



East of Suez Premium Markets: Laying a Vision for the Future

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This paper serves as background notes for the presentation.

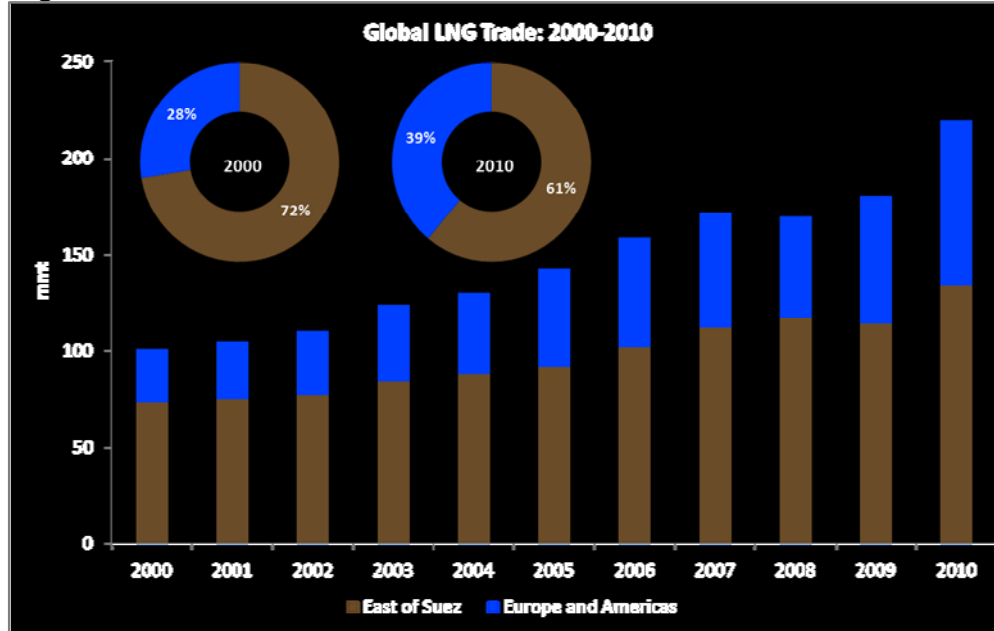
1. Background

Oil prices and oil market dynamics will continue to heavily influence the East of Suez LNG business. The future of LNG pricing in the region is clearly a function of oil prices. The economics of supplies is also evidently dependent on sustained high oil prices. FGE believes oil prices are on an upward trajectory until 2020. Although oil prices will be subject to some degree of volatility, the fundamentals of the market, which drives longer-term crude prices, will not change.

On the LNG trade front, since breaching the 100 million tonnes (mmt) mark in 2000, global LNG trade has been growing at an average annual growth rate of 8% per annum to nearly 220 mmt in 2010. East of Suez LNG imports constituted nearly three-quarters of global LNG trade in 2000 where there were only three LNG importing countries, all concentrated in Asia, namely Japan, South Korea, and Taiwan (JKT). These countries rely almost exclusively on LNG imports to meet their domestic gas needs. By 2010, India and China had already joined the Asian LNG importers club, while Kuwait and Dubai became the Middle Eastern LNG representatives, effectively increasing the number of LNG importers from the East of Suez to seven. Although East of Suez LNG imports (specifically in reference to the traditional LNG importers, JKT) rebounded strongly year-on-year (y-o-y) in part from the global economic recession in 2010, LNG trade growth elsewhere, notably in Europe and the Americas, were markedly higher. LNG demand in newer markets in the Americas soared amid a lack of domestic feedgas and growing gas demand. Meanwhile, Europe was a key beneficiary of the greater influx of Qatari mega-train volumes. Going forward, the East of Suez market is expected to continue dominating global LNG trade, albeit at a slightly reduced market share come 2020. Although the global LNG market is expected to face some market tightness during the first half this decade (or so), we would likely see some softening of the market in the remaining half.



