Journal of Natural Gas Science and Engineering 9 (2012) 16–27

Contents lists available at SciVerse ScienceDirect

Journal of Natural Gas Science and Engineering

journal homepage: www.elsevier.com/locate/jngse

Invited Review

A review and outlook for the global LNG trade

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ARTICLE INFO

Article history:
Received 15 December 2011
Accepted 14 May 2012
Available online 27 June 2012

Keywords:
LNG
Markets
Trends
Forecasts
Importers
Exporters
Competition
Regions
Pricing
Diversification
Development
Plans

ABSTRACT

The evolution of global and regional LNG trade over the past twenty years has been a story of rapid growth, diversification and increased flexibility in LNG cargo movements. Asia continues to dominate global LNG trade, but the European LNG market has evolved significantly in the past decade and seems destined for sustained growth and diversification over the next decade or so. Despite the LNG import market in North America being overwhelmed by unconventional gas developments in the past few years, future sustained growth of LNG demand in Asia and Europe are underpinned by firm new project commitments. A number of North American LNG export projects are progressing with a view to supplying this growing market demand in Europe and Asia. New gas discoveries in deepwater offshore East Africa and Eastern Mediterranean are also likely to compete for LNG market share in growing European and Asian gas markets Country and regional statistics presented illustrate how significantly the global LNG industry has changed in the past decade. These statistics reveal the complexity of commercial, political and technical drivers at play, particularly in the case of Europe, and how these drivers are conspiring to boost future demand for LNG.

LNG offers a global commodity, i.e. a product that is fungible and can be delivered reliably to meet the growth in demand for natural gas worldwide. Concerns over security of energy supplies, higher natural gas prices, higher LNG production costs, rising gas import demand, and requirements for clean, low-emissions, flexible energy supplies continues to drive more consuming countries to develop LNG supply chains. At the same time the desire of potential new gas producers to monetize their remote, and to-date stranded, gas reserves, is continuing to diversify geographically the sources of conventional and unconventional gas supplies.

Fig. 1 illustrates the growth in LNG trade from 1990 to 2010, extrapolated from 2011 to 2020. The trade evolved from 55 million tonnes per annum (mtpa – equivalent to 74 bcm of natural gas) in 1990 to 220 mtpa (298 bcm) in 2010; representing a compound annual growth rate (cagr) of 7.2%. A review of projects now in engineering and construction, and potential projects in planning, suggest that production could reach some 320 mtpa (~430 bcm) in 2015 and some 450 mtpa (~610 bcm) by 2020 assuming a cagr for the period of 7.5% and that global LNG demand keeps pace with new installed capacity. However, forecasts for future LNG trade are difficult to predict due to: volatile regional LNG market conditions, competition from other sources of natural gas, emergence of new technologies, late development and start up of some planned projects etc. In addition, global gas demand is inextricably linked to global economic growth and persistent economic downturns can slow demand and reduce utilization of installed supply chain capacities. In the past year though a number of venerable organizations have released quite different forecasts for the role that they believe LNG will play in future gas supply. Compare for example: International Energy Agency (IEA) World Energy Outlook special report on gas (2011), Energy Information Authority of the United States (EIA) International Energy Outlook (2011), BP Energy Outlook (2011a,b) and ExxonMobil's (2011) outlook for energy: a view to 2040. They hold differing views on how, in particular, unconventional gas developments will impact the LNG markets. ExxonMobil (2011), for example, see 15% of global gas demand being met by LNG in 2040 (compared to some 9.4% in 2010) constrained by unconventional gas developments particularly in North America and Europe.

Over the past few years many of the large oil and gas companies already involved in developing and operating longstanding LNG supply chains have taken large investment decisions to expand these facilities and have developed new projects for importing, shipping and exporting LNG. New-entrants, some much smaller companies with limited previous experience of the international

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doi:10.1016/j.jngse.2012.05.002

