

DEPARTMENT FOR BUSINESS
ENTERPRISE & REGULATORY REFORM

**INTRODUCTION TO GAS
MARKET LIQUIDITY**

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Introduction to Gas Market Liquidity

SUMMARY

Market liquidity facilitates efficient competition and thereby encourages optimal allocation of gas to where it is valued most, and optimal allocation of investment in interconnection, import facilities and source development. It can aid security of supply by reducing investment risk, enabling the market to balance efficiently, by encouraging new entry and hence diversity, by allocating price and quantity risk to those with the greatest appetite for it, and by enabling the demand side to respond to high prices in the short and long term. Traded markets can lead to more volatile prices than, say, long term gas contracts linked to oil, and this has costs such as the cost of hedging. However, price volatility also offers opportunities to those prepared to participate actively in the market.

The UK gas market is one of the most liquid in the world and the most liquid in Europe.

1. INTRODUCTION

Liquidity in the wholesale gas sector rises when:

- the number of players active on the market,
- price transparency,
- volumes traded; and
- the number of trades that take place

- all increase. Whilst the vast majority of gas globally is sold under long term contracts, wholesale gas is also traded around the world in country-specific hubs and international exchanges. It is either sold spot¹ or forward², depending on the demand and supply needs for the country and the risk management strategies of market participants. The demand and supply balance in a country determines the market price for wholesale gas in that trading market³. Some of the world's major gas hubs are the Henry Hub in the US, the National Balancing Point (NBP) in the UK, Zeebrugge in Belgium and the Title Transfer Facility (TTF) in the Netherlands.

¹ Spot trades are settled normally one or two business days from the trade date, and the spot price is the price at which the gas changes hands.

² Forward contracts are contracts between the shipper and the producer agreeing on a set price and volume today for delivery in the future. The price of the forward contract will normally have a risk premium attached to it. Gas financial trades are cash settled and could be either futures/forwards/swaps. Options are financial instruments that convey the right, but not the obligation, to engage in a future transaction and are cash settled. Such cash settled products are traded on other exchanges – such as the Intercontinental Exchange (ICE), which is benchmarked against the price on the US Henry hub gas trading platform. In this paper the term “forward gas market” includes forward, financial and options trading.

³ Production and import capacities, the marginal cost of gas, and supply, demand and price in other gas consuming countries all impact on the supply curve.

This paper will begin by looking at the levels of liquidity both in the spot and forward markets. The paper then moves onto the implications and issues surrounding liquidity, such as efficient markets, security of supply and price volatility. Finally there will be a short conclusion.

2. LIQUIDITY LEVELS

The UK's NBP is a virtual gas trading point (i.e. not a physical location) where gas is bought, sold and balanced. It was established by the UK Network Code in 1996. The UK spot gas market is one of the most liquid markets in the world and is the most liquid in Europe⁴, with roughly 70 active players.

The tables below show the volume of gas traded in the UK forward gas market compared with the European gas market. The trades consist of:

- Forward contracts - the physically settled forward trades;
- Financial trades - cash settled, which could be either futures/forwards/swaps, but are predominantly swaps; and
- Options - financial instruments that convey the right, but not the obligation, to engage in a future transaction and are cash settled.

One measure of liquidity is the ratio of the volumes of gas traded over the volumes of gas consumed. On the UK forward market, around 570,000 million cubic meters (mcm) of gas was traded in 2005/06 (01/08/05 – 31/07/06) and over 220,000 trades took place: during this period around 97,000mcm⁵ of gas was consumed, therefore the ratio of volumes traded to volumes consumed was around 6:1. On the European forward market only around 60,000 mcm were traded (around one tenth of that in the UK) and over 200,000 mcm was consumed in North West Europe⁶ – a ratio of less than 0.3:1.

