



## Role of Gas Markets in Gas Monetization Case Study: European Gas Market Development Andy Hubbard ExxonMobil Gas & Power Marketing

### Background

Natural gas is expected to be the fastest-growing major fuel between now and the year 2040, with world demand rising by more than 60 percent. Europe's dependence on gas as part of the energy mix is also growing, with gas expected to contribute around 30 percent of the region's overall energy supply by 2020.

To meet this rising demand, substantial sources of new supply must be developed. Significant portions of new supplies will face technical challenges and will come from locations far from major markets. These factors will in turn increase the complexity of resource commercialisation and monetisation.



### Introduction

#### Background

- World gas demand forecast to increase more than 40% over next 20 years
- Europe increased dependence on gas and gas imports
- Global gas market is emerging

#### Overview

- Emergence of liquid markets in Europe is:
  - Enabling Europe to attract new and diverse sources of gas
  - Facilitating timely development of new gas resources

Figure 1: Introduction

This paper addresses the role of liquidity in facilitating gas resource monetisation, using the European gas market as a case study. Specifically, we'll describe the evolution of the European gas market from country-focused structures based on long-term contracts, through the emergence of liquid markets in individual countries, to the current development of a broader European market. The paper offers a perspective on the impact of these developments on the emerging global gas market, on Europe's ability to attract new and diverse sources of gas, and in facilitating the timely development of new gas resources.

### Overview

Our industry has for years forecast that the gas market would become global. With new and diverse supplies of gas from liquefied natural gas [LNG] and unconventional resources, as well as new and planned cross-border pipelines, we are now seeing this global market become more of a reality.



## Global Gas Market Emerges

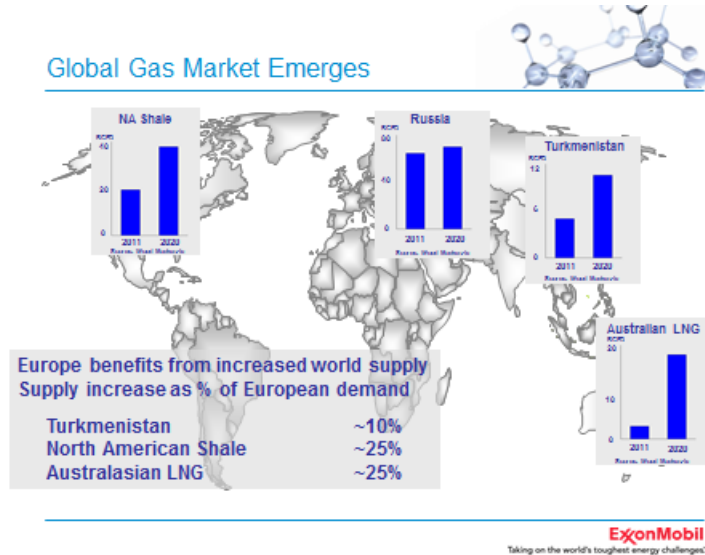


Figure 2: Global Gas Market

Europe has benefited from new gas supplies from many parts of the world. Qatar, home to the world's largest gas field and the world's largest LNG producer, recently started up all of its planned LNG trains. Since 2009, QatarGas trains 4 through 7 and RasGas trains 6 and 7 have added an incremental ~47 million tonnes per annum [MTA] to total global LNG supply capacity.

New LNG projects have also recently come on-stream from Russia, Indonesia, Yemen and elsewhere. Coupled with increased access to markets that have been provided by new regasification terminals around the world, these new supplies provide a global opportunity for LNG cargos to move to markets where they are needed rather than being restricted to their original destination.

Australia alone is well on its way to contributing to substantial increases in LNG production. By 2020, these Australian developments could be equal to around 25 percent of European demand. It will be unlikely that this gas will be transported directly to Europe, but the developing global market allows for displacement of other supplies, resulting in shipments moving to where they need to be based on market fundamentals and economics.

In the U.S., unconventional gas supply is also expected to increase by an amount equal to around 25 percent of European-projected demand by 2020. These additional supplies are likely to result in the U.S. having a self-sufficient gas supply, possibly even exporting some production. As a consequence, LNG shipments that may otherwise have been sent to the U.S. will now be freed up to meet demand elsewhere, including Europe.

Turkmenistan gas supplies are starting to grow as well. Russian gas will continue to be an important element of the gas-supply mix for both Europe and Asia as the Yamal development comes online later this year.

### European Case Study

To better understand today's European gas market, we first need to step back and look at its evolution from traditional country base structures based on long-term oil indexed contracts,

through the emergence of liquid markets in individual countries, to the current development of a pan-European liquid market. In particular, it is important to understand how the markets evolved, what drove the changes, what obstacles needed to be overcome, and the existing legal and regulatory frameworks in which those changes had to occur.

