrangements provide a secure forward stream of income for the investor and allocate a share of the risk to the purchasers of the capacity. Non-domestic investments may not be triggered by security standards as is the case for fully regulated investments – but often as a result of the exploitation of a commercial opportunity. Despite the important role that long term contracts continue to play in the development of infrastructure, concerns remain about the potential for such contracts to contain clauses which have anti-competitive effects. Regulatory oversight must be sufficient to ensure that such effects do not occur, and that the regulatory arrangements are sufficiently clear to provide regulatory certainty for investors.

*Fully Regulated' Investments*
Investments made by network operators in their own network tend to be triggered by a requirement that the network must meet specific planning and security standards. Investment can also be stimulated by other factors including quality of supply and environmental ones. Security standards could include mechanisms which allow network companies to take account of market signals in making investment decisions. Provided such investments are efficient, the network operator will be allowed to earn a rate of return over the life of the asset,

recovering costs through tariffs paid for by users of the network. The investment (if efficient) will be included in the regulated asset base of the network operator and earn a return equal to the estimated cost of capital over the life of the asset. Under this approach, the costs (and risks) of the investment are passed through to users of the network – if an investment became stranded the network operator would still be able to collect revenue and earn a return on the original investment. These arrangements for allocating costs and risks work well where the beneficiaries of the investment are the network users themselves.

Different approaches to investment in infrastructure are possible within and outside the EU and so the options for developing an appropriate framework to facilitate the development of a European grid are different.

- *A 'fully regulated' approach for investment within the EU* (reflecting an approach that already exists in many Member States) requires a comprehensive regulatory framework that placed obligations on network operators to provide capacity according to pre-defined regulated security standards. Network operators would also be required to build the necessary non-domestic infrastructure, and to operate it in conformity with regulated operating standards. Efficient investment would be allowed into the regulated asset base of the network operators and they would earn a fair regulated rate of return. Compliance with regulated operating and security standards would be overseen by independent regulators who would also allow the network operators to make a fair rate of return. Regulated third party access would be mandatory for cross-border interconnections, as they currently are for domestic transmission networks. Regulators would also be responsible for ensuring that the tariffs for the use of the network are set in a way which ensured that the costs and risks of cross border investments are allocated properly to those network users that benefit from the investments. Appropriate mechanisms would be required to allocate costs and risks on an appropriate basis between groups of users. The development of a fully regulated approach for a European grid requires consideration of other issues. In gas pipelines, network companies may compete with one another for the development project in some areas of Europe (as there may be a choice of routes, or there may be more than one network in a particular area) such competition needs to be taken into account in the final arrangements. Market mechanisms that are developed must allow signals to be sent to network companies about the long term location of generation and gas supplies. Clearly, each investment project requires a positive business case and some network congestion will remain as, therefore will some price differences between regions.

- *For infrastructure outside the EU* a 'fully regulated' approach to investment is not possible, and therefore investment is likely to continue to be 'contract investment' underpinned by long term contracts (indeed some investments within the EU will also be based on long term contracts). If such contracts are to work in ways which help the development of a secure and competitive single EU energy market, then a regulatory framework must be developed which balances the need to promote competitive markets within the EU (i.e. in the downstream market) with the need to foster security of supply by creating of an attractive investment climate. Different regulatory conditions are already in place in Europe to achieve this balance (such as requiring that some capacity is made available for short term booking). Current legislation envisages the possibility of exemptions from regulated third party access requirements for certain investments. However, a more comprehensive framework of regulatory conditions must be developed with long term contracts providing regulatory certainty for investors without precluding competition in energy markets. This could take the form of guidelines issued under the current ex-ante and/or ex-post regulatory arrangements. Recent jurisprudence must be applied rigorously and consistently to both the electricity and gas sectors (notably, decision C-17/03 of the European Court of Justice provides a clear ruling for certain, but not all, old contracts). The Regulators are willing to provide advice to the Commission on

the content of such Guidelines to ensure consistent regulatory application across the Union.