Table 1: UK Forward Gas Market

UK Gas	Total	Forward	Financial	Options	Number of Trades
	Million Therms (mcm)	Million Therms (mcm)	Million Therms (mcm)	Million Therms (mcm)	
2004/05	173,680 (472,411)	162,458 (441,886)	2,271 (6,177)	8,951 (24,348)	161,173
2005/06	209,504 (569,850)	128,110 (348,460)	59,144 (160,871)	22,250 (60,519)	223,782

Source: Financial Services Authority (FSA)

Table 2: European Forward Gas Market

⁴ Global Insight (2005), 'Ensuring Effective and Efficient Forward Gas Markets.' Pg 37
<http://www.berr.gov.uk/files/file33153.pdf>

⁵ Figure from National Grid's "Historic Actual NTS Demands and SNT"
<http://www.nationalgrid.com/uk/Gas/Data/misc/>

⁶ Belgium, France, Germany and the Netherlands (but excluding the UK)

Euro Gas*	Total	Forward	Financial	Options	Number of Trades
	Million Therms (mcm)	Million Therms (mcm)	Million Therms (mcm)	Million Therms (mcm)	
2004/05	23,507 (63,940)	23,304 (63,386)	0 (0)	203 (553)	36,326
2005/06	22,971 (62,482)	22,971 (62,482)	0 (0)	0 (0)	30,235

* Includes all European hubs

Source: Financial Services Authority (FSA)

In terms of the spot market, Heren analysis showed that in January 2007, around 670mcm⁷ of spot gas was traded on the NBP's Over-the-Counter trading platform⁸, with nearly 1,700 trades taking place. During this month around 10,000mcm⁹ of gas was consumed in the UK, this works out to a ratio of around 0.06:1. In comparison, on the Continent, 170mcm of gas and 418 trades took place at Zeebrugge and 57mcm of gas and 56 trades took place on the TTF: thus total spot trade on these hubs was a third that on the UK hub but gas demand in North West Europe (excluding the UK) is over twice that in the UK. Looking forward, some of the smaller hubs such as the BEB (German) and the Points d'Echange de Gaz (French) are expected to show strong growth in the near future.

A report on gas market liquidity was carried out by Global Insight¹⁰ for the Government in 2005. It found that, despite the UK gas spot market being by far the most liquid in Europe, compared to other worldwide commodity markets (such as the copper market, foreign exchange etc) it was not particularly liquid. It found that the forward market is functionally liquid (trades of 'normal size' can at any time reliably be transacted at prices that will approximate those being reported at the time as being 'the market price'), but compared to global commodity standards it was illiquid beyond 12 months. One of the main reasons for this thin liquidity was due to the collapse of Enron, a major energy trader.

The section above discussed the aspects of market liquidity, the following section will examine the implications of this, in particular its impact on security of supply.

3. IMPLICATIONS AND ISSUES

⁷ Heren publish the OTC monthly trading statistics for the NBP, as published by National Grid. The data provided by National Grid only represents all the physical nominations made on its system and does not include trades that may have been made and netted off ahead of nomination.

⁸ Many spot trades also take place on the UK's On-the-Day Commodity Market (OCM) but are not counted here.

⁹ Figure from National Grid's "Historic Actual NTS Demands and SNT"
<http://www.nationalgrid.com/uk/Gas/Data/misc/>

¹⁰ Ensuring Effective and Efficient Forward Gas Markets.
<http://www.berr.gov.uk/files/file33153.pdf>

Efficient markets

As noted above, liquidity is about being able to trade at “market prices”. This requires (and hence provides) high levels of price transparency so that players can rely on the prices they are being quoted. Price transparency can help drive an efficient market. If prices are transparent then players and producers see where the gas is needed the most, i.e. where users are prepared to pay the highest price. The flow of gas is possible if there is a physical gas link between two countries, such as the case between the UK and Belgium. This clarity on price and the link facilitate price arbitrage¹¹ between the UK and Continental markets, where many gas contracts are linked to oil prices, and hence deliver gas when and where needed. Price transparency is also important in sending correct price signals to incentivise investment in networks and import/export facilities to take place when and where it is needed. Finally, such a market can enable and encourage new entry from producers, shippers and suppliers, thereby increasing competition and hence potentially raising service quality and innovation and keeping downward pressure on retail prices.