Figure 1: Asia Still Dominates Global LNG Trade



LNG pricing especially in the East of Suez is expected to be driven by a few factors, with two of the most critical factors stemming from prevailing LNG market conditions and oil prices. Asian LNG prices are generally linked to crude oil prices, specifically the Japan custom cleared or Japan crude cocktail (JCC) price. Because of the linkage between crude prices and LNG, the price of LNG generally goes up or down with the price of JCC, unless there is an in-built protection mechanism to temper or eliminate the effects of higher or lower oil prices. In addition, the changing demand-supply dynamics briefly mentioned above likely imply that in the nearer term, pricing negotiations would seem to favour sellers while buyers would likely benefit from the prospective deluge of LNG supplies in the longer-run. For now, natural gas is not yet a globally traded commodity, so prices can vary substantially from region to region. Currently, Europe, Asia, and the US each have their own unique pricing regime. In the US, a competitive gas market is firmly ensconced and prices are generally linked to the market price at Henry Hub (HH), thereby creating a competitive reference point. The price of gas at various points in the continental US is derived from differentials (+/-) from HH. It is interesting to note that the high volumes at HH allows for a transparent market, enabling a futures market to develop on the New York Mercantile Exchange (NYMEX). Meanwhile, in Europe, the liberalization of the natural gas market has led to the emergence of spot markets, mostly in Northwest Europe (mainly the UK, Belgium, and the Netherlands). For example, natural gas prices in the UK set on the National Balancing Point (NBP) (a notional point in the transportation system) by the law of supply and demand.

2. Aims

The presentation will attempt to address the following questions:

- **Oil markets and its impacts on the global LNG markets:**
 - Who determines the price of oil? Suppliers or consumers?
 - What do the fundamentals tell us about how prices will move and how will this impact the LNG markets globally and, specifically, for the East of Suez market?



- **Growth potential and salient issues of the East of Suez market:**
 - Who will dominate LNG demand growth in the region? Will it be the traditional, emerging, or new LNG importers?
 - What are the wildcards of LNG demand in the region? What should LNG players be watching out for?

- **The next market shift and the implications for the market:**
 - Are we moving toward a permanent softening of the market by the end of this decade?
 - How long will this last? What could potentially derail the move in this direction?
 - What are the implications on LNG trade and pricing/LNG contractual issues?

Through the presentation and questions and answers session, Dr. Fesharaki aims to provide a vision of the future of the premium LNG market of the East.

3. Methods

FACTS Global Energy (FGE) is a leading consultant in the East of Suez natural gas and petroleum markets. Its clients include nearly all the major private and national energy companies operating in the Asia-Pacific region as well as government think tanks and financial institutions.

Relationships developed with all the key players especially in the Asia Pacific and Middle East over nearly three decades gives us unique insights and access that other companies cannot match. Our extensive body of work includes years of ongoing research in natural gas, LNG and also crude oil, and petroleum product markets. Our convening power at the CEO level and throughout the organizations provides not only distinctive access, but also top insights into the marketplace.

FGE is in touch with the market with consultants and analysts personally meet with the major players in the business in all the key countries on a regular basis to get the most up-to-date insights on the market. Such an extensive clientele network allows FGE to interact with key individuals within these organizations to collect market intelligence and carefully sieve information available in the public domain. In addition, our extensive database coupled with industry contacts and government statistics allows us to present a clear picture of the global LNG market.

FGE combines technical tools, economic analysis, computer simulation, and engineering considerations with qualitative analysis of market behaviour and political realities. Our multi-disciplinary approach enables our team to provide complementary support to client's own areas of expertise. FGE adopts several stages in our forecasting methodology. The first stage involves estimating formal models to analyse areas of interests including country demand, and project supply forecast. In the second stage we rely on our regional expertise and country contacts to adjust the results for subtleties not captured by the formal model. These include supply constraints, changes in public policy and short-term fluctuations. Among the advantages of our approach is that it accounts for two common features of the energy market—changes in energy intensity and fuel switching—in a theoretically rigorous yet relatively straightforward manner. Overall, we feel that this combination of statistical