## 3.3. A European Grid Code and network co-ordination

Key Recommendations

- A 'European Grid Code' would be different in character from national grid codes. Preferably a different term should be found to bring out the nature of the proposed
- A 'European Grid Code' should specify the responsibilities of network companies in relation to the provision of a European gas and electricity grid. It should include standards on the development, maintenance and operation of the networks in this regard, as well as information sharing and information control.
- A 'European Grid Code' should be approved, overseen and enforced by Energy Regulators to ensure it operates in the interests of European customers.
- New EU legislation giving a harmonised minimum level of powers to national regulators to oversee the integrated Grid and powers to co-operate effectively in cross-border situations
- Regulators to continue work on common administrative obstacles to grid authorisation (with the clear objective of developing a pan-European approach).

The Green Paper suggests the creation of a 'European Grid Code' to "encourage harmonised or at least equivalent grid access conditions". The Regulators believe that for an integrated Grid of the sort outlined above to operate effectively, each network operator must be placed under a legal obligation to co-operate with others so its individual network contributes to the effective operation of a European network. The regulated operating and security standards referred to in 2 (i) are in effect a "European Grid Code". However, such a 'European Grid Code' is not the same in character as the grid codes at national level. To avoid potential confusion for industry practitioners, consideration of a different term than "European Grid Code" is proposed (such as 'European Network Standards Code'). Regulators in principle favour an overarching approach to the rules to be applied by the network operators towards their customers and towards each other. A 'European Grid Code' must be approved, overseen and enforced to ensure that it operates effectively in the interests of European customers. The public interest dimension should be safeguarded by the Regulators.

## 3.4. A European Centre of Energy Networks (ECEN) - Key Recommendations

- The formal responsibility for the delivery of the substance of an integrated European Grid must fall on individual national network operators, and not a centralised body.
- But there is an important role for a central body to facilitate co-operation between network companies at an EU-level.
- It is preferable to build on existing structures, rather than create new institutions.

## 3.5. The role of European Regulators

Key Recommendations:

- The powers and independence of national regulators must be broadly harmonised, without diminishing the present effectiveness of individual regulators. This may require substantive enhancement of the powers of many but should not reduce the existing powers of others.
- New additional powers, and a duty to co-operate across national borders, will need to be introduced for EU national regulators through new legislation.
- European-level regulation is needed for certain key EU wide activities.

- Different institutional options exist to fulfil European regulatory functions and each has advantages and disadvantages. The choice of the most appropriate arrangement should be assessed against the current state of integration of the EU energy market.
- To allow market rules to keep pace with market developments, flexible legal instruments (including comitology) should be more extensively used where appropriate.

The current structure of European energy markets is one where substantial national and regional differences exist in the fundamental design. The Green Paper itself raises the possibility of a *"Single European Regulator"*. Such a proposal (although not defined or explored in detail) would have the advantage, potentially, of full independence from political and national interests – from the Commission as well as from national governments and national regulators.

A second theoretical option could be to designate *exercise of a European regulatory function to the European Commission*. For example, where DG Competition currently has powers to initiate ex-post market investigations, DG Transport and Energy might be given complementary powers as an ex-ante regulator. Such an arrangement would consolidate the policy development, regulatory and enforcement functions in a single body. Regulation which is free of direct political intervention is an important feature of any regulatory institution as is the predictability of regulatory decisions which leads to regulatory certainty. Investment in network infrastructure requires that the confidence of investors is high and this would be achieved principally through the confidence that regulatory decisions will be based on economic principles rather then political objectives. However, the debate around the role of the Commission in regulatory arrangements, including for energy, will also be influenced by the readiness of Member States to transfer power to the Commission.

The third option is to *build upon existing regulatory institutions* of national regulatory authorities and the European Regulators' Group for Electricity and Gas (ERGEG). Decision making on the most controversial issues could potentially be difficult to achieve. Enhanced responsibilities for ERGEG would combine local expertise and accountability with established European competence. It would have the additional benefits of mirroring the structure proposed for the organisation of the transmission sector (section 2 ii). However, although the responsibilities of national regulators might be broadened to include cross border issues the risk remains that national regulatory members would tackle European regulatory problems from a national perspective rather then a European one. Any procedure would clearly need to address this potential difficulty.

### 3.5.1. Guaranteeing security of supply: diversification and solidarity between Member States

Key Recommendations:
- Diversity of supply is best achieved through liberalisation, which creates commercial incentives for the necessary investment.
- Any review of the rules on oil and gas stocks must be comprehensive and should not
- Obligatory rules on gas storage are unlikely to be the most efficient answer to security
- The Regulators welcome the establishment of an energy supply observatory as an instrument for greater market transparency.