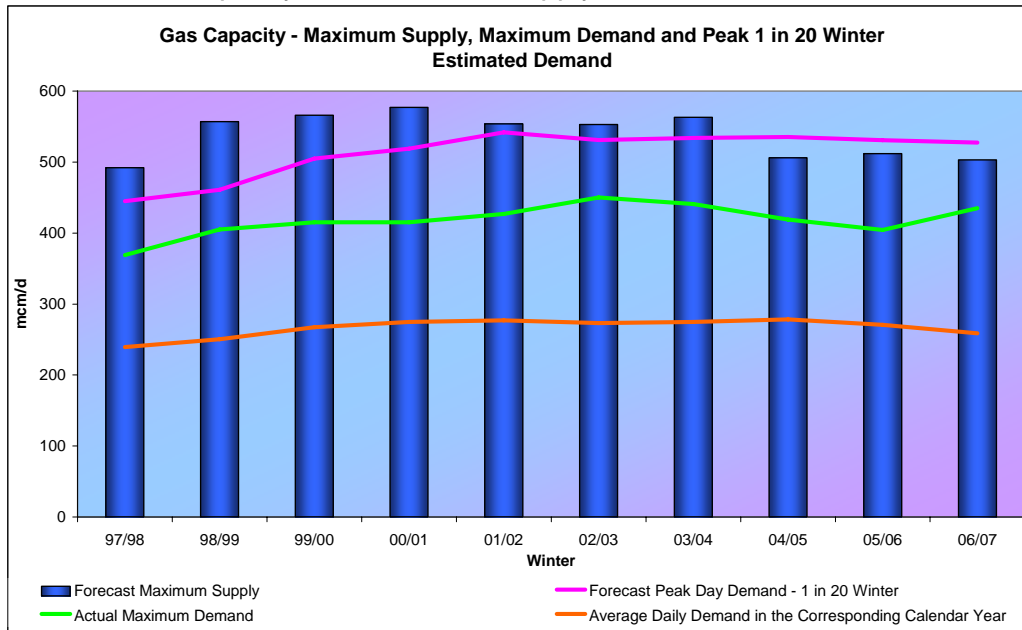
Security of supply

Similarly security of supply can be higher in a liquid market because greater flexibility, in terms of price and volumes available, enables gas supplies to be diverted in response to price signals to where it is needed the most so that gas supply and demand are balanced economically. Potentially, transportation costs can be minimised by for example giving players the confidence in prices to engage in swaps (where a gas supply contract is struck between, say, a producer and consumer who are some distance apart, the producer can arrange a nearer third party producer actually to supply the molecules (over the shorter distance)). It can also allow price and volume risk to be allocated to those with the greatest appetite or to those who are best able to handle it (e.g. traders could choose to sell short and major users/suppliers could buy long in the knowledge that they could trade to balance their position efficiently on the day). Swaps facilitate demand side response (DSR) by giving major users a robust facility to trade back the gas they had contracted for to help demand and supply to balance.

A liquid spot and forward market could also facilitate investment due to better price transparency and, hence, market signals. If high prices are clearly due to market tightness, rather than large trades moving the (illiquid) market (unrelated to demand and supply levels), and players are able to attach an appropriate risk premium to the forward prices, a long run profit making opportunity can become apparent.

¹¹ The nature of this arbitrage is explained further in: <http://www.berr.gov.uk/files/file41845.pdf>

Chart 1: Gas Capacity vs. Demand & Supply



Source: National Grid, BERR

The chart above, shows market tightness in 2004/05 – 2005/06. The data are readily available as is information on oil and forward gas prices. Every player will have this kind of information, and thus being able to make their individual decisions about supply and investment.

