



## The Evolution of the Gas Industry in the UK

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The rise of the United Kingdom's gas market and its regional integration within the north-western European gas market over the course of more than a century is a gas market integration success story. It is characterised by important energy policy changes and changing market circumstances both in Europe generally as well as at an intra-regional level.

The objective of this paper is to use the GMI model as a framework to describe the evolution of the UK gas market. It provides a descriptive retro-

spective from the gas monopoly years to the fully liberated market today through three lenses of policy frameworks. It poses the challenges and outlook for the future given the infrastructure and price linkages that are currently in play.

### ● The monopoly years: launching British Gas

Originally, gas used in the UK was synthetic gas manufactured from coal (or "town") gas, and the market was run primarily by county councils and small private firms. After World War II that changed with the Gas Act of 1948, which nationalised the UK gas industry. When it came into effect in May 1949, over 1,000 privately owned and municipal gas companies were merged into 12 area Gas Boards – geographically organised and collectively known as British Gas.



The world's first commercial LNG delivery was made from Algeria to the UK by the *Methane Princess* with the shipment arriving at Canvey Island on October 12, 1964.

This was the beginning of the publicly owned, vertically integrated monopoly for the downstream supply of gas in the UK. No interconnection to the mainland of Europe existed at this early stage of development and the UK remained isolated from Continental supply.

In an energy strategy spearheaded by energy supply diversification during the 1960s, the UK was the first European country to import LNG (from Algeria). Natural gas was supplied to certain industrial end-users and offered benefits over town gas, which was characterised by the variation in its gross heating value and its low pressure, requiring large storage in the various towns in order to ensure a stable supply to local consumers.

In 1966, following the discovery of natural gas in the United Kingdom Continental Shelf (UKCS), a national policy decision was taken to convert the UK supply from town gas to natural gas, a major shift in terms of supply and distribution techniques. On an energy supply basis, gas contributed only 5.4% of the UK's primary energy consumption in 1970<sup>1</sup>. The availability of gas supplies from the North Sea led to the closure of Canvey Island, the UK's only LNG receiving terminal in 1979, eliminating part of the diversity of supplies and compelling the UK to put into place a nationally determined energy policy. Gas from the Frigg field on the UK/Norway boundary was the only other non-UK gas source at this time (and after more than 30 years of statutory monopoly, only a small fringe of self-generators existed).<sup>2</sup>

Up until 1986, the state-owned British Gas held the monopoly for the sale and distribution of natural gas to end-users, controlling the supply from landfall to the entire industrial and domestic gas markets. British Gas also added to a number of upstream investments, which saw its exploration affiliate in the role of a UKCS producer.

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1 P. Wright *Gas Prices in the UK – Markets and Insecurity of Supply* (Oxford: Oxford University Press 2006).

2 D. Helm, *Energy, the State and the Market: British Energy Policy since 1979*, (Oxford: Oxford University Press, 2003).

Similarly, the electricity supply monopoly was run by the Central Electricity Generating Board (CEGB), primarily dependent on UK coal reserves. Since gas was considered to be a "premium" fuel and the development of modern, efficient gas-fired power plants was in its infancy, there was no gas-to-power market until the 1980s.

From the late 1970s (until 2004) the supply of gas in the UK came primarily from domestic UKCS production. The offshore pipelines and terminals were owned by upstream companies, initially by the larger petroleum companies who had pioneered the development of the North Sea oil and gas industry (e.g. Shell, BP, Exxon and Amoco), who had been encouraged to do so by a UK government which was keen to bring a degree of self-sufficiency to bear in a country which had suffered during the energy crises of the 1970s.

Before the 1990s an upstream exploration and production company could sell its gas only at landfall, after processing offshore, with onshore transportation remaining the preserve of British Gas.

### ● The privatisation of British Gas

The next major milestone in the history of the UK gas industry came during the mid-1980s, after a new Conservative government led by Margaret Thatcher came to power in 1979. The early years of this government were marked by an attempt to use whatever levers were available to address resource allocation, efficiency and pricing issues.<sup>3</sup> Under Thatcher, the government's policies fundamentally changed the course of developments in the UK gas industry, which was driven primarily by a perceived need for more efficient, market-driven competition. In the words of Dieter Helm, Professor of Energy Policy at Oxford University: "Many Conservatives thought that the problems were more systematic, and looked to the central pillars of the framework: the prohibition on competition and

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3 D. Helm, *Op. Cit.*, 2003, p. 48.

public ownership.”<sup>4</sup> In a bid to eliminate inefficient government control of the energy sector and in a vigorous pursuit of a market-oriented policy, the UK gas sector was privatised. The UK gas market and electricity markets in general were to become subject to the laws of the market, the cornerstone of a programme of mass-privatisation driven by the Thatcher government.

The energy policy of the day was based on the premise that, given the level of maturity achieved in the energy market(s), access should be given to more players, which would vastly improve competition and hence reduce prices for the end-consumer. This could be achieved because significant investments in infrastructure had already been made (and written down), meaning an “open-door” policy could be put into place, effectively introducing a market mechanism for the private entities involved. So, during the Thatcher years several privatisations were carried out in a broad drive encompassing the entire UK gas market. One of the first of these measures put into place, the Gas Act of 1986, led to the privatisation of British Gas, and on December 8 of that year, its shares were floated on the London Stock Exchange. The IPO (initial public offering) of its shares yielded a price of 135 pence per share valuing the company at £9 billion, the highest equity offering ever at the time.

The government created an industry regulator, the Office of Gas Supply (Ofgas), to protect consumer interests. Years later Ofgas merged with the electricity regulator to become the Office of Gas and Electricity Markets (Ofgem).<sup>5</sup> The energy policy had two main focal points: creating a market for commodity trading, and maintaining

the necessary infrastructure (which would be monitored by the regulator so as to ensure a level playing field for private entities operating in the market). As such, there would be a compulsory separation between the actual commodity trading and transport.

In preparation for the opening up of the gas supply markets to competition in 1996, British Gas plc had to go through a major process of restructuring including a substantial reduction of staff, which separated the company into five new divisions:

- Public Gas Supply (for the domestic market);
- Contract Trading (later named Business Supply);
- Transportation and Storage (later named Transco);
- Service and Installation (later named Services);
- Retail (later named Energy Centres).

The Exploration and Production and Global Gas Divisions were unaffected by these changes.

The offshore fields which were contracted to British Gas were assigned to either the domestic or business divisions, with the most flexible supplies consigned to the domestic consumers (with each division separately optimising the swing, take-or-pay and other contractual terms of the contracts allocated to them).