*Gas stocking*

Natural gas is becoming an increasingly important component of the EU´s energy mix, and it is expected that in the longer term we will become increasingly dependent on gas imported from non-EU sources of supply. The Green Paper proposes that one way of reducing concerns about security of supply in relation to the supply of gas would be to increase the level that is kept in storage through the imposition of new rules on the level of gas stocks that Member

States should hold in order to meet short term disruptions in supply. At a European level, the Regulators consider that gas stocking must be considered alongside the development of interconnectors and an interconnected European grid, as discussed, if gas stocks are to truly provide security for all areas of Europe.

Storage capacity levels across the EU are very different and range from 2-3 months of supply in Austria to just a few days in other countries like Spain. The overall working gas volume in Western Europe's storage facilities adds up to roughly 70 bcm in total – which is equivalent to around 40 days of supply.

There are a number of issues that would need to be considered in relation to gas storage:

- The impact on the wholesale gas market the criteria for the release of stored gas would need to be transparent and well framed to avoid creating an implicit wholesale gas price cap or other market distortions;
- The impact on market provision of gas storage – there is a risk that obligatory requirements on the holding of gas stocks could "crowd out" the provision of gas storage from the market which could leave Member States in the position of ensuring that there was sufficient gas storage in non-emergency circumstances;
- The costs of requiring obligatory stocks of gas to be held across the EU is not easy to calculate, as they will differ depending on the nature of the storage facility and a number of other factors;
- Obligatory rules on stocking of gas could have a significant impact on costs and consequently the prices paid by consumers. It is likely that these costs would also vary significantly across the EU – and there are some Member States that do not have access to natural potential sites for gas storage facilities;
- The levels of gas required to be held in stock to provide certain level of supply security are likely to be different across all Member States – this would mean that a single stock level for the EU would not be appropriate and that the costs would vary significantly across Member States;
- There may be a need for further increased investment in associated infrastructure – eg. investment may also be required in transportation infrastructure to ensure that gas that is held in stock can be delivered to consumers in the event of a supply disruption;
- There is a risk of stranded assets – if there is significant investment to increase the levels of gas that are held in stock then this will ultimately be paid for by consumers. If the obligatory stocks are not utilised then there is the potential that these assets could be stranded and that consumers would face higher costs without receiving any associated benefits.

## **3.6.** A common external energy policy

The Regulators support the Commission's view that there is a need to define the aims of an external energy policy. The Regulators welcome the efforts made by the European Union to extend the principles of liberalisation by building a common regulatory space around Europe through the Energy Treaty with South East European partners, and encourages the EU to go in the same direction with the EuroMed partners. The Regulators continue to support these initiatives with practical and technical assistance. We have established a dialogue with the United States regulators through NARUC and are developing, on a seed funding basis, an international database ('IERN') to enhance the effectiveness and efficiency of all regulators internationally. We have also established ongoing relations with eastern European regulators in ERRA, and intend to extend our international dialogue with other important supplier countries, notably Russia and Algeria.

## The European Gas Market: price setting, structures and future prospects

**Allan Asher, Chief Executive, Energywatch, UK**

## Introduction

*"The competitiveness of the European economy depends on market-based, competitive electricity and gas prices. Security of supply is enhanced through correct market signals which will lead to the necessary investments within the EU as well as to a diversification of supply. And sustainability is boosted by correct price signals which give incentives to energy efficiency and energy saving.*

*"But it is clear that no-one in their right mind could say that a competitive single European energy market is already in place today. Before I started work as European Commissioner I felt this as strongly as anyone. Once I got into the job, I decided to go out and see if my feeling - and I know it was shared by objective market supervisors like OFGEM - was matched by reality. As you know, the result was the sector inquiry into competition conditions in the electricity and gas sectors.*

*"Malfunctioning in this sector is significant. I know you are familiar with our findings:*

- *first, too much market concentration creating scope for incumbents to raise prices;*
- *second, a lack of liquidity and too much tying of infrastructure and supply which prevents successful new entry and reduces consumer choice;*
- *third, very little cross-border integration. For gas, it is difficult to secure transit capacity on key routes. For electricity there are long-term capacity reservations and insufficient inter-connector capacity;*
- *fourth, a huge lack of transparency;*
- *fifth, prices are not determined on the basis of effective competition."*

*Mrs Neelie Kroes, European Commissioner for Competition Policy*
*The need for a renewed European energy policy SPEECH/06/541, London, September 28 2006*

In 2003, the European Commission (EC) revised the requirements of the Gas and Electricity Directives, to address concerns over the slow progress of market liberalisation, including the condition that the markets for all customers should be liberalised by July 1 2007. More recently the Directorate General of Competition initiated a sector inquiry based on Article 17 of Regulation 1/2003[3], which assesses the competition conditions on European gas and electricity markets and examines whether current indications of market malfunctioning result from breaches of competition law.

