



مرگــزالملـــك عبــدالله للدراســات والبحوث البتروليـــة King Abdullah Petroleum Studies and Research Center



LNG Markets in Transition The Great reconfiguration

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 OIES and KAPSARC brought together international experts from the industry and academia to create this book





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What happened over 2 years -2014-16



- Mid 2014: we started thinking about the book
 - 'Only' 100 mtpa under construction, including 1 US project
 - Asia still considered as the bottomless premium market for LNG
 - Oil prices at ~\$100/bbl
 - Many planned projects ready to take FID

How is the LNG business going to be affected by these changes?

- May 2016: we finalize the book
 - 150 mtpa to come over 2015-20 (64 mtpa in the US)
 - Asian LNG demand growth uncertain (additional volumes) (down by 2 percent in 2015), buyers in search of flexibility
 - Sellers looking at new markets
 - Oil prices at around \$40-50/bbl, gas spot prices at ~\$4-6/MMBtu
 - Who will take FID?



- May 2017: one year later
 - Several LNG projects have come on line in Australia (4), the US (1), Malaysia (1st FLNG) and Indonesia (1)
 - But LNG supply has been increasing slowly (+17 mtpa in 2016)
 - Sellers looking still at new and small markets Jamaica, Gibraltar, Malta, as well as Ivory Coast, Panama and Ghana
 - And new markets are making the difference MENA imported 17.4 mtpa (half of the European volumes) in 2016
 - Very few FIDs: Tangguh T3 (brownfield) and Elba Island (2.1 mtpa)
 - Less 20-year contracts have been signed, the volumes are also low, and most contracts are portfolio contracts

Towards a reconfiguration?

Koving away from the "cosy" club





- Multiplication and diversification of players in the liquefaction, shipping and regasification businesses
- Aggregators are increasing their role, buyers are going upstream, traders want to participate, and new entrants to take market shares (even in Asia)
- More companies alliances on the buyer side



Where is LNG demand heading?





Regional LNG demand outlooks

- Considerable regional uncertainty ٠
- Europe will play a balancing role, absorbing unwanted volumes in the low demand ٠ case and letting LNG go to other markets in the high demand case
- Potential upside in the transport sector •

Many potential new LNG importers





Many new LNG importers are looking at LNG, attracted by current low prices and flexibility Sellers are actively looking for new markets and are being innovative offering new models that may suit riskier new LNG buyers



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Focus on Asian LNG demand





- Asia is and will remain the largest LNG importing region
- Individual factors can result in very different outlooks for Asian countries, with up to 100 mtpa between the low and the high case by 2030
 - Production/pipeline supply decline
 - Energy mix uncertainty (policy)
 - Investment/pricing framework



🎇 Mature Asian markets



Japan:

Huge uncertainty range driven by a) pace and extent of nuclear re-start and b) achievement of energy efficiency policy.

South Korea:

Future LNG demand growth was previously muted by government policy but the new elected government is more in favor of LNG and REN.

Taiwan:

LNG the beneficiary of government commitment to phase out nuclear in the 2020s while containing growth of coal.

Future power demand growth also a large uncertainty.







DEMAND



China





Demand

2025

2030







- Europe is acting as the swing market for LNG and as a result, the region is expected to help absorb the LNG surplus coming on to the market in the second half of the 2010s and early 2020s (even though this has not happened yet)
 But the region is facing major uncertainties:
 - The future role of natural gas in the whole energy system is in question, primarily as a result of greater governmental support for renewables
 - The region will face a decline of its indigenous (conventional) production (Groningen!). Unconventional gas and biogas production will increase but it will have little impact on the major decline. In a low energy price environment, it is difficult to envisage more optimistic scenarios

Despite low demand growth, declining indigenous production means that Europe will have to increase its gas imports, but how much and from which sources is unclear

 In 2015 and 2016, most of the gas imported arrived in the form of pipeline gas with a predominant role of Russian pipeline gas, the main competitor to LNG