An early enabler of the market opening was the development of standard contracts for transportation of third party gas, the third party access (TPA) agreements; and for greater than 25,000 therms end-users could buy direct from the producers.

Despite these measures, competition in the gas market still faced many barriers for new entrants into the gas market, and several interventions were needed before the market became “fully” liberalised. Notably, in 1988, the Monopolies and Mergers Commission (MMC) report on British Gas led to many recommendations which would allow greater access for third-party gas providers in the gas value chain.

The recommendations alone did not provide the momentum for competition and “forced competitive measures” were introduced. In 1991,

4 He also points out that the appointment of Nigel Lawson as Energy Secretary in late 1981 marked a real turning point in post-war British energy policy, as Lawson immediately began with the Oil and Gas (Enterprise) Act 1982, with its focus on the privatisation of the British National Oil Corporation as Britoil and introducing competition into the gas industry. See D. Helm, *Op. Cit.*, 2003, pp. 51-57.

5 Ofgem is the UK’s regulatory body for the downstream gas and electricity industries.

a review by the Office of Fair Trading, which followed up on the MMC report, proposed that British Gas should release some gas it had already contracted to competitors in order to create a third party supply of gas. In 1992, the volume threshold for competitive supplies was reduced from 25,000 therms to 2,500 therms, which increased the number of customers available for third parties.

In 1994, British Gas plc was again re-organised into British Gas and Transco. British Gas owned the offshore supplies, storage and all the supply contracts including those originally purchased on a field depletion basis (with these contracts reunited under one group). The downstream pipeline system (National Transmission System – NTS) was separately and independently operated by Transco<sup>6</sup>. This development aided the liberalisation process, which was designed to allow transparent, open access to the transmission system. The intent was to increase competition in supplies to consumer and/or consumer groups, i.e., “the more the merrier”, with the aim being to drive down costs in the mature system and provide the corresponding benefits to end-consumers. This was against a backdrop of an outlook of natural gas being abundant with little to no limitations in supply; the constant provision of the commodity underpinned the functioning of the market.

### ● The opening up of the market

In overview, the liberalisation process involved the introduction of a new legal framework. It encompassed “unbundling”, i.e., the separation of ownership and transport, of the industry, shifts in the ownership of assets in British Gas plc, the introduction of supply competition, regulation and oversight of the onshore transportation and transmission system. The Chancellor, Nigel Lawson, had already recognised early on during the Thatcher years the structural issues relating to the combination of natural monopoly networks

and potentially competitive activities within single monolithic nationalised industries.<sup>7</sup>

New downstream companies (such as power producers) entered the market, which meant that offshore gas supplies could now be shipped and sold directly to end-users, provided that they obtained a shipper’s licence. New market entrants entered into various points of the supply chain, depending on the business model they adopted.

Over the period of 1990 to 1998, a liberalised gas market emerged, with gas supply continuing to come primarily from UK sources (small amounts of Norwegian gas came to the UK during some of this period). The market at this stage can be described as transitioning from one of advanced competition with the features described by the GMI model as “integrated” to a fully integrated one (driven by domestic gas supplies). There were plentiful gas supplies from the UKCS which meant that gas prices fell to a low level and supply competition via market based policies would ensure that low prices could continue. The GMI model of IGU’s GMI Task Force provides a schematic and simple path of development. Taking a snapshot of the UK gas market at this stage, its development has the features of a fully integrated market. The UK provided its own gas supplies, being both a producer and consumer country, downstream market liberalisation thus being applicable to both supplier and consumer countries in this particular case. *Table 1 (over)* summarises the most important features of a fully integrated gas market.

Following the liberalisation of the power sector and its privatisation, coupled with the privatisation of CEGB, the era of “the dash for gas” started in earnest during the 1990s. Gas being the cheapest fuel source now available encouraged the development of new, efficient, combined cycle, gas-fired power stations. The new TPA regulation for transmission meant suppliers could gain access to consumers ranging from power plants to domestic

<sup>6</sup> Transco was divested from BG into the Lattice Group in 2000, which merged with National Grid in 2002.

<sup>7</sup> D. Helm, Op. Cit., 2003.



end-users. The fact that natural gas is the cleanest fossil fuel (given its carbon footprint versus coal) further drove the momentum in UK gas sector development.

Operational measures were introduced to encourage this process. Transco operated the NTS and there were clear and transparent rules for TPA, with Ofgas being the regulator for Transco. The National Balancing Point (NBP) was subsequently established as the notional, central trading point, or hub, for natural gas in the UK. Entry capacity into the NTS was established via auctions from each entry point in the UK (terminals).

Capacity in the system was to be booked and paid for using capacity rights and obligations which were also to become tradable alongside the commodity of natural gas. Throughout this period,

the nature of the gas contracts changed from being solely long-term field depletion (life-of-field) contracts to include shorter-term supply contracts and spot contracts. Security of supply was not an issue since plentiful volumes were available to the market from an increasing range of producers. Gas also became available as a short-term commodity as part of a fully mature natural gas market. Gas increased its share of the primary energy mix from 5.4% in the 1970s to 40% in 2004.

The marketplace shifted from long-term, rigid sales to include more flexible, short-term and spot trading. As a result the previous long-term incentives to motivate new upstream green field developments in the UK dwindled. Sales to the new independent power projects (IPPs) became increasingly important in order to secure long-term nat-

RIGHT  
Table 1.

FULLY INTEGRATED GAS MARKET	
<b>Market Structure</b>	<p><b>Supplier Countries:</b></p> <ul style="list-style-type: none"> <li>● No restriction for the export of gas supply</li> </ul> <hr/> <p><b>Consumer Countries:</b></p> <ul style="list-style-type: none"> <li>● No restriction on importation of gas supply</li> </ul>
<b>Number of Players</b>	<p><b>Supplier Countries:</b></p> <ul style="list-style-type: none"> <li>● Many players in the various segments of the gas value chain i.e. gas producers/suppliers or aggregators, transporters, storage, trading, exports</li> </ul> <hr/> <p><b>Consumer Countries:</b></p> <ul style="list-style-type: none"> <li>● Full choice for all consumers (even residential) to choose gas supplier</li> </ul>
<b>Fuel Diversity</b>	<ul style="list-style-type: none"> <li>● Diversity in the sourcing of gas supply (type and source e.g. pipeline gas) without over reliance on certain suppliers or type of supply</li> </ul>
<b>Contract Structure</b>	<ul style="list-style-type: none"> <li>● Mix of short-term contracts (normally 12 months), spot and long-term contracts</li> <li>● Standard terms and conditions and master contracts for trading</li> <li>● Relatively complex supporting contracts which cover in detail many advanced contractual obligations such as the provision of additional services, flexibility, swapping, trading etc.</li> </ul>
<b>Pricing and Price Signals</b>	<ul style="list-style-type: none"> <li>● Price formula fully linked to cost of production, fuel competition or gas to gas competition</li> <li>● Price is transparent with price movements frequently reported and publicly available</li> </ul>
<b>Drivers/Benefits</b>	<p><b>Suppliers:</b></p> <ul style="list-style-type: none"> <li>● Diversity of consumers that reduce volume and price risks</li> </ul>

ural gas offtake from these developments. Thus, UKCS developments continued to be underwritten, albeit by a new form of long-term buyer compared with the erstwhile monopoly of British Gas – and not in such quantities, given that many IPP owners became active gas traders, and were comfortable with managing their fuel requirements in a more dynamic fashion (to the extent permitted by those who financed such projects and demanded a degree of term gas).