The overall objective of the inquiry and as disclosed in the Preliminary Report[4] (EC Report) is to address the barriers currently impeding the development of a fully functioning open and competitive EU wide energy market by 1st July 2007.[5]

This paper considers the emerging results of the sector inquiry contained in the EC Report with greater emphasis on the structure of European gas markets, issues relating to Price formation and regulatory roles. Rather than stumbling into an energy policy for Europe, it is important to know what the key goals and their dependencies are. In a speech (06/524, September 22 2006) Mr Andris Piebalgs, Energy Commissioner identified Europe's declining

[3] http://www.reckon.co.uk/open/Council_Regulation_1/2003
[4] http://europa.eu.int/comm/competition/antitrust/others/sector_inquiries/energy/#16022006
[5] *Energy Sector Inquiry, Draft Preliminary Report*, European Commission

indigenous energy production and increasing reliance on volatile energy markets as one such dependency. Europe in this context has much to learn from the mistakes and poor planning of the UK in this regard. The balance of this paper illustrates the challenge for Europe by way of shortcomings in the UK market.

## PART I – GAS MARKETS

The UK has now moved from being a net exporter of gas to being a net importer, but there was little timely investment prior to this happening – in 2003 – to ensure continuation of supply.

Now, this infrastructure – pipelines from Norway and the Netherlands; upgrades to the Bacton-Zeebrugge Interconnector; new liquefied natural gas (LNG) facilities; and new storage facilities – is coming on stream, but three years too late for UK consumers, who have seen prices rise hugely over this uncomfortable transitional stage.

The UK gas market is relatively complex, with gas sometimes traded a dozen times or more on the wholesale market amongst producers, shippers, suppliers, electricity generators and large industrial and commercial consumers. It is further complicated by the levels of vertical integration in the industry.

## PART II – REASONS FOR MARKET FAILURE

### 1. MARKET CONCENTRATION

The UK Department of Trade and Industry, and the major producers, insists that the UK market is highly competitive, with a number of significant players on the UKCS and new players able and encouraged to enter the market.

However, the market is dominated by a small number of multinational oil companies. Estimated market share for the biggest five is 58%; another estimate is that the largest six had 71% of total market share in 2004.

Ofgem has estimated that between 70-80% of trade on the wholesale market involves companies that are both producers and shippers. The disappearance of traders has both reduced the number of companies trading and limited the ability of other companies to trade. Centrica estimated that market liquidity fell by 40% in just two years between 2002 and 2004. Greater transparency was needed, but more supply, from more diverse sources, was essential.

The majority of gas fields and production facilities on the UKCS, and the pipes connecting the fields to each other and the beach, are jointly owned by several companies. If, for example, maintenance to one of the major pipelines is necessary, all those using the pipeline have to be informed. In this market, producers have vastly more information on what their competitors are doing and, until last week, customers had vastly less.

Since liberalisation of the retail market in the UK took place in the 1990s the number of active players has, through a process of merger and acquisition or exit, steadily reduced to six. Concentration of the market acts as a barrier to entry.

Both the retail gas and electricity markets are concentrated when compared to guidelines on market concentration used by the Office of Fair Trading.

Competition brings benefits through lower prices, greater choice, enhanced efficiency and more innovation. However, highly concentrated markets indicate that competition is not effective and therefore these benefits are not being realised.

**Barriers to entry in the gas market**
For new suppliers to enter the market, or to expand existing activity, companies depend on a number of factors – stable access to gas at a competitive cost; transparent and non-discriminatory access to the transportation network; and access to flexibility, including, inter alia, storage, balancing and contract terms.

Downstream, the supplier needs access to customers, requiring appropriate switching processes and the absence of exclusionary practices from incumbents. However, the information available to consumers is often not conducive to switching and consumers often do not validate their decisions before or after switching. Switching should be straightforward – suppliers have been challenged to improve the system before, though progress is slow.