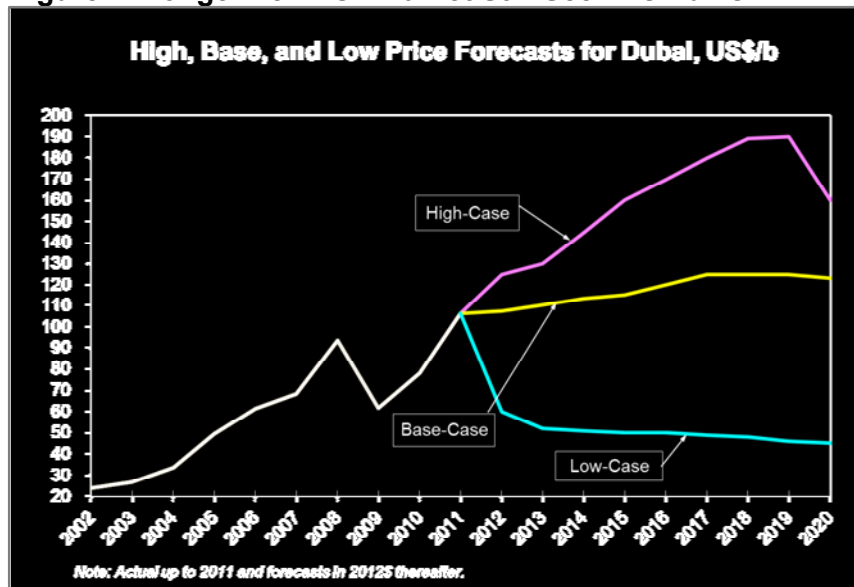
modelling and common sense adjustments yields a more realistic picture of each situation in different area of expertise.

4. Results

Oil Price Outlook

Oil prices and oil market dynamics will continue to heavily influence the East of Suez LNG business. The future of LNG pricing in the region is clearly a function of oil prices. The economics of supplies is also evidently dependent on sustained high oil prices. FGE believes oil prices are on an upward trajectory until 2020. Under our base-case scenario, prices remain relatively strong but contained as additional non-OPEC supply and Middle Eastern condensate entered the market in 2011, but after that, new supply tapers off. At the same time, the economies that are the key global oil demand drivers (China, India, and the Middle East) continue to expand as the global economy recovers, adding some 0.8-1.0 million barrels per day (mmb/d) annually to global demand. If OPEC is unable to counteract such bouts of bullishness, prices must rise in response. Once oil prices reach a sustained level of over US\$120/b, consumers are likely to make real adjustments to their behaviour. Based on FGE's projection of an upward trending oil price, LNG prices with an oil indexation have a tendency to trend upwards unless some protection mechanism is set in place to moderate the rise. Although oil prices will be subject to some degree of volatility, the fundamentals of the market, which drives longer-term crude prices, will not change.

Figure 2: Longer-Term Oil Market Still Seen As Bullish

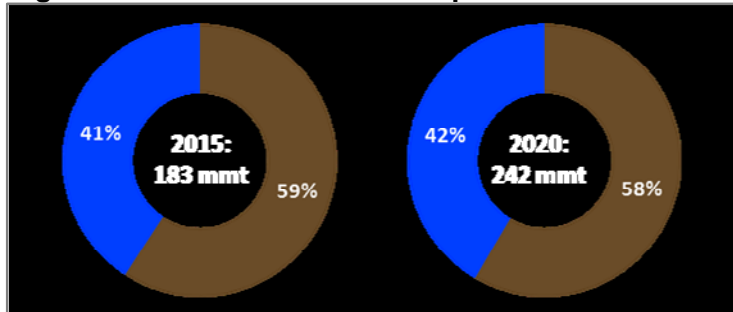


LNG Import Outlook

The LNG market in 2011 will continue to be dominated by the East of Suez with around 62% of global LNG trade. This region's LNG trade is expected to expand by around 6% per annum between 2010 and 2020 to well over 240 mmt, although the region's market share is expected to shrink to under 60% by then.