However, the rapid decline of field reserves (exacerbated by the lack of focus on UK exploration from the increasingly global producers) began to emerge as a new energy issue. Alarmed by this projection, UK policymakers adjusted their approach to embrace the need for additional alternative supplies outside the UKCS.

As can be seen in *Figure 1 (over)*, subsequent forecasts have successively down-rated the level of gas supply.

According to data from the Department of Energy and Climate Change (DECC)<sup>8</sup> the UK's net oil and gas demand will continue its steep rise well into the future, while since 2000 every production projection has been adjusted downwards with respect to that forecast in the previous year.<sup>9</sup>

Nevertheless, DECC does note the fact that it is possible in theory to maintain domestic production

8 The Department of Energy and Climate Change was established in October 2008, bringing together energy policy with climate change mitigation policy in the UK. Much information on the British energy sector was transferred from its predecessor, the Department of Trade and Industry.

9 DECC data on production forecasting, 2009.

- Ability to deal directly with end-consumers (without having to go through agents or intermediaries)

**Consumers:**

- Accessibility to various sources of gas that will enhance energy diversification and supply security

- Enhanced competition that would ultimately reduce costs

**Common Benefits**

- Competition that leads to provision of better services and lower prices (level of services improved significantly and substantial price reduction experienced by the UK when the market moved to a fully integrated market).

- Operational optimisation (physical and contractual)

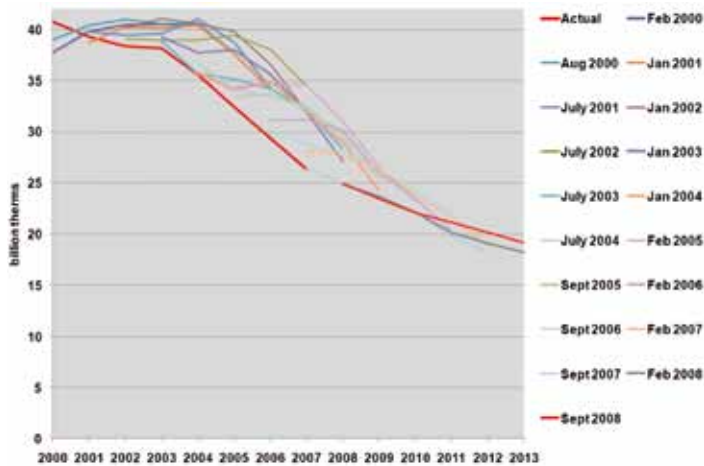
- Market liquidity and flexibility

**Challenges**

**Common Challenges for both Suppliers and Consumers:**

- Clear segregation of roles between the regulator and other regulating bodies
- Setting the social safety net and ensuring its implementation
- Other features to ensure against supply imbalances e.g. storage provisions
- Drafting the transition plan and managing the implementation (managing reliability, supplier of last resort)
- Price volatility risks
- Providing market signals to ensure infrastructure is built/renewed

### DTI AND DECC GAS PRODUCTION PROJECTIONS, 2000-2013



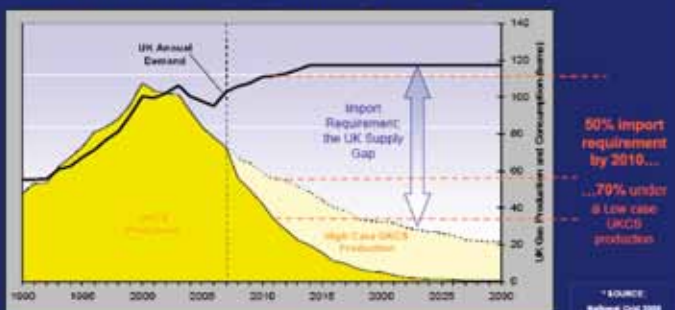
ABOVE  
Figure 1.

to satisfy domestic demand since there are many fields still to be brought into production. However, gas production can be affected by a host of factors, including demand, technical uncertainty and failure of facilities (ageing infrastructure). DECC expects capital investments in upstream production from the UKCS to fall from £5 billion to £3.5 billion between 2007 and 2012, respectively, wherein the share of the development of new

BELOW  
Figure 2.

### UK GAS PRODUCTION, 1990-2030

#### The UK is rapidly running out of gas



- UK imported 30% of its gas needs last year.
- Decline in UKCS steeper than anticipated. New supplies are not as available as hoped for.
- Supply shortfall has two major effects which are strongly linked:
  - Prices: rising sharply as UK moves from significant exporter to major importer
  - Security of supply: depending on other countries for supply makes politics as important as price

Source: Centrica presentation, Energy Institute event, July 2008.

fields is projected to be only a fraction of the total.<sup>10</sup> (See Figure 2.)

From the 1980s, UK energy policy had an aim of creating benefits for the end-consumer by creating more competition, which in turn was encouraged by a levelling of the playing field and regulation of the transmission/distribution facilities, all in a context of plentiful supplies. This proved successful at driving unnecessary bureaucratic costs out of the system and delivering a lower price to the consumer. Throughout the 1990s, this type of market-oriented gas supply system mirrored a development similar to developments in the telecommunications sector, which was also characterised by limitless supply and intense competition amongst multiple suppliers.

