

To What Extent is a Liquid LNG Hub in the Middle East Feasible?

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 [Keywords to Follow]

Introduction

Liquefied natural gas (LNG), according to the International Energy Agency projections, could account for about half of global gas trade by 2030. The Middle East is pivotally positioned to benefit from changing trends in the Pacific and Atlantic gas markets because it holds the largest proven reserve. Furthermore, due to population and economic growth, the Middle East is one of the fastest growing consumer regions in the world.

Given the emerging global market for LNG, efforts are being made to set up a framework for trading LNG spot and futures contracts in the Middle East. Qatar's International Mercantile Exchange (IMEX) is designing these contracts to be traded in a manner similar to dated-Brent crude oil contract.¹ Similarly, Dubai Multi Commodity Centre (DMCC) plans to build an LNG Storage Facility² that would enable customers to store, trade and manage LNG supplies with opportunities for LNG loans and quality blending. The Dubai Mercantile Exchange (DME)³ also intends to list LNG futures contracts, and is considering collaboration with Qatar.⁴

The above developments indicate great optimism about LNG trade but it does seem that the projects are indirectly aimed at enhancing market liquidity and the rate of LNG commoditisation. The projects' proponents and developers are presuming that the creation of LNG contracts on an exchange is a sufficient condition for price autonomy and transparency regionally (or globally). But this may be a case of putting the cart before the horse, since spot transactions are still few⁵ and seasonal. Against this background it is

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1 The contracts are being developed by Hess Energy Trading Company (Hetco) and Clifford Chance, to be regulated by the Qatar Financial Centre Regulatory Authority (QFCRA).

2 In partnership with Canadian LNG Firm IMPEL.

3 DME is owned jointly by the New York Mercantile Exchange (NYMEX) Holdings Incorporated and the governments of Oman and Dubai.

4 Unofficial discussions have begun as reported in Platts, *DME considering joint LNG futures with Qatar*, at <http://www.platts.com>.

5 Spot transactions make about 13.8% of global gas trade, but the number of transactions is also increasing.

therefore pertinent to question the extent to which LNG contracts could be competitively traded in a hub. This article, essentially, aims to determine the feasibility of a competitive LNG trading platform in the Middle East (the largest source of Liquefied Natural Gas). An LNG Hub, in this context, implies an exchange for tradeable LNG contracts (spot and futures). An LNG Hub is considered "liquid" if it is transparent and competitive⁶ enough to set a benchmark for the indexation of spot and long-term LNG Contracts.

The issues discussed here are important because a major challenge which LNG producers have continually faced (with respect to pricing) is the lack of liquidity and depth in the global gas market. This effort is pertinent because previous attempts to list LNG spot and futures contract on exchanges have failed due to illiquidity—insufficient transaction volume to achieve competitive trade and profitability. Furthermore, as competition for LNG supplies increases, it is expected that the Middle East (especially Qatar) would eventually transmit price signals across the Pacific and Atlantic markets. It can be appreciated more given the confused state of energy pricing globally.

The article focuses on the global LNG industry with some emphasis on the Middle East and adopts a comparative approach on the assumption that LNG contracts could be traded like dated-Brent contracts.⁷ The effort reveals that a robust and effective mechanism for determining price is essential for attracting many participants to achieve liquidity. To a large extent, liquidity in any LNG trading hub would depend on an interactive relationship between long run and short run LNG prices. Furthermore, a defined LNG-pipeline gas price relationship, linking the Atlantic Hubs and Asia Pacific markets with the potential Middle East Hub is essential. The author resolves the fundamental questions of "where" and "how" the hub's price would be determined. The analytical framework which defines liquidity and other concepts used in the work are below. Issues relevant to competitive exchange-based LNG contracts in the Middle East are also raised and discussed.

Description of concepts, case study and analytical framework

"Spot transaction" is the physical exchange of a commodity with nearby delivery at the prevailing price in the market, exchange or delivery point. Petroleum prices are often referenced to a delivery point or an exchange. In commodity trading, the delivery point is very important because transportation cost is vital in energy trade.

A futures contract is a standard agreement, traded on an exchange, for buying and selling a fixed amount of a commodity to be delivered on a certain future date at a preset contract price.

The Brent crude oil contract was developed by BP and Shell in the late 1970s and it evolved around the physical trading of Brent blend. Today, a cash-settled Brent futures trade is provided by the Intercontinental

6 That is; has a wide range of both buyers and sellers.

7 This is irrespective of whether it is launched in Qatar, Dubai or jointly.

Exchange (ICE) and the physical crude Brent is the main benchmark. Due to production decline in the North Sea, however, Brent has been combined with Forties and Oseberg streams as BFO.

Equity cargoes are the stocks⁸ of BFO crude blends held by different stakeholders. The nomination procedure (for loading vessels at a terminal) determines the nature of contracts and structure of Brent trade. In the 21-day-forward market, contracts for delivery in future months are traded. The exact three-day loading window may not be known but the contracts are subsequently nominated and sellers notify buyers 21 days in advance.