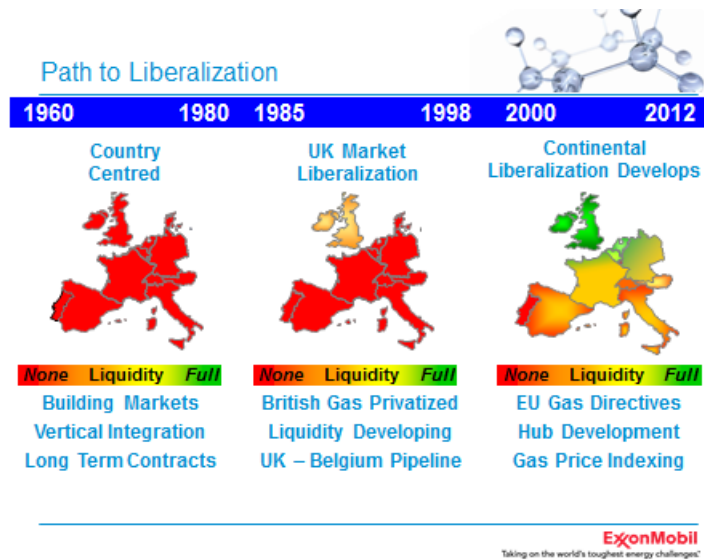


Figure 3: Liberalization

The European gas market evolved in the 1960s based on areas of domestic production in continental Europe. Supply came largely from production joint ventures and was sold to end users in competition with other supply sources, such as heating oil. The gas was sold under long-term contracts that were linked to the prices of competing oil products. The point of sale under the contracts was fixed, typically at the physical point of connection between the processing plant and the gas pipeline transmission network. These arrangements were often dedicated field contracts between the production joint ventures and national energy entities.

Such arrangements provided the stability and security to support large investments in field facilities and infrastructure undertaken by production joint ventures. There were very few participants in these early gas markets, with those involved tending to be vertically integrated with exploration, production, infrastructure and market activities all under the same management.

Gas production soon expanded from continental Europe to the U.K. based on discoveries in the North Sea. The U.K. natural gas market grew on the back of the previously existing infrastructure used to distribute manufactured “town” gas, operated by national energy company British Gas [BG]. As in continental Europe, the gas was originally sold from production companies or joint ventures to BG under long-term contracts.

Following BG’s privatisation in 1986, gas-producing companies, encouraged by regulatory change, started to recognise the potential to participate directly in the downstream gas market. As the market was given regulatory freedom to develop further, price and demand signals led other participants, such as independent suppliers, to enter into the market.



In the mid 1990s, the owner of the U.K. transmission pipelines and various gas shippers began negotiations to harmonise commercial terms for gas transportation, resulting in the introduction of the Network Code in 1996. The code specified the terms and conditions for the entry of gas into the transmission network and for onward delivery to local distribution networks and end customers. This “entry/exit” system effectively treated gas as being of the same commercial value once the cost of entry into the system had been paid, since all gas in the system was comingled and could exit the system at any point under preagreed commercial terms. This in turn facilitated the development, over time, of trading between market participants, with gas valued upon entry at what became known as the National Balancing Point [NBP]. As competition and liquidity developed over time, reported sales started to represent a value for traded gas.

When a gas interconnector pipeline was constructed between the U.K. and continental Europe and became operational in 1998, the markets were linked physically for the first time. This link aligned with the vision of the European Union [EU] for the creation of a single open gas market across Europe. The EU’s first gas directive became effective in 2000 and attempted to establish a common framework across member countries. The initial regulatory steps were limited, but trading did extend to northwest Europe, driven in part by the commercial opportunities offered by the interconnector pipeline. Change was slow, however, due in part to the significant changes required in primary legislation across EU member states.

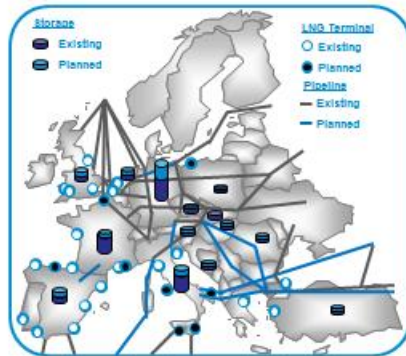
The EU’s second gas directive became effective in 2004, further developing the vision of a single market for European gas. Both the separation of production, transportation and marketing activities required by the directives and the provision of open, nondiscriminatory access to gas transmission systems have been important factors in the development of market liquidity. As trading increased, trading hubs began to develop across the continent.

### **Infrastructure**

Bringing new and diverse sources of gas to liquid markets requires a significant investment in infrastructure. A number of major infrastructure investments are either completed, underway or being actively planned to move new gas resources to European markets. These include investments in pipelines, ships, regasification terminals and storage facilities.



## European Gas Market



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Figure 4: European Gas Market Infrastructure

For example, the South Hook LNG terminal is just one of a number of LNG projects in Europe. At over 2 billion cubic feet per day of gas, the capacity of the terminal represents more than 20 percent of current U.K. demand. Several other LNG projects (both new terminals or capacity expansions) have come online in the last few years; many other projects are either proposed or under construction.