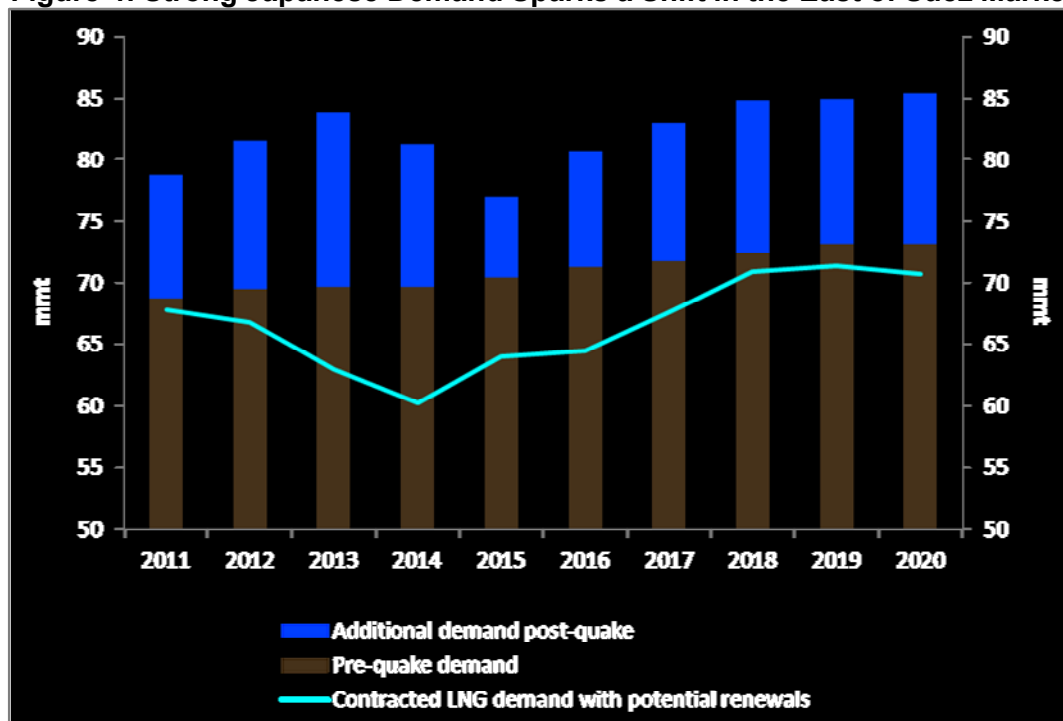
Figure 3: The East of Suez Is Expected to Remain as King



Asia has seen several dynamic shifts in market sentiments over the last couple of years, moving from a buyer's to a seller's market then back again. Has the market started evolving again?

The triple disasters in Japan as a result of the Great East Japan Earthquake of March 2011 greatly impaired the country's nuclear power plant capacity, be it through physical damage or as a result of tougher government mandates. This coupled with other factors in turn placed significantly greater emphasis on LNG imports to meet fuel supplies for power generation. Indeed, we witnessed a y-o-y spike in shorter-term LNG deliveries to Japan in 2011 even during months that are traditionally considered "shoulder" LNG import months. Power utilities were especially active in securing shorter-term LNG via a combination of cargoes delivered on a spot basis, under short-term deals, or even mid-term arrangements to supplement long-term LNG deliveries. Post-disaster LNG demand in Japan has clearly increased with FGE estimates ranging between roughly 7 and 15 million tonnes per annum (mmtpa) for the forecast period to 2020. This increased demand for LNG in part helped rouse the market to shift once again.

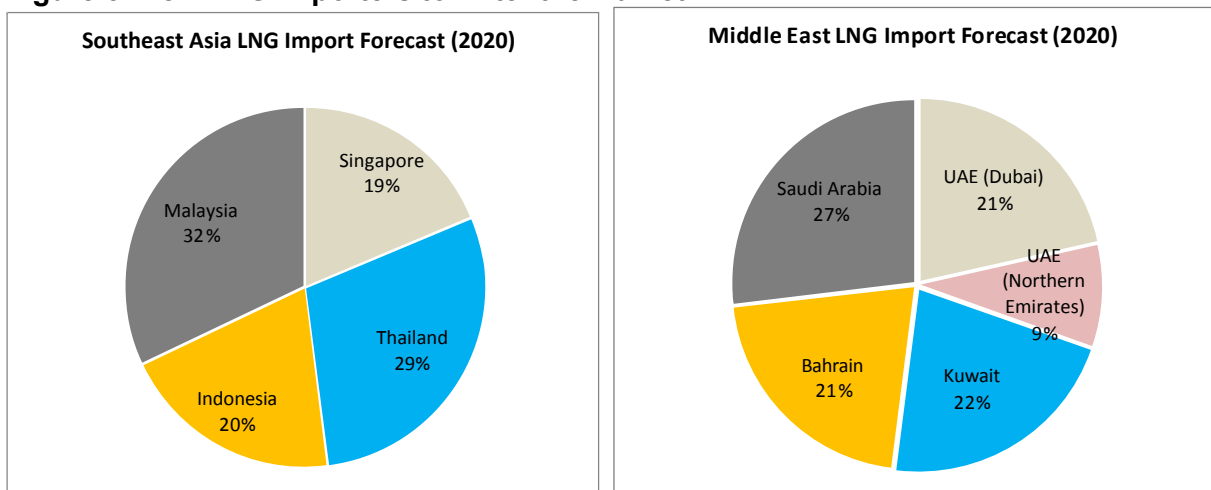
Figure 4: Strong Japanese Demand Sparks a Shift in the East of Suez Market