#### ● The “Interconnector”: an end to Britain’s “Gas Island” status

In 1999, the UK-Belgium Interconnector became operational; enabling UK gas supplies to be exported to Europe and vice versa. Ostensibly the main purpose of the Interconnector was to allow the UK to become an exporter to Europe, introducing it as a gas supply competitor vis-à-vis the Netherlands and Norway. This physical linkage meant that UK gas prices were now coupled *de facto* with those of Continental Europe, which in turn were oil-indexed. Spot trading began in the Continental European market, giving rise to standard contracts and hub services in a manner akin to the NBP, with the Zeebrugge hub operated by Distrigaz.<sup>11</sup> Trading grew rapidly until 2003. However, due to a lack of liquidity and market support, volume levels fell and caused UK price spikes (see Figure 3). The Continental arena differed completely from that of the UK, with the bulk of traded volumes being locked into long-term contracts, with only minor volumes being supplied through short-term trading centred on NBP-type hubs.

10 DECC data on production forecasting, 2009.

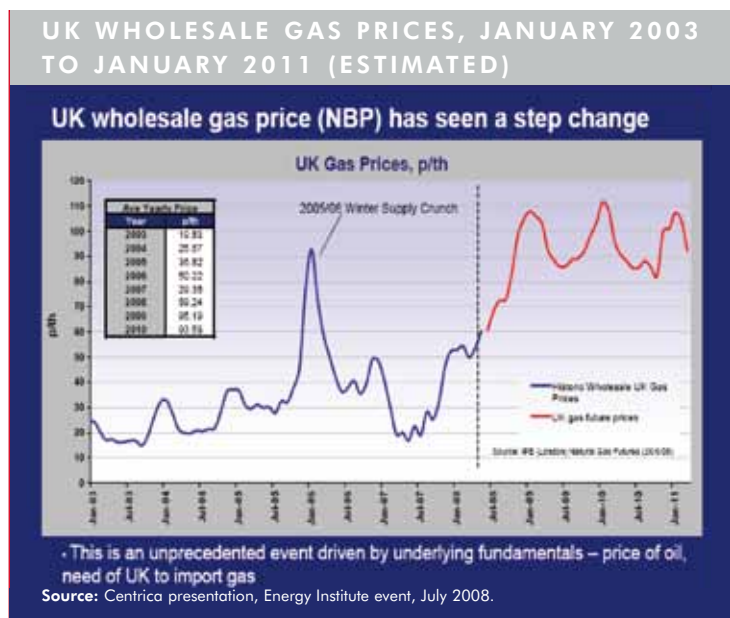
11 The hub subsequently evolved into a separate company called Hubertor.

Since the UK and Continental markets have been liberalised to differing degrees, the pricing signals seen at the hub reflect the markets' different fundamentals. Winter demand on the Continent is met through storage and the available flexibility included in the provisions of long-term oil-indexed contracts. Hence price volatility on the Continent is lower, given its connection to long-term supply contracts; while in the UK prices exhibit more volatility, given the short-term and/or spot market conditions. Supply related problems in the UK create demands at the NBP which cannot be met quickly because of infrastructural constraints in the UK (i.e., storage, connectivity and type of supply) and the nature of the supply contracts in place. The reverse flow capability of the Interconnector translates into perverse price signals, with responses occurring when the two markets are not mutually supporting each other.

In response to price spikes, outages and market demand, opportunities for investments in new LNG import facilities emerged, such as the Isle of Grain, Teesside and South Hook projects, as a form of supply/demand shock absorption. Major efforts were put into place to begin gas imports. The UK has evolved via a transition phase towards a gas-importing rather than a gas-exporting country. The overall result was that prices of 30 pence/therm shifted to a higher level of spikes around 100 pence/therm, during this phase of market development. The need for a new energy policy emerged which was to allow more structural support to ease the burden of price spikes being passed onto the end-consumer in the UK.

#### ● Policy responses to emergent new drivers

Increasingly, around 2005 and beyond, dwindling domestic gas supplies in the UK fed through into availability of supply concerns, leading to UK gas price increases. This signal was more or less already apparent but not translated into a different "investment signal", and ultimately it began to lead to the need for an energy policy modification.



An adjustment away from a primary focus of energy policy concentrated on the end-consumers' market and in-depth regulation of publicly-run infrastructure and non-regulated market settings.

In 2006, infrastructural issues, particularly relating to gas storage, demonstrated how exposed consumers were to supply/demand imbalances. UK seasonal swings in demand are addressed mostly by landfall swings and to some extent storage.<sup>12</sup> Since the shutdown of city gas storage facilities, and the general reduction in contractual "swing" in the new breed of gas sales agreements, new high pressure storage had to be put into place in order to take care of seasonal swings as well as daytime peak demand. The situation is complex because of the relationships between import and export flows and the physical infrastructure; depletion of sources; increased supply from associated gas rather than non-associated gas; ageing offshore infrastructure; and, on the demand side, limited substitution availability. It could be argued that liberalisation has led to the fragmentation of the gas value

ABOVE  
Figure 3.

12 P. Wright, Op. Cit., p. 17.





## FEATURES OF A LIBERATED MARKET

### Market Structure – Common Features in Supplier and Consumer Countries

- Full choice for all customers to select the supplier of gas
- No single player has dominant position/significant market power
- Clear and distinct segregation of ownership and operation of various segments of the gas value chain.
- Full access to gas infrastructures (pipeline, gas storage, LNG terminal)
- Availability of risk management instruments (spot, futures etc.)
- Gas spot and futures markets are established
- Examples: Gas industry/market structures in the UK

ABOVE  
Table 2.

chain, with a mix of ownerships and interests as well as inadequate infrastructure, which has led to high sensitivity to pricing patterns.

Against this backdrop, the UK government began an energy review and consultative process to address these issues and work towards devising a new energy policy<sup>13</sup>. The government outlined the consideration of legislating to establish a clear regulatory framework for the offshore storage of natural gas in non-hydrocarbon features such as salt caverns, as well as in partially depleted oil and gas fields. It included provision for the unloading of LNG offshore. It was designed to aid a clear framework to ensure that the market is better able to provide the infrastructure facilities that can make a major contribution to secure gas supplies for all consumers.

This consultation was closely linked to a number of other consultations that were proposed in the Energy Review report, in particular to address climate change. The Energy Challenge was published in July 2006. The measures set out in the report now coupled energy related policy with that of climate change namely to, “help to take forward our commitment to meeting the two major

13 [www.berr.gov.uk](http://www.berr.gov.uk), Offshore natural gas storage and liquefied natural gas import facilities consultation. This consultation ran from November 24, 2006 to February 16, 2007.

long-term challenges in UK energy policy:

- tackling climate change by reducing carbon dioxide emissions; and
- delivering secure, clean energy at affordable prices, as we move towards increasing dependence on imported energy.”

