A changing face of the global LNG market
- the past and the present -
and factors of further changes

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LNG has grown from almost nothing in 1970 to the current 10% of the global gas trades, meaning that the growth rate for LNG has been much higher than that of natural gas as a whole, which in turn has been much higher than total primary energy. During the rather rapid expansion of the market size, different countries have joined the importers' club, starting from industrialized nations mostly in OECD regions to emerging economies in a wider range of global regions.

This article looks at brief histories and factors to create changes in various regional markets of LNG in the world.

[Asia Pacific]

The Asia Pacific and the broader East of Suez LNG markets today represent three-quarters of the global LNG demand. As the regions are expected to continue leading global growth of energy consumption and are not necessarily connected by pipelines (compared with other gas consuming regions in the West), LNG is expected to continue playing an important role to meet expected increasing demand of natural gas in the regions.

<u>Northeast Asia ("traditional") markets - Japan, Korea, and Chinese Taipei</u>

LNG trades in the Asia Pacific region started in 1969, when Japan introduced LNG from Alaska. The regional market was dominated by Japan until the Republic of Korea started importing LNG in 1986, followed by Chinese Taipei in 1990.

The original motivations to introduce LNG into those markets were: firstly to meet increasing energy needs to support rapid economic growth in those days; to diversify away from oil in the power generation and industry sectors given the inherent lack of domestic

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energy sources in the region; and to clean up air in urban areas, as well as to introduce cleaner, more affordable and stable sources of city gas supply, replacing gas manufactured from oil and coal.

The three traditional LNG markets, particularly Japan, dominated not only the East of Suez, but also the global LNG markets until new importing markets emerge in the 21st century, with the three representing (71%) of the global total imports of LNG as of the turn of the century, supported by exports from regional suppliers like Indonesia, Malaysia, Brunei and Australia, supplemented by suppliers in Alaska and the Middle East. As of 2015, the three markets still represented nearly 60% of the total global LNG demand.

While individual electric power and city gas companies directly import LNG through receiving terminals that have been set up by themselves in Japan, LNG is mostly imported by single wholesale companies arranged by the respective governments in Korea and Chinese Taipei. This model in the latter two economies was partly because it was necessary to create economy of scale to enable LNG imports and in turn LNG production project development. In many cases in Japan, however, companies formed consortia or partnerships to establish LNG value chains, rather than creating a national buying agent.

As the traditional three markets do not have much domestic production of natural gas or other forms of natural energy resources, they are expected to continue relying on LNG as one of core energy supply sources. Absolute demand levels will be dependent on competitiveness of LNG against other energy sources, new technologies to utilise natural gas, accompanying infrastructure development, developments of nuclear power operations, renewable energy sources, and energy conservation measures. As LNG prices in the region have been by far the most expensive among gas prices in various regions in the world, future pricing and flexibility of LNG trades will be a crucial factor to shape the region's LNG market.

New markets - India and China - starting in the 2000s

Two of the today's fastest growing economies in the world, India and China, are relatively new comers in the LNG market, with India and China having started imports in 2004 and 2006 respectively. Primary LNG buyers in the countries have been either national companies or entities set up by the governments of national companies. Although they are new to the LNG market, both China and India are among the largest five LNG importers in the world as of 2015, along with the traditional three ones in the previous chapter.

Although LNG demand in the two markets has developed rapidly in recent years, future development will be also affected by not only those factors similar to those in the above traditional markets but also by domestic gas resource development and existing and possible pipeline gas supply from neighbouring countries, as pipeline connections could be easier than the above traditional markets. Pricing reforms in the domestic gas markets will be also important factors affecting LNG demand in the countries. Notably China reduced LNG imports in 2015 for the first time since it started LNG imports in 2006.

Emerging markets
- Southeast Asia and the Middle East ("producing and consuming" region)

Southeast Asia, traditionally considered to be an LNG exporting region, is now also starting its own consumption of LNG. Malaysia and Indonesia, the two largest producers of LNG in the region, have started operation of their own LNG receiving terminals, as have Thailand and Singapore. Southeast Asia as a whole, including the four countries along with Vietnam, the Philippines and Brunei Darussalam, has been a larger consumer of natural gas than Japan since the turn of the century. While the region has been bestowed with natural gas resources, lower local natural gas prices have encouraged faster growth of demand than other markets.

Although the region is still expected to produce more gas and LNG in the future, it is also expected to use more gas and LNG into the future. Balanced policy measures that can stimulate both domestic market development and gas and LNG production will be the key for the region.

The Middle East, also long considered an energy and gas supplier, has been increasing its own energy use and there have been additional LNG receiving plans. Kuwait (2009), Dubai (2010), Israel (2013) and Jordan (2015) have already started LNG imports in the region. In the vicinity Pakistan and Egypt started LNG imports in 2015, partly taking advantage of ample LNG supply within the region.

Interaction with other regions
- Globalization of the market and expected new supply sources to the region

Up until the turn of the century, the global LNG markets were relatively clearly divided into the East and West of Suez. Only the Middle East LNG producers, Qatar and Abu Dhabi, used to supply both the East and West at that time. Only small numbers of occasional cargoes were traded between the regions.