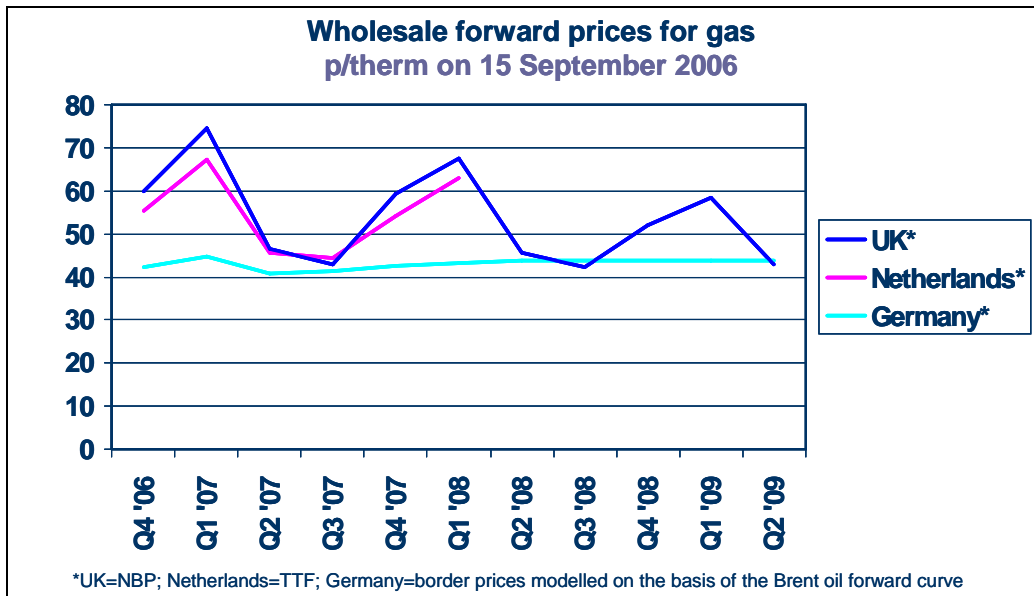
Market liquidity may be reduced by public policy obligations, such as requiring gas to be held in stock and pipeline capacity to be held to ensure domestic supply in extreme situations. These can prevent gas being traded and transported and hence going to where price is highest. As a result, those countries could incur an opportunity cost through not being able to take advantage of the price differential (and arbitrage opportunities) and those firms exposed to the spot price could incur high costs as the wholesale price increases. A high price might be sustained and enforced interruptions occur if trading opportunities for demand side response (DSR) are limited

Price volatility

Another factor which may reduce market liquidity is the existence of long run contracts which don't facilitate gas release to the market for third parties to trade and which have prices fixed within a range – e.g. a “collar” – and/or to a more stable liquid substitute (e.g. oil). This price link can be the case with European border prices and Asian (Japan, Korea etc) prices, which are fixed in long term contracts that are linked to oil product prices. These prices tend to be more stable compared to the prices traded on the liquid hubs (UK gas prices have become one of the most volatile commodities in the world) and this may be seen by some market participants as advantageous. However, heavy use of such contracts means that markets have less volume to trade and become less responsive to changes in the supply-demand balance (because these are not reflected in the prices actually paid for gas). This may

lead to more interventionist and possibly less efficient means of market balancing, such as forcible interruption to supply.

Chart 2: Wholesale Forward Prices for Gas



Source: Heren, Platts, BERR

As well as price transparency, volatility can signal the market to invest to supply more – both in storage and import facilities, such as LNG regasification terminals. It can also encourage DSR and better/more risk management strategies among users. However, these responses can come at a cost and price volatility can damage industrial users as they tend to buy large quantities of gas at near wholesale prices.

4. CONCLUSION

Liquidity in European gas markets is limited due to the lack of players and an unliberalised market. However, several new hubs are emerging and the development of new hubs will encourage more trade and players which will result in a more open, flexible and competitive market. As more players start to trade on and between hubs, efficient pricing and price signals could also improve. If this occurs liquidity could increase and the delivery of gas would be determined more by market signals, thus gains to security of supply could result.

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