The consultations helped formulate the UK’s position on a range of energy issues published in the Energy White Paper in May 2007.<sup>14</sup>

From the perspective of the IGU GMI model, the UK gas market structure has several of the features of an integrated and liberalised gas market (see Table 2). So with a backdrop of this type of market structure, the new energy policy would address security of supply/demand as well as a carbon reduction commitment.

### ● Outlook

Looking ahead, IGU’s GMI model offers an explanation for the UK’s current level of market integration. In 2008, the UK had a potential diversity of supply with respect to sources in the form of increased capacity coming from pipeline connections (Norway and the Netherlands) and new LNG facilities, combined with significant pipeline interconnections with the Continent (see Figure 4).

### ● The outlook for LNG

New infrastructural developments are expected to allow large amounts of gas supply to be imported into the UK. Nevertheless, the short-term orientation of the UK gas market is still not particularly favourable for green field operations in the offshore sector of the UK compared with other global opportunities which now exist for exploration companies. Thus LNG imports are increasingly likely, with Milford Haven having two LNG projects, Dragon and South Hook, and the Isle of Grain set for further expansion (see Table 3).

Depending on the availability of LNG (the supply of which is somewhat a function of NBP

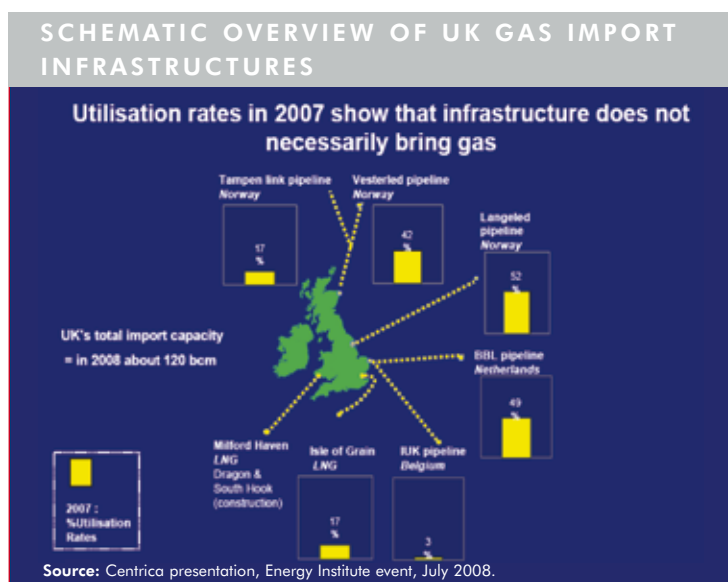
14 [www.berr.gov.uk/energy/whitepaper](http://www.berr.gov.uk/energy/whitepaper).

prices relative to those obtainable in other markets accessible to LNG), these capacities could provide entry for new sources of gas with pricing patterns moving away from a fully closed national setting to a fully global, integrated system.

However, there is still the prevailing fact that infrastructural development, when decoupled from commodity trade, does not imply adequate gas supplies, as LNG is subject to inter-regional competition. This makes long-term predictability for the end-consumer difficult.

Importing LNG may improve security of supply in the UK, but it all depends on the contract arrangements in place. LNG supply agreements have an increasing degree of flexibility embedded within them, enabling suppliers to divert cargoes to other more profitable markets. It is obvious that the arising uncertainty does not enhance UK security of supply, giving suppliers (and also their buyers who may share such diversion “upside” with the suppliers) arbitrage flexibility while failing to provide end-consumers with a guaranteed level of gas supplies.

Today, one may conclude that the UK has sufficient pipeline capacity (and expansions) in place to meet annual demand, as well as sufficient options to receive LNG, but the utilisation level is low and is likely to remain low, unless significant gas supplies become available in the medium term. Another issue is whether the capacity in place is sufficient to meet the peak demand requirement. For example, during cold winters, doubts remain over the availability of enough capacity to handle peak volumes. Capacity is expensive, and suppliers will avoid these kinds of expensive infrastructural investments whenever possible. Many suppliers are likely to focus on average volume sales at the lowest possible cost for capacity usage. With the freedom on the end-user’s side to install equipment in accordance with its needs, it is indeed questionable as to whether enough capacity can be supplied in a period of extreme energy need. As such, given the boundary



solutions offered by a free market, one is tempted to question, in the absence of a monopoly provider tasked with a national obligation to ensure security of supply, whether this is indeed a workable solution for security of supply requirements which are needed to withstand the harshest of circumstances such as cold winters, supply disruptions, etc. Part of the answer to this conundrum

ABOVE  
Figure 4.

BELOW  
Table 3.

- ### RECENT UK INFRASTRUCTURAL DEVELOPMENTS
- In 2005: Isle of Grain LNG import facility commissioned (originally 4.4 bcm/year capacity, later expanded to 13.3 bcm/year, will ultimately be 20 bcm/year).
  - In 2006: Phase 1 of Langeled pipeline connecting to Sleipner field, gas from Norway (Phase 2 connecting to Ormen Lange field in 2007, 23 bcm/year).
  - In 2006: BBL pipeline from Balgzand in the Netherlands to Bacton (14 bcm/year).
  - In 2006: Expansion of UK-Interconnector for imports to UK (up to 23 bcm/year).
  - In 2009: Dragon LNG import facility commissioned (6 bcm/year capacity, expansion to 9cm/year authorised).
  - In 2009: Phase 1 of South Hook LNG import facility commissioned (ultimately 21 bcm/year capacity).



will be increased market liquidity via extensions of market liberalisation in Europe.

The UK gas market is one of the most liquid in the world.<sup>15</sup> The BERR report summarises the UK perspective in that market liquidity facilitates efficient competition and therefore encourages optimal allocation of gas to where it is valued most and optimal allocation of investment in interconnections, import facilities and source developments. It can aid security of supply by reducing investment risk, enabling the market to balance efficiently by encouraging new entrants and hence diversity by allowing 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. It also suggests that increased inter-connectivity and greater flexibility in price and volumes available in a more liberalised European market could offer gains in security of supply.

#### ● **Liberalisation, import-dependence and state-driven companies**

The liberalisation policies implemented by policy-makers in the UK have set a precedent for policies in the European Union (EU). Throughout the 1990s, the European Commission (EC) has been active in implementing similar measures to those applied in the UK throughout the 1980s and subsequently. Going beyond the scope of this paper, the EC has initiated a whole package of measures in a protracted effort to re-regulate the European gas industry. The most recent of these initiatives is the Third Energy Package and the introduction of the Agency for the Cooperation of Energy Regulators (ACER).<sup>16</sup> The UK is an example

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<sup>15</sup> D. Patel, *Introduction to Gas Market Liquidity*, Department for Business Enterprise and Regulatory Reform (BERR), October 2007, URN07/1535.