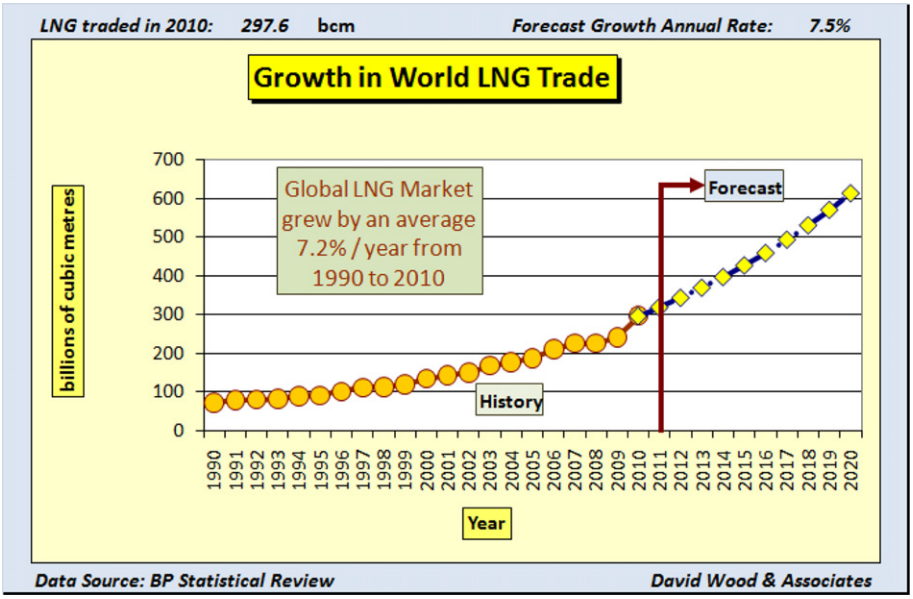

Fig. 1. Evolution of the LNG trade 1990 to 2010 with a forecast to 2020.

gas trade have also become aware of the benefits of LNG trade and are developing new projects, some in politically-challenging countries. In such cases the new-entrant operators are relying heavily on more-experienced LNG engineering, construction companies, service providers and critical-path item suppliers to ensure the safety, engineering integrity and ultimate efficient performance of these installations. A trend toward increased competitiveness has been an increase in the economies of scale; from expansion of existing LNG receiving facilities to construction of larger liquefaction trains and ships. This trend has also led to the development of new technologies such as floating regasification, gas ports and LNG FPSOs which have emerged to compete for some important niche market positions around the World.

Higher materials and services costs and skilled manpower shortages in the LNG industry, due to the high demand of upstream and downstream oil, gas and petrochemical plants since 2004 has however reversed the trend of lower unit costs for LNG facilities developed in the period 1990–2005. However, because of higher gas demand and persisting high gas prices in Europe and Asia, higher unit costs have slowed but far from extinguished the growth of LNG industry capacity in the period 2006–2011. Contracts being signed for future supplies suggest sustained growth of LNG capacity in the medium and long-term, particularly in Asia and Europe.

However, the impacts of shale gas in North America have depressed gas prices there since 2008 to the extent that imported LNG is only competitive on a small scale during seasonal peaks in demand. Indeed projects to build liquefaction plants to export LNG from Western Canada and the US are now at an advanced stage of planning. Rapid deployment of shale gas technologies to other continents outside North America seems unlikely due to the large number of wells required and reservations about the environmental sustainability of large-volume hydraulic fracture stimulation on water supplies (e.g. an outright ban on hydraulic fracturing introduced in France and several other countries tightening regulations). Nevertheless shale gas projects are seen as likely to impact some markets (e.g. China, India, South Africa, parts of Europe and South America) without displacing significantly the continued growth in LNG imports. On the Contrary, as mentioned above some organizations are forecasting a more significant impact on LNG from unconventional gas.

It is also likely that in areas where significant, relatively low-cost gas resources are present, companies and governments will look at developing integrated complexes incorporating LNG, gas-to-liquids and other gas monetization petrochemical options, following Qatar's lead. In addition, suppliers have identified the value of integration in the LNG value chain. Historically, suppliers focused attention on supplying long-term customers and building relationships that led to renewal of contracts as they approached term.

Over the past few years, greater competition, economies of scale and market liquidity have increased the importance of controlling LNG infrastructure to improve margins at every point across the value chain. Companies, such as BG, BP, GdFSuez, Petronas, QP, Shell, Statoil and Total recognized that access to markets and the ability to control infrastructure in each part of the value chain would assist them in monetizing their gas reserves and provide them with the flexibility to switch cargo destinations to access the best netbacks. Such LNG strategies have enabled these large companies to rapidly exploit evolving LNG market opportunities, while their competitors have lacked the capability to do so. Other key players in LNG supply are following their lead (e.g. ExxonMobil, Gazprom, Chevron, ENI, Repsol), but some of them have a significant gap to close on the market leaders and are regretting that they did not chose to do so much earlier.

Fig. 2 highlights the growth of LNG exports and imports in the key global regions. Dominated by Asian supply in period 1990 to 2000 the LNG export industry saw rapid growth in supply from Middle East North Africa (MENA i.e., Qatar, Oman, Yemen, Egypt) and West Africa (i.e., Nigeria, Equatorial Guinea) and Latin America (i.e., Trinidad &Tobago, Peru) in the period 2000–2010. Further growth in non-Pacific supply is seen as coming principally from the Africa, North America, Latin America as well as MENA regions. On the other hand rapid expansion of Pacific supply from 2014 onwards is set to come from Australia, Indonesia and Papua New Guinea based upon projects sanctioned and in planning.

On the demand side, whereas OECD-Asia dominated the LNG destinations from 1990 to 2010, the main future growth is expected to come from Non-OECD Asia (i.e., China, India, Indonesia, Thailand and Vietnam) and Europe, where increasingly it will be able to compete with expensive and politically insecure, long-distance pipeline gas supplies.