At the same time, a new pool of Asian LNG buyers is providing a further boost to Asian LNG imports. Southeast Asia is an increasingly exciting market that complements the growth from the existing LNG market players. Malaysia, Indonesia, Singapore, and Thailand are expected to have started receiving LNG before the middle of this decade as natural gas supplies fail to match the relatively robust appetite for natural gas, especially in the power and industrial sectors. Thailand became the first Southeast Asian country to import LNG when it received its first cargo in May 2011. Total imports from these four countries alone are expected to represent roughly one-tenth of existing LNG importers¹ requirements by 2020.

Figure 5: New LNG Importers to Enter the Market



Another quiet but emerging market is the Middle East. The region has always been a major player in supplying the global markets with LNG. However, it has become increasingly important on the demand side of the equation due to a significant rise in oil revenues, continued subsidies that are driving gas demand, increased spending power, and large infrastructural investments. The region could be importing close to 15 mmtpa of LNG by 2020, comparable to Taiwanese LNG imports for the same year, from over 3.5 mmt in 2011. Kuwait was the first Middle Eastern country to rely on LNG imports, taking its first cargo in August 2009, to supplement domestic gas supplies. Despite being an LNG exporter, the UAE resorted to importing LNG in 2010 when Dubai, a high gas demand centre with comparatively limited gas supplies, imported two cargoes in late 2010.

Two wildcards on the demand side affecting Japan (the largest LNG market) and China (one of the fastest growing LNG markets) are summarized below:

Wildcard 1: Japan's nuclear issues

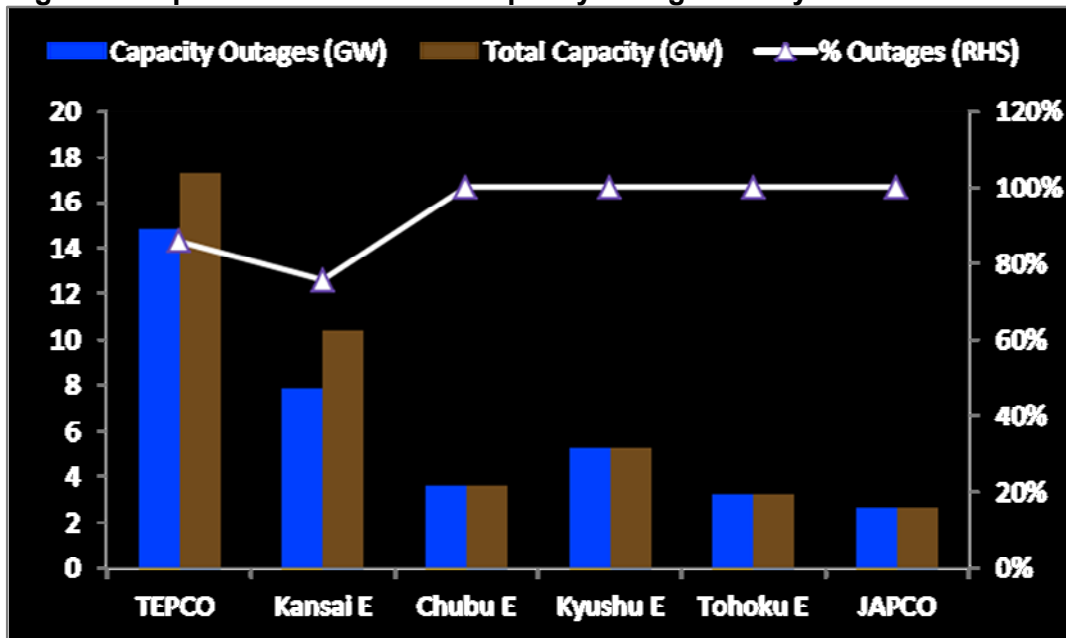
As of early January 2012, eight companies that operated nuclear power plants in Japan saw at least 75% of their nuclear power capacity remaining offline. Should some units that have been shut indefinitely, such as those owned by TEPCO and Chubu Electric, resume operations, this would place less strain on LNG requirements. However, getting all the

¹ Japan, Korea, Taiwan, China, and India.



necessary parties on-board the idea of restarting a nuclear power unit is a substantially complex and tedious process.