<sup>16</sup> The third energy package is the latest of a series of EU-level drives to dismantle large energy firms for the benefit of a more level playing field within a seamless EU internal gas market. These measures cover ownership unbundling, the creation of Independent System Operators (ISOs), as well as more power to national regulators. The ACER initiative is designed to intensify and broaden cooperation between the national European regulators.

of how well a market may function in terms of the model, having developed into a fully integrated gas market, and indeed, north-western Europe as a whole appears to be following suit. Whether the European gas market as a whole is likely to develop in a manner similar to the UK remains to be seen.

One fact is certain, UK and EU gas import dependencies are already significant and will continue to rise despite relatively well-developed infrastructure being in place. This trend comes at a time when state-driven companies are becoming increasingly influential as they internationalise their export strategies centred on a sovereign resource base. Meanwhile private companies such as Shell and ExxonMobil, despite their level of vertical integration, control only a limited amount of such resources, and these players increasingly seek to cooperate with state-owned players throughout the value chain. Security of demand and supply in foreign markets are major issues for state-driven companies, who face a number of important domestic and political constraints in their decisions to develop their resource base. For oil producers, OPEC has long been the vehicle to defend their interests in a cartel setting. The combination of the increasingly inter-regional nature of gas market(s), the physical flexibility of LNG and the huge capital investments required to develop gas resources and effect their transportation, has encouraged gas-supplying countries to intensify their dialogue through platforms such as the Gas Exporting Countries Forum (GECF).

#### ● **Summary and conclusions**

The UK market structure has evolved over 10 years via three distinct phases of policy initiatives, the first of which served to deliver competition and lower the price of gas to the consumer via a liberalisation of the gas market. Over time, geopolitical dynamics became increasingly important as both security of supply in combination with security of demand were added challenges and the UK market became inter-linked with European

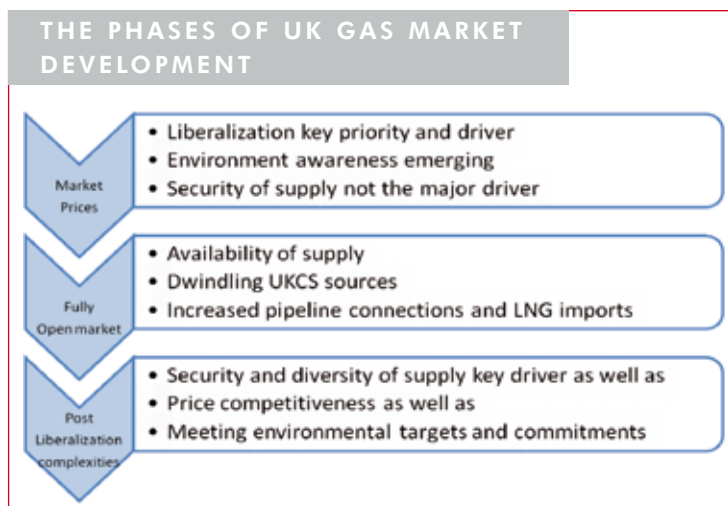
policies and market fundamentals. Climate change and energy security concerns are features of the post-liberalisation challenges.

Three distinct phases of UK gas market development have occurred, as summarised in *Figure 5*. By using the GMI model of IGU, it becomes possible to put each of the developments of the UK gas market into perspective – starting from the base this shows the policy drivers and market responses within the model framework, moving upwards through various stages to deliver stakeholder benefits.

Until reaching the maturity of the market, UK energy policy was focused on liberalisation of the end-user market, managing a single publicly-owned network and providing a level playing field for multiple UK gas players. The short-term focus of the new resultant gas sales regime may not have encouraged new green field development, while simultaneously the country discovered that it was beginning to see a need for supply diversity. “Cheap” domestic supplies had to be compensated for by “expensive” foreign imports, leading to a marked increase in average end-user prices.

Nevertheless, the fully liberated UK market has become globally interconnected. The UK is much more oriented than the rest of Europe towards the suppliers’ desired pricing for LNG (Europe is 90% linked to pipeline conditions with 80% oriented towards long-term contracts heavily linked to oil pricing). The Continent for this reason is much more connected to security of supply and security of demand while the UK is to a certain extent linked to gas-to-gas competition. From a pricing point of view this environment tends to be more of a supplier dominated market than the rest of Europe. The UK and continental European markets are increasingly connected to other markets through an inter-regional dimension. Pricing in both markets will increasingly be influenced by both hub- and oil-based pricing.

Jonathan Stern, Director of Gas Research at the Oxford Institute for Energy Studies, examined this



issue in a recent paper<sup>17</sup> and came to the conclusion that, “a fully liberalised UK market does not seem to deter very large investment projects, even when the profitability of some projects may be questionable given anticipated market conditions”.

The key question for the future is how successfully will the UK, within a European linked system, diversify its sources of energy to embrace climate change targets and provide energy security, using natural gas? Will a fully liberated energy market with better linkages between countries both in a physical sense and contractual sense, offer all of Europe not only a more efficient energy future but also a more secure one?

*This paper was prepared for IGU’s Gas Market Integration Task Force during the 2006-2009 Triennium by Calliope Webber, who was a Task Force member and is the Managing Director of Greengold Ltd. The author would like to thank Timothy Boon von Ochssée for his help, who in turn would like to thank Michael Earp at the UK’s Department of Energy and Climate Change for providing energy statistics and information regarding UK gas production.*

<sup>17</sup> J. Stern, *Large Scale Investments in Liberalised Gas Markets – the Case of UK*, [www.oxfordenergy.org/presentations](http://www.oxfordenergy.org/presentations).

ABOVE  
Figure 5.



## NGA Defines Future Path for Gas Industry in Nigeria

By Chidinma Obi

The 10th anniversary of the Nigerian Gas Association (NGA), the country's gas industry body and a Charter Member of IGU, was an excellent opportunity to take stock and plan for the future of the Nigerian gas industry.

Held at the Nigerian capital, Abuja, on November 23 & 24, 2009, the anniversary celebration comprised four events: a gala night and opening of a photo exhibition on the 23rd, followed by the 10th anniversary gas symposium and a dinner and awards night on the 24th. The symposium, with the theme "The Gas Millennium: Strategic Focus for National Development", attracted high-ranking speakers

and delegates from various stakeholder groups within the Nigerian oil and gas industry.