In the gas market, at the wholesale level, markets maintain a high level of concentration, with incumbents dominant. At the retail level, choice is limited and competitive pressure reduced. DG Competition's report provides a picture of new entrants being dependent on vertically integrated incumbents for services throughout the supply chain.

**2. VERTICAL FORECLOSURE**
With vertically integrated operators acting at several levels of the supply chain, new entrants are largely foreclosed. Vertical integration reduces the necessity for companies to trade on wholesale markets, with consequences for liquidity.

Long-term supply contracts between gas producers and incumbent importers makes it difficult for new entrants to access gas upstream, a hindrance to effective market liberalisation. Despite EU rules on third party access and legal/functional unbundling, new entrants often lack effective access to networks, the operators of which are alleged to favour their own affiliates.

In 2004, in the UK, the operators of Grain LNG requested, and were granted, an exemption from section 19D of the Gas Act 1986 to the entire proposed capacity of their facility. Recently, concerns have been expressed about transparency, with customers particularly interested in potential deliverability from Grain LNG, and the capacity that may be available through 'use it or lose it' (UIOLI) arrangements.

These UIOLI arrangements are also causing some concern, with effective 'use it' incentives but no effective 'lose it' incentives. This has led Energywatch to commence a regulatory process which it hopes will result in certain disclosure requirements on the operator.

**3. TRANSPARENCY**
Lack or transparency prevents new entry, as potential entrants are unable to take decisions without information. Transparency creates a level playing field and builds confidence in the market, highlighting where unbundling requirements must be fulfilled.

In the gas market, onshore buyers had too little information about offshore activities. In July 2005, improved information was made available, which was a step forward, but not far enough. Energywatch had proposed a modification to the Network Code to improve information symmetry in the UK wholesale gas market, a proposal that was accepted despite fierce opposition from the upstream operators, and came into force last week.

Information asymmetry curtails market liquidity, as participants need to be able to hold different objectives or opinions, which are formed on the basis of the available information.

It leads to buyers having less certainty than producers about the true supply position; buyers being less able to assess whether price movements is based on short- or long-term factors, which can lead, when faced with market volatility, paying a premium to gain price security; and giving some participants opportunities to profit from the behaviour of less well-informed parties.

Information is garnered by the market in many ways, including the interpretation of actions by others. Unless consumers and their suppliers have access to the available information, their purchase decisions are less effective and higher costs result.

**4. PRICE FORMATION**

A well functioning and transparent market mechanism for setting prices is essential for markets to function properly and deliver the advantages of efficiency and choice to consumers.

According to a report by Global Insight,[6] the UK wholesale gas market has witnessed rising prices since October 2003. The market remains responsive to supply and demand patterns displaying distinct seasonality. The spot prices have seen a trend increase with the biggest percentage movements being seen in summer prices and lower, but still considerable increases in winter prices.

## PART III – ACTION POINTSA

Having discussed in general the findings of the EC report, Energywatch now proposes actions to deal with the problems mentioned above:

1. More liquid markets
2. Fair provision of information
3. Active monitoring of the upstream sector
4. Increasing pipeline import routes
5. New LNG facilities
6. Increasing gas storage capacity
7. Ownership unbundling
8. Effective and equivalent regulation

**CONCLUSION**

Liberalisation is not a neutral concept without consequences. Liberalisation was supposed to give consumers a wider choice; however economic conditions and regulatory conditions have created a market structure with high barriers to entry, where all dominant players in the market are pursuing a similar business model. These factors acts against competition and innovation that was suppose to bring benefits to the consumers.

The UK is committed to promoting competitive energy markets, which help raise the sustainable rate of economic growth and support industrial and business competitiveness through reliable and affordable energy. Energy makes a significant contribution to the economy and represents a key input into all other sectors. A competitive energy sector is therefore important to a nation's competitiveness and productivity[7]. To achieve a competitive energy sector work has to be done on the lines of action points as suggested by Energywatch.

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[6] *The UK Gas market – impacts of interactions with the wider European gas market* (August 2005), Global Insight, www.globalinsight.com

[7] Timms, S. *Competitive energy markets*, World Petroleum http://www.world-petroleum.org/first/first2003/34-35.pdf