After the proliferation of LNG production projects since the turn of the century, frequent cross-basin voyages, cargo diversions between regions, and even reloadings are now common, mostly from the West to East, due to unforeseen demand decline in the West and higher than expected demand surges in the East. The global exchanges of LNG volumes have fortunately helped balance the markets in recent years.

Given the expected healthy increases in LNG demand in the Asia Pacific region, in addition to existing supply sources that are expected to continue fuel the market, new external supply sources are expected to supply the market in the years to come, including North America, additional projects in Eastern Russia, and East Africa. Even some projects in West Africa and Russian Arctic North are likely to be underpinned by future gas demand in the Asia Pacific region.

[Atlantic]

The early days of the Atlantic region's LNG trades (1964 - 1996) were represented by a couple of traditional gas markets, with LNG supplementing pipeline gas supply. During ten years from 1997, interest in the Atlantic Basin has returned and supported much higher growth in LNG trade supported by increasing number of importers and exporters. In recent years new importing countries have joined from Latin America and Eastern Europe.

West Europe relatively matured markets
- United Kingdom, France, Italy, and Spain

The United Kingdom was the first country to import LNG on commercial basis[1] in the world in October 1964. After importing LNG between 1964 and 1982 and relying on

[1] On experimental basis several LNG cargoes were transported from the United States to the United Kingdom in 1959.

growing gas production from the North Sea for following years, the country in 2005 restarted LNG imports with a newly built terminal at the Isle of Grain in England. Two more regasification terminals (Dragon and South Hook) are currently operational at Milford Haven, Wales.

France is also among the oldest LNG importers. Its first terminal in Le Havre started operation in 1964 but was decommissioned in 1989. The country has three terminals at this time: Two Fos terminals on the Mediterranean coast and Montoir-de-Bretagne on the Atlantic Ocean. Another terminal is under construction in Dunkirk to be operational later in 2015.

Italy started importing LNG in as early as 1969. But LNG accounts for a small portion of the country’s natural gas imports, with the bulk imported by pipeline. The Rovigo terminal became Europe’s first offshore LNG terminal when it began operation in 2009.

Spain is one of the world’s largest importers of LNG and was one of the fastest growing LNG markets in the 2000s with import volumes increasing almost three times between 2000 and 2007. Spain's first terminal in Barcelona was opened in 1969. While Algeria was the main LNG supplier in the past, the import sources have been diversified.

West Europe younger markets
- Belgium and the Netherlands, as well as Portugal

Belgium has had a regasification terminal in Zeebrugge since 1987. With the connection to major import pipelines and the downstream pipeline network on Continental Europe, as well as the Interconnector with the United Kingdom, its role as a hub terminal has become more important in recent years.

The Netherlands opened its Gate terminal in 2011 and it has a similar ambition to function as an important gas hub in the region, although the terminal's utilisation rate has not been so high so far.

After importing some regasified volumes through Spain since 2000, Portugal opened its Sines terminal in 2003, supplying its own market and storing some volume for third parties.

East Mediterranean and Baltic markets
- Turkey and Greece, followed by others, as wells as Lithuania and Poland

Turkey has been an LNG importer since 1995 with two terminals in Marmara Ereglisi and Izmir. Greece started importing LNG in 2000.

Poland's first LNG receiving terminal at Świnoujście received its first cargo in late 2015 while Lithuania opened a floating receiving terminal at Klaipėda in late 2014.

North American markets - from importers to exporters

The United States first imported LNG from Algeria in 1970. After years of relatively small imports throughout the 1980s and 1990s, the prospects of LNG imports were huge until 2007 when the country was the fourth largest importer of LNG in the world. However around 2008, when the first land-based LNG terminals built in the United States for more than 25 years, domestic gas production began to surge.

Although Mexico and Canada started LNG imports in 2006 and 2009, respectively, huge potential of regional pipeline gas supply, North America is not expected to increase LNG import volumes significantly in the future.

Caribbean and South American markets

Puerto Rico has been importing LNG since 2000, followed by Dominican Republic in 2003.

Argentina and Brazil inaugurated their first LNG regasification terminals in 2008. They have recently increased presence in the international LNG market helped by extensive use of floating regasification units. Chile joined them as an importer although its terminals are located onshore.

Key factors in the region

Factors of growth of LNG in the Atlantic region are varied; they include:

Expectations of new external supply from various sources, including North America, the Middle East and Africa;

Interest in gas-fired power generation and competitive situation against other energy sources, including coal and renewable; and

Interest in diversification of supply sources of natural gas.

During the course of the industry's growth, the traditional integrated business model has been supplemented by new more flexible arrangements. The new arrangements have less stringent delivery commitments, both with regard to volume and delivery point and the LNG seller often market the gas itself (or via an agent) on the market of importing countries or on the respective hubs. Some LNG buyers have at the same time sold those flexible LNG cargoes into different regional LNG markets, helping consumers in the region to meet their fluctuating demand.

This could further enhance LNG's role as a flexible energy supply source.

[Conclusion]

More economies are expected to start importing LNG, as they diversify their energy supply sources to include this cleaner fuel and LNG itself diversifies not only its geographical reach but also its role in various countries. At the same time traditional LNG importing countries are expected to maintain their presence in the market.