Among the respected persons at the events were the IGU Secretary General, Torstein Indrebø, Nigeria's Minister of State for Petroleum Resources, HE Odien H. Ajumogobia, and the Chairman of the Nigerian Senate Committee on Gas, Senator Osita Izunaso. Chevron, ENI, ExxonMobil, Shell, the Nigerian National Petroleum Corporation (NNPC), Brass LNG, Nigeria LNG and many other players in the industry sent high-powered delegations to the events.

A total of four papers were presented at the seminar. These covered areas such as the opportunities and challenges of investing in the Nigerian gas industry, and gas industry reforms – implications and views from the legislative, national oil company and operators' perspectives. Of particular note to many



NGA President Charles Osezua (left) introducing Nigeria's Minister of State for Petroleum Resources (centre) to IGU's Secretary General.



Nigeria currently exports gas as LNG (part of Nigeria LNG's Bonny Island plant is pictured) but is evaluating the feasibility of a trans-Saharan pipeline.

participants were the presentations by the Nigerian Minister of State for Petroleum Resources and the representative of the Group Managing Director of NNPC, which provided further information and understanding about the Nigerian oil and gas industry reforms, especially the Nigerian Gas Masterplan and the Petroleum Industry Bill.

The evening of November 24 afforded all NGA members and guests the opportunity to relax after the intellectual excitement generated by the seminar. Apart from the opportunity the dinner gave for networking and enjoyment, participants also witnessed the giving of awards to various players within the Nigerian gas industry.

In his speech at the end of the proceedings, the NGA's President, Charles Osezua, who

holds the Nigerian honour of Order of the Niger (OON), stated: "The high level of support given to the NGA in the last 10 years has indeed been very humbling. From the Nigerian government to the industry's operators, the NGA's ability to drive and moderate the gas conversation in Nigeria has enabled us stay true to our goal to remain the voice of the Nigerian gas industry. We hope, in the next decade, to build on these relationships in our efforts to move and expand our industry into higher levels of productivity and prosperity, while also increasing the scope of Nigeria's involvement in the activities of the International Gas Union."

*Chidinma Obi is the Secretary General of the NGA ([www.nigeriangasassociation.org](http://www.nigeriangasassociation.org)).*

## GECF Moves Forward with Election of Secretary General

By Mark Blacklock

The election of Leonid Bokhanovsky as the first Secretary General of the Gas Exporting Countries Forum (GECF) marks another important step in the Forum's transition from an informal grouping to a fully-fledged international organisation.

Bokhanovsky, a member of the management board of Russian engineering company Stroytransgaz, was unanimously elected by the Forum's 11 members when they convened in Doha, Qatar, on December 9, 2009 for the ninth GECF ministerial meeting.

GECF's current members are Algeria, Bolivia, Egypt, Equatorial Guinea, Iran, Libya, Qatar, Nigeria, Russia, Trinidad & Tobago and Venezuela, accounting for 43% of global gas exports (see *Table 1*). Kazakhstan, the Netherlands and Norway have observer status.

The Secretary General will serve for a two-year term, renewable for a further two years, and is based in Doha. When the GECF charter was adopted in December 2008 it was agreed that Qatar would host the secretariat. Qatar also holds the 2009/2010 presidency, Energy & Industry Minister Abdullah bin Hamad Al-Attiyah having been elected President in June 2009. The Vice President is Algeria's Minister of Energy & Mines, Dr Chakib Khelil, who will take over the presidency for 2010/2011.

In the run-up to the ministerial both Al-Attiyah and Khelil expressed concern about the fall in gas prices caused by a combination of weak demand and increased supply; and the balance of supply and demand is clearly a key item of concern for GECF. But Khelil was quick to reassure importing countries about the Forum's intentions, suggesting that members could boost profits through a system of swap deals to cut the cost of delivering their products to the market, rather than trying to increase prices. This followed his earlier comments during the 24th World Gas Conference about



**LEFT AND ABOVE**  
Qatar's Deputy Premier and Minister of Energy & Industry, Abdullah bin Hamad Al-Attiyah, presided at the ninth GECF ministerial during which Leonid Bokhanovsky (ABOVE) was elected as GECF's first Secretary General.

GECF working “to the benefit of both suppliers and consumers”.

The theme of cooperation was also emphasised by Al-Attayah when he addressed the ministerial, saying that GECF would “provide the necessary support for the Member States to help them develop their resources of natural gas through research and development efforts to face energy challenges and future investment opportunities”, and stressing the need to exert a “greater level of mutual support to ensure the uninterrupted supply of energy to the world and a wise and prudent utilisation of our natural resources”.

As well as electing the Secretary General, delegates set the secretariat’s 2010 budget at \$6 million. After his election, Bokhanovsky said that apart from the supply-demand balance GECF’s activities would cover:

- developing a research capability;
- promoting gas exploration, production and

transportation technologies worldwide;

- monitoring and forecasting gas exploration and production trends worldwide;
- coordinating transportation projects (pipelines and LNG carriers);
- studying the interaction of gas with other energy resources; and
- promoting greater use of natural gas.

He also said he wanted to develop close cooperation with other international organisations, and that he hoped to bring in new members, highlighting Azerbaijan, Canada and Uzbekistan as potential candidates.

Progress on the secretariat’s work will be reviewed by the 10th GECF ministerial meeting, which is scheduled to be hosted by Algeria at the time of LNG16 in Oran.

*Mark Blacklock is the Editor-in-Chief of International Systems & Communications Ltd.*

#### GAS EXPORTS OF GECF MEMBERS

Country	Pipeline exports (bcm, 2008)	LNG exports (bcm, 2008)	Total gas exports (bcm, 2008)	Share of world gas exports
Algeria	37.5	21.87	59.37	7.3%
Bolivia	11.79	–	11.79	1.4%
Egypt	2.86	14.06	16.92	2%
Equatorial Guinea	–	5.18	5.18	0.6%
Iran	5.8 (less imports of 6.9)	–	-1.1 (net gas importer)	–
Libya	9.87	0.53	10.4	1.3%
Nigeria	–	20.54	20.54	2.5%
Qatar	17.1	39.68	56.78	7%
Russia	154.41 (excluding CIS)	–	154.41 (excluding CIS)	19%
Trinidad & Tobago	–	17.36	17.36	2.1%
Venezuela	–	–	–	–
<b>GECF members</b>	<b>232.43</b>	<b>119.22</b>	<b>351.65</b>	<b>43.2%</b>

Source: BP Statistical Review of World Energy, June 2009.

LEFT  
Table 1.





## Publications and Documents Available from IGU

As a non-commercial organisation promoting technical and economic progress in the gas industry worldwide, IGU offers its publications free of charge and you are invited to order the IGU publications currently available from the Secretariat. (All documents are A4 format unless stated otherwise and those that can be downloaded from the IGU website are indicated.)