"Europe" = EU28 + Albania, Bosnia and Herzegovina, Macedonia, Norway, Serbia, Switzerland, and Turkey

Research Gas Natural E S STUDI Programme ENERGY 0 R LL. **DXFORD INSTITUTE**

Latin America: substantial potential for additional LNG imports





Energy demand (and in particular power demand) is still growing and the development of local resources is taking more time than expected Natural gas has a role to play as a clean and efficient complementary source of firm energy to hydropower and intermittent renewable sources, but flexibility of supply will be an important element In 2030, the region is expected to need 37 - 103 bcm of LNG (uncertainties about the pace of development of local resources and great variability of LNG demand in Brazil)



Middle East and Africa: more than a niche market?



Initially, a very small market representing 10 mtpa in 2015, but reaching already 17 mtpa in 2016

- Both regions are overall exporters, but intraregional pipeline trade has proven difficult to put in place or expand
- **Middle East**
 - Many countries facing gas shortages and struggle to develop new generation of gas fields
 - Currently four countries importing, more looking at LNG imports
 - Most ME countries have low wholesale gas prices, which are increasing
- Africa
 - Egypt started importing in 2015, but scale and duration highly depends on future domestic production and demand rebound
 - Several other countries are looking at importing LNG for variable durations
 - Most of them opt for FSRUs (except for Morocco)
 - Many issues related to financing, need to provide regulatory certainty to prospective sellers, affordability and payment issues





- Low oil prices now make the financial case harder
- The environmental case is primarily driven by legislation.
- The benefits from reduced GHGs are less than other emissions though methane slip can be reduced/eliminated through technical enhancements
 - Initial prospects are stronger in marine than in road apart from China
 - Already established for LNG tankers
 - Greater scale (1 ferry \approx 1,300 buses)
 - Legislation in place
 - "LNG ready" a no regrets step for some new build
 - Easier to establish refuelling facilities
 - Norway has demonstrated what is possible
 - Could be a significant market by 2030





LNG capacity additions, existing and under construction



Source: KAPSARC.

- By 2020, Australia will be the largest LNG capacity holder, followed by Qatar and the US (unless Qatar debottlenecks)
- New business structures (US LNG) challenge existing models
- First FLNG in Malaysia just started, followed by Cameroon and Prelude in 2018



- Australia LNG
- Australia ramp up well under way, despite low prices
 - 3 projects in Gladstone are up and running
 - Gorgon T1 and T2 are also operational
 - 2017: Wheatstone T1, Ichthys T1 and Gorgon T3
- Some delays, and "setbacks" but set to overtake Qatar by 2019
- Cash costs low, especially in Asia
- New controversy due to high domestic gas prices



Location of Australian LNG projects

- Potential for new projects very limited, despite falling costs
- Some brownfield expansion possible in 2020s
- An extra 20mtpa of capacity by 2025?







- US LNG exports ramping up towards end of decade, but impact still being felt in global LNG market
- Is there any incentive for new project development, or could current projects default?
- Will there be any Canadian LNG projects within the next decade?

SUPPLY



Russian LNG





Outlook for Russian LNG

Yamal LNG to start up in 2017, fully online by 2020

Sakhalin 2 expansion logical but not expected before 2021

Baltic LNG – 5-10 mt or a limited project for bunker market and Kaliningrad?

Other projects significantly delayed

SUPPLY









- Prospects for Eastern Africa undermined by low prices
- Regulatory, legislative and fiscal issues also major hurdles
- Tanzania could fail altogether
- Mozambique reserves very large, but timing of output in doubt

Which projects will move forward?