There is also significant ongoing investment in long-distance pipelines. The Nordstream pipeline came on-stream earlier this year, connecting Russia directly with Germany. In addition, the South Stream and Tanapo pipelines both plan to bring Russian or Caspian gas directly into Europe.

These pipelines serve the function of not only enabling the import of new gas, but supporting the interconnection of gas flows within Europe, thereby facilitating the efficient functioning of the overall market.

Gas storage is also important. In addition to directly facilitating market trading and liquidity, storage supports the optimal use of infrastructure and facilities. It can help accommodate for seasonality in gas demand and allow more stable imports, helping to address potential concerns over security of supply. Storage capacity in Europe is expected to increase about 20 percent by 2015, with a large number of storage developments in the U.K., Spain, Germany and France.

### Liquidity

The history of gas development in Europe has shown that liquid markets can provide an alternative option to long-term dedicated contracts to facilitate resource and infrastructure development.



Liquidity: Commercializing Resources



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Figure 5: Liquidity

The fact that gas can be sold through a liquid trading hub at a reliable market price has given confidence to resource developers. Companies including ExxonMobil have made investments based on these markets. The availability of a liquid market in the United Kingdom, providing a secure outlook for considerable volumes of gas, was fundamental for the project economics required to underpin several developments, including the South Hook LNG terminal project. The feasibility of any such development project relies on identifying a market area and a preferred gas strategy to achieve maximum overall value for the resource, whilst also ensuring timely project progression.

A liquid market provides a framework in which commercial terms of the sale and purchase agreements can progress efficiently and in line with project development timelines. Further, depending on the size of the liquid market, it may not be necessary for all gas available at a project to be fully contracted at the outset. Larger liquid markets can provide the basis for confidence in the sale of additional volumes at a later date. The security of outlets and structure of trading mechanisms can reduce overall commercial complexity and risk. The transparency associated with liquid markets also provides demonstrated market value, which can be beneficial for joint ventures as they seek a basis to ensure fair allocation of project risk and future reward between partners.

In summary, liquid markets can support investment by instilling confidence in the security of off take, efficient commercial terms, and reduced project risk, together with a demonstrated and transparent market price.

### Regulation

Regulation impacts the ability of a market to develop successfully toward more liquidity and competition, in addition to providing the right environment for investment. In Europe, regulation is developed both at the EU and at the national level. An important factor in how markets have developed in Europe has been the way in which EU directives have been transposed, or implemented, in individual member states.

Regulatory development in Europe is an ongoing issue.



## Regulatory Roadmap



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Figure 6: Regulatory Roadmap

Following the passing of the second gas directive in 2004, there was an energy review in 2007, leading to the publication of the third gas directive (or legislative package) in 2008. This became effective in 2011. It is not the only new legislation that will impact gas markets, as Europe is also in the process of implementing a range of measures aimed at ensuring efficiency and transparency of trading markets.

Regulations always run the risk of unintended consequences. Poorly thought-through regulations can have the effect of distorting the efficient operation of market mechanisms. Interaction and consultation between gas industry participants and policy and decision-makers is therefore important. In Europe, this understanding is required both at European and national levels.

The key to consultation is to ensure the quality of new legislation and avoid unintended consequences that could adversely impact both the investment environment and existing contracts. Active engagement and consultation between all stakeholders can help ensure a well-structured, open and competitive market that responds to changes in supply and demand through transparent pricing signals.

Liquid markets combined with a long-term, focused, stable fiscal and regulatory framework provide the best market structure to minimise commercial project risk.

The pace of regulatory activity in European energy markets remains significant, with a growing emphasis on security of supply, climate change and financial market reform. The challenge for policymakers and market participants alike is to ensure that this developing legislation facilitates and supports rather than hinders competition and liquidity, and that Europe is not placed at a disadvantage versus the rest of the world through over-regulation, complexity and bureaucracy.

### Summary/Conclusions

The European gas market has come a long way from the early days and has been successful in attracting new resources, as demonstrated by the recent startups of LNG



terminal and pipeline projects. While it still has challenges to overcome, the data suggests that Europe will continue to have supply options and diversity going forward.

## Outlook



- Significant change within Europe has been successful in attracting new resources
- Liquidity continues to develop
  - Increasing use of gas indexation
  - Development of trading hubs
- Open, competitive markets remain fundamental to Europe
  - Government regulation is poor substitute for free market solutions
  - Stakeholder engagement is required to ensure efficient legislation
- Principles of market development can be transferred to other markets to provide a roadmap for development

Figure 7: Outlook

Market liquidity has evolved over the past 10-15 years. Whilst the U.K. has clearly led this trend, other countries are following. With the development of infrastructure and trading hubs across the continent, a spot market for gas at market prices has evolved and is becoming more and more important. Open, competitive markets within a stable fiscal and regulatory framework will remain fundamental to Europe's energy strategy. These markets help attract new investment and supplies, facilitating security of supply and providing end customers with reliable, market-based supplies.

The evolution of the European gas market can provide useful insight to support the ongoing development of open and competitive markets around the world.