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### *IGU organisational information*

- IGU Articles of Association, (A5).
- IGU Guiding Principles for Sustainable Development.
- News, Views and Knowledge on Gas – worldwide. This general brochure gives a concise introduction to the organisation together with its Vision and Mission.

### *2009-2012 Programme (also available from [www.igu.org](http://www.igu.org))*

- Triennial Work Programme 2009-2012
- IGU Organisation Chart 2009-2012
- IGU General Brochure
- IGU Annual Report
- Climate Brochure, Natural Gas – Part of the

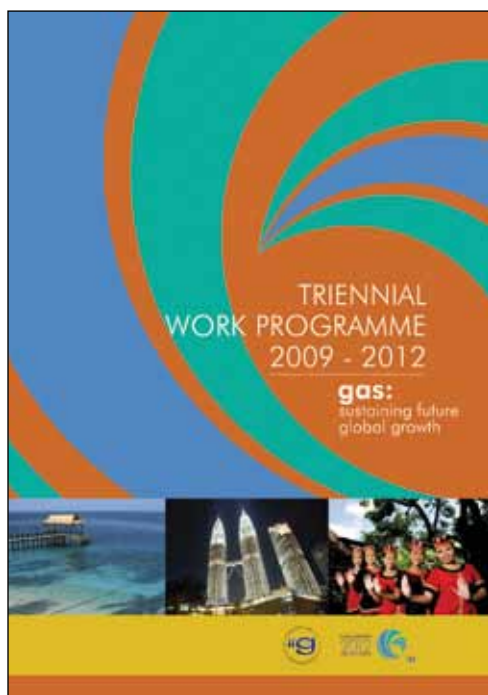
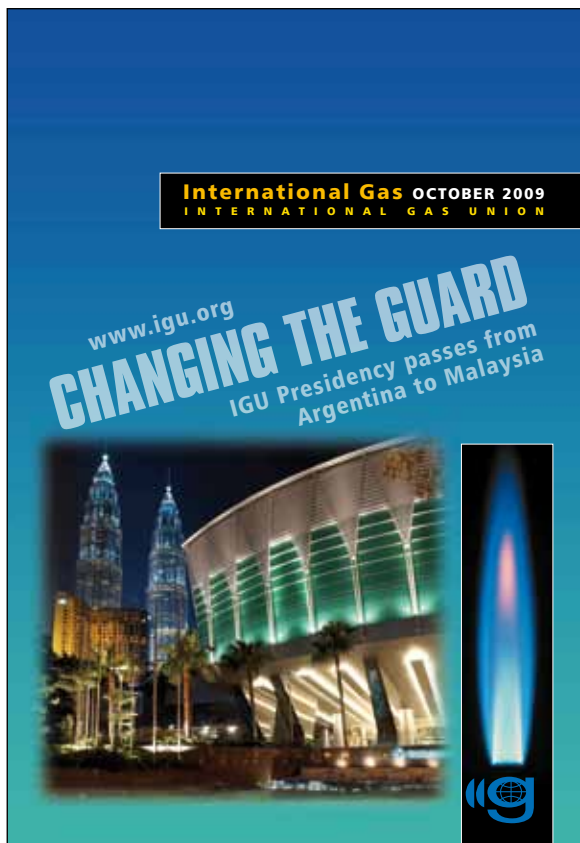


Solution to Global Climate Changes

- Natural Gas as a Transportation Fuel
- IGU Gas Efficiency Award 2008/2009 & IGU Social Gas Award

**Scientific and technical papers and documentation**

- Global Natural Gas Perspectives, Nebojša Nakićenović e.o., IIASA, IGU, October 2000 (71 pages, 18 x 25.7 cm). This booklet presents research-based arguments as to how natural gas appears to be suited to provide a bridge from the current energy system to a new era of more environmentally sound energy systems.
- Natural Gas Supply to 2100, M. A. Adelman and Michael C. Lynch, DRI-WEFA, IGU, October 2002, (51 pages, 18 x 25.7 cm). This booklet outlines the authors' assessment of a long-term supply curve for natural gas.
- Proceedings of the 17th, 18th, 19th, 20th and 21st World Gas Conferences, (CD-ROM).



- Proceedings of the 22nd World Gas Conference, Tokyo 2003, (available on [www.igu.org](http://www.igu.org)).
- Proceedings of the 23rd World Gas Conference, Amsterdam 2006, (CD-ROM).
- Worldwide Underground Storage (UGS) database, (available on [www.igu.org](http://www.igu.org)).
- Gas to Power Global Outlook, (brochure, 12 pages).
- The Art of Regulation, (brochure, 8 pages).
- International Gas, ISC. All issues of the bi-annual IGU Magazine from 2004-2009.

**Individual publications from WGC 2009 (available from [www.wgc2009.com](http://www.wgc2009.com))**

- 2030 Report
- CO<sub>2</sub> Report
- Energy Efficiency Model
- Guidelines on Gas Market Integration
- Best Practices Initiative
- IGM brochure



## IGU Events and IGU-related Events 2010-2011

### 2010

#### April 6-8 IGU Executive Committee Bali, Indonesia

April 18-21  
LNG16  
Oran, Algeria

June 8-10  
12th World IANGV Conference and  
Exhibition (NGV2010)  
Rome, Italy

June 15-17  
Global Unconventional Gas 2010  
Amsterdam, The Netherlands

June 17-18  
Eurogas General Assembly  
Warsaw, Poland

June 24-25  
GIE Annual Conference  
Vienna, Austria

September 12-16  
World Energy Congress (WEC2010)  
Montreal, Canada

September 27-October 1  
44th IPLOCA Convention  
Venice, Italy

#### October 18-22 IGU Council Meeting Doha, Qatar

November 29-December 10  
16th session of the Conference of the  
Parties to the UNFCCC (COP16)  
Mexico City

#### November 30 2nd IEF-IGU Ministerial Gas Forum Doha, Qatar

December 2  
Eurogas General Assembly  
Brussels, Belgium

### 2011

#### April 5-7 IGU Executive Committee Houston, USA

#### October 3-7 IGU Council Meeting Dubrovnik, Croatia

October 18-20  
4th Biennial Conference & Exhibition  
of the Asia-Pacific NGV Association  
(ANGVA2011), Beijing, China

#### October 19-21 IGU Research Conference (IGRC2011) Seoul, Korea

December 4-8  
20th World Petroleum Congress  
Doha, Qatar

You can find links to many of the  
above events by visiting [www.igu.org](http://www.igu.org).

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