- The cost competitive projects
 - Brownfield expansion
 - Notably Qatar, the low cost LNG producer
 - Utilisation of existing under utilized LNG capacity in Egypt, Trinidad and Oman
 - Projects with strategic involvement from buyers
 - FLNG
 - Liquid-rich projects
 - And those left behind
 - Uncompetitive fiscal framework, uncertain regulation, potentially rapidly growing domestic demand, politically unstable
 - Expensive greenfield projects

The evolution of spot and short-term LNG trade





- Drivers behind the growth of spot/short-term LNG trade (28% in 2015 and 2016)
 - Supply side developments (Uncommitted or 'spare' LNG capacity, Ramp-up volumes, Volumes initially committed to a market, but released and redirected, and Portfolio LNG (without secondary sales)
 - Demand side developments (Demand shocks, Expansion of LNG import capacity more rapidly than liquefaction, the impact of liberalization in Europe and the U.S. (hubs, TPA, end of final destination clauses (Europe) and Change in the nature of buyers from government monopolies or utilities in OECD countries to smaller players, IPPs and traders

The buyers' dilemma



This is what buyers want

- The end of final destination clauses
- Moving away from oil indexation
- More flexible LNG



Source: JERA, 2016.

CONTRACTS AND FLEXIBILITY

This is why it will happen

- The Japan Fair Trade Commission is reviewing the legality of these clauses
- 3 Asian countries trying to set up a trading hub
- More uncommitted LNG, flexible US LNG

More portfolio players long on LNG

Less willingness/interest in renewing LNG contracts at times of oversupply

Renegotiation of long-term contracts with smaller volumes or shorter duration



Towards 43% of total LNG trade by 2020 KAPSARC





- Increasing pressure on existing but also on future long-term contracts
 - This could be exacerbated by discontinuity between term and spot prices, financial distress of buyers

Tackling a \$2bn/y inefficiency





Optimising shipping

- If we were to optimize shipping based on the shortest route, we could save \$2bn/y
- Unrealistic? Margins are low! It is time for collaboration...

Price formation mechanisms which could replace JCC



- Henry Hub or European (NBP/TTF) hub prices
- Asian spot price Index (eg JKM, RIM, Argus, JOE): too few cargos (at least currently) on which to base long term contracts
 - Prices at an Asian hub or hubs
 - Average Japanese/Korean LNG import prices JLC/KLC
 - `Hybrid pricing' a mixture of all of these + JCC/oil+ electricity +.....

Which of these mechanisms best reflects gas supply/ demand conditions in Asian countries?

Comparing oil-indexed LNG to US HH-indexed LNG



US LNG export cost* to Asia at different Henry Hub prices compared with different JCC prices



• US LNG exports looked very profitable in Asia at \$100/bbl oil, but at \$2.50/ MMbtu Henry Hub will struggle to cover full costs below \$50/bbl oil

PRICING

Establishing a liquid hub takes time and commitment





Based on Experience in US, UK and Continental Europe:

- This could take 10 years in Asia
- It requires the commitment of government, suppliers and system operators
- An over-supplied market with strong competition accelerates the process

PRICING

Asian markets do not need to adopt the same price mechanism



- SINGAPORE: an LNG trading location which develops a regional price for South East Asia
- CHINA: a Shanghai citygate benchmark price reflecting domestic/ international gas prices, and prices of competing fuels (fuel oil and LPG)
- JAPAN: a hybrid/spot JCC/JKM/HH/NBP price developed by competition which could evolve into a hub

These prices will have a relationship with each other and in time will create a "messy transition" to a converged Asian composite price; meanwhile expansion of spot pricing will put continued pressure on JCC-based long term contracts, especially if oil prices increase

So where does this leave us?



- Companies realizing that they have to adapt to the new market environment
- Companies have to change the way they operate
 - What do we mean by collaboration?
 - Cost is king; innovative and cost-competitive projects could proceed
 - Lots of potential in new markets ... as long as LNG is 'affordable' and competitive
 - Changes in pricing formation are coming, but there is resistance
 - Existing projects can accept more flexible contract structure, while new projects will require some form of LT commitments unless conditions are fundamentally different
 - Contract sanctity?





Thank you for your attention