Figure 6: Japan's Nuclear Power Capacity Outages A Key Concern



Currently, Japanese law requires nuclear reactors to go under maintenance every 13 months. Since March 2011, communities refused to allow the restart of plants shut for routine maintenance. As such, unless the federal government can persuade local governments to change their minds (assuming the reactors pass the stress tests), all the country's reactor will remain closed, which would imply a de facto phase out of nuclear power. However, FGE does not expect this worst case scenario to pan out in the longer term. One reason is that the Noda cabinet is unlikely to allow a complete phase out as it will hurt an already struggling Japanese economy. One thing seems relatively certain however: Japan will have to continue securing more long-term supplies to meet its growing LNG demand needs.

Wildcard 2: China's unconventional gas developments

China holds a huge potential in unconventional gas, namely coal-bed methane (CBM) and shale gas. The country has the second largest identified shale gas reserves in the world, after the US, and holds the third largest CBM resource globally. Based on China's latest survey, the country's CBM and shale gas resources are massive. China's total CBM resources are estimated at 1,300 trillion cubic feet (tcf), the third-largest amount in the world, after Russia and Canada. Recoverable CBM resources are estimated at around 385 tcf. Despite this, the cumulative proven geological reserves at the start of 2011 were only 10.2 tcf. Region-wise, North China holds the largest amount of CBM resources in the country, followed by the Northwest and the South. Compared to CBM, the exploration of shale gas in China began at a much later stage. Current estimates for shale gas resources vary from source to source, ranging from 918 to 1,589 tcf. China has not yet established proven reserves. Areas of potential reserves: North China, Tarim Basin, and Southwest China. Serious exploration for shale gas in China began only in 2009. Much more work has to be done to determine the recoverable resources and proven reserves.

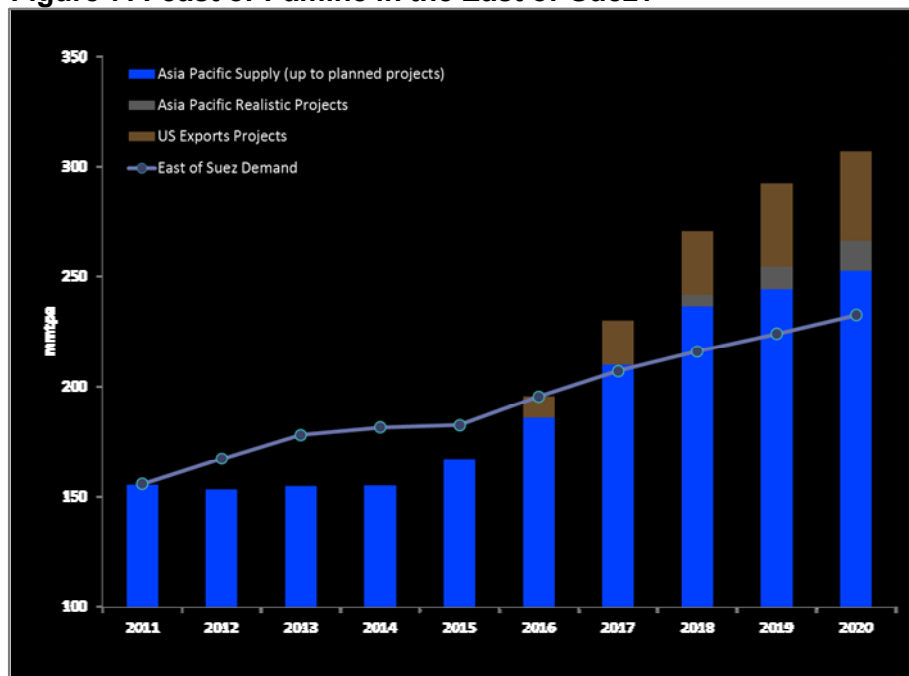


China is expected to see CBM production more than triple to about 3 billion standard cubic feet per day (bscf/d) by 2020 from less than 1 bscf/d in 2010. Meanwhile, although China has not started producing any shale gas, this will change over the coming years as PetroChina and Sinopec have already started the exploration activities. By 2020, more than 1.5 bscf/d of shale gas could be produced in the country. Combining CBM and shale gas, the share of unconventional gas in China's total gas production is expected to reach 15% in 2020. While some have speculated that Chinese LNG demand would be greatly affected by the development of unconventional gas, FGE does not foresee this being translated into a downward revision in our existing Chinese LNG import projections as any impact would affect potential new LNG demand. In the less likely event that China's unconventional gas aspirations are impeded, this would put more upside demand for LNG imports to supplement domestic gas production as well as pipeline gas imports.

LNG Capacity Outlook

With the East of Suez region's potential growth from, the supply side of the equation comes to the forefront. The near-term market remains tight for some time until the middle of the decade as no significant LNG volumes will be entering the market from within the region. The widely reported delays in LNG projects, especially in Australia, owing to multiple concurrent projects targeting to commence production within 1-2 years of each other are straining resources and causing cost to escalate. A case in point is the concurrent construction of three coal seam gas-based LNG projects in Queensland that have employed Bechtel as their engineering, procurement and construction (EPC) contractor. Of the more than 120 mmtpa of prospective greenfield capacity coming from four Asia-Pacific LNG suppliers (i.e., Australia, Canada, Indonesia, and Papua New Guinea) by 2020, over three quarters will originate from Australia. This has affected the speed of not only projects currently under construction but also those planning to make final investment decisions.

Figure 7: Feast or Famine in the East of Suez?





While the pendulum seems to have swung in favour of LNG sellers, the latter half of the decade could, however, present a markedly different scenario where the markets are expected to turn softer with multiple LNG sellers—mostly located in the Asia-Pacific region (refer to Figure 7)—chasing the same market opportunities. The supply situation could further favour LNG buyers should the US be able to move ahead of other LNG suppliers and get closer to its LNG export “potential”, making this one of the main export provinces to watch.

Wildcard 1: The US as a potential massive exporter of LNG?

The robust development of unconventional gas, specifically shale gas, in North America has rendered the need for LNG import terminals obsolete. Existing and planned LNG receiving terminals in the US have made a U-turn by seeking authorization to export LNG liquefied from domestic sources FTA and/or non-FTA countries or have expressed interest to export LNG. An estimated 90 mmtpa or so of LNG export capacity have been mooted so far. LNG market participants are taking a greater interest in this new supply province following the initial marketing success of volumes from the Sabine Pass LNG project: 12.5 mmtpa of LNG was sold to three buyers. Will all these LNG projects manage to get final approval and export all their volumes? FGE believes no. However, it is likely significant volumes will be targeting the East of Suez premium markets. This could mean more options for buyers for new long-term contracts. As such, the onus is on each project, whether in the Atlantic Basin or East of Suez, to showcase their attractions to prospective buyers and maximize their chances of capturing a greater piece of the pie from this relatively lucrative market.

Wildcard 2: Other Atlantic Basin projects (sans the US) may also chase the premium East of Suez Market

While the progress of other LNG projects in countries such as Nigeria, Russia, and Venezuela have gained less traction despite having being mooted much earlier than their US counterparts, they nonetheless hold a relatively large potential of LNG resources as no less than 50 mmt of LNG have been announced. Of course, one of the key questions is how soon, if ever, will these projects get off the ground, especially considering these projects have to contend with more recently proposed “competing” LNG projects following the discovery of new large gas fields in relatively less gas developed/smaller markets. Mozambique and Israel are some recent examples.

LNG Pricing Outlook

In the longer term, FGE expects the increased trade between the Atlantic and Asia Pacific Basins to result in increasing pressure for more contracts (short- and mid-term) to consider different pricing mechanisms. We have seen shorter-term contracts being indexed against both crude oil prices and benchmark Atlantic Basin gas prices. An interesting development is that Asian buyers are increasingly showing an interest in and willingness to try “alternative” pricing mechanisms. However, our expectation is for the bulk of long-term contracts in the Asia-Pacific region to continue maintaining a crude linkage in the Asia-Pacific region. It is key to remember that for some of the existing big buyers, security of supplies is a main concern. In this situation, it is considered the “norm” to pay a premium to other market prices in order to secure stable supply.