Dated-Brent is a contract with a previously nominated window less than 21 days in advance. In other words, they are cash-market or liquid Brent cargoes assigned to load less than 21 days ahead of time and are therefore sometimes referred to as "wet" barrels. Rather than physical delivery, financial settlements (payment) for the commodity's value on the delivery date are common. Dated-Brent is used as a case study⁹ because:

- its price is formed in a transparent manner through a robust methodology;
- it is, therefore, a good marker as a wide range of counterparties (both sellers and buyers) participate, without restriction, in Brent trade; and
- it is easy to comply with the terms of entry to the market and there are no constraints on its delivery infrastructure.¹⁰

In addition, the following features, which underlie liquid trading of Brent cargoes on the ICE, are used as the criteria for analysis:

Price determination

Generally, Brent trades at a discount to WTI¹¹ because it comprises light sweet crude blends which are heavier and sourer than the WTI crude basket. This unique blend-price relationship (Brent/WTI and Brent/Dubai spreads) determines the global flow of crude oil. It then becomes pertinent to ask how such a (defined) price relationship could be created for LNG contracts.

Market participants and equity cargoes

International oil companies; oil trading companies; investment banks and national oil companies participate in Brent trade. *Would tradeable LNG contracts be attractive to a similar set of stakeholders?* The production capacity and storage levels of BFO blends held by producing companies affect the price of dated-Brent. For instance, disproportionate price movements result in market distortions as smaller physical basis alter trading positions. *What blends or combinations of LNG*

⁸ This includes the production capacity/levels.

⁹ As in every imperfect market, as soon as any of these conditions becomes lacking or weak the market price becomes open to manipulation.

¹⁰ Oxford Analytica, *Crude-oil benchmarks' ties go awry*, June 19, 2007 at <http://www.oxan.com>.

¹¹ West Texas Intermediate (WTI) deliverable against the New York Mercantile Exchange (NYMEX) futures contract.

would underlie a tradeable LNG contract and which countries would stake their capacity as Equity Stock? What combinations of physical and paper LNG would underlie an effective exchange?

Tradeability (Trade Pattern)

There are no restrictions on dated-Brent's tradeability in long-term LNG contracts. The value, volume and transaction rate of a financial instrument (like futures and options) on an exchange is driven by price volatility. Dated-Brent is competitively traded because various factors (especially storage and production capacity) affect oil price volatility. With respect to trading LNG futures/spot contracts, therefore, it is pertinent to consider *what set of factors would be significantly affect price and to what extent storage capacity would affect trade levels in the Exchange.*

What are the prospects and constraints to liquidity?

Prospects for liquidity

Evolving LNG trade and the quest for more flexibility

Some Middle East exporting countries are not yet in the spot market, but are tied to long-term deals with relatively unattractive prices. If they utilise the opportunity of an exchange to capture rent, liquidity and confidence in tradeable LNG contracts would be high.

Furthermore, importers' keen interest to diversify supply would, consequently, make the hub a competitive platform for managing the various risks associated with globalisation of LNG trade.

Price volatility

The competitiveness of a trading hub and the value of its contracts depend significantly on the price volatility of the commodity being traded. Seasonal demand and price variations offer significant attraction for gas traders to hedge risks by trading LNG contracts.

Constraints to liquidity

Reference price and market determination

The lack of an international price marker for natural gas is, however, a major obstacle towards the competitive trading of LNG. Because an organised market is required for the emergence of a price reference, some have argued that an exchange-traded spot LNG contract could yield a global price benchmark. Since there are two competitive regional natural gas spot markets, it may be necessary, therefore, to answer the fundamental questions of "Which", "Where" and "How".

Which?

In continental Europe and Asia Pacific, gas prices are cloaked in secrecy, while the US Henry Hub (HH) and the UK's National Balancing Point (NBP) offer more transparent prices. Although their prices are often comparatively divergent, however, both markets have their peculiar strengths and weaknesses, with respect

to setting the international marker price for LNG. It is pertinent that these strengths and weaknesses are considered when creating the methodology for price formation in the exchange.

Where?

Sullum Voe (Shetland Islands) is the terminal for Brent's 21-day-forward market. For LNG, where would the loading terminal or storage hub be situated? This is a central issue because of the high transport component of price. Furthermore, where would the price be determined (in the sophisticated importing markets or the evolving Middle East)?

How?

How will price on the trading platform be linked to the organised gas markets in the consuming regions, while ensuring a high degree of global price transparency? Furthermore, does a long run price path exist for globally or regionally-traded LNG? If yes, to what extent does it determine or is it influenced by short run price variations? Does a definite relationship exist between the short and long run prices?

Long-term contracts

Exporters' interest in tradeable spot and futures contracts may be an indication that they anticipate, potentially, greater benefits from short-term LNG trade. This paper contends, however, that LNG exporters are keen to maintain the long-term contract regime. Liquidity in an LNG Hub, therefore, would depend on the number of exporting countries that opt-in, as well as, the number of arms length transactions. Given fewer transactions the exchange-generated price becomes unsuitable for price indexation.

Domestic Market policies

The European Commission's Directive on increased gas storage could affect stakeholder interest and reduce liquidity. Without the directive, buyers would only need to compare storage costs against the futures price. The considerable underground storage capacity which exists in the US gas industry, as well as inadequate shipping capacity and the rising cost of building new vessels can constrain competition in any storage or contracts market for LNG.

The gas and electricity pricing policies of importing and exporting countries further compounds the above constraints. In many OECD countries, gas is highly overpriced¹² because gas prices are determined mainly through oil price indexation. Conversely, gas is under priced in the exporting countries, which leads to inefficiency in gas consumption and potentially constrains LNG exports, as well as, liquidity.

Overcoming constraints: What conditions would ensure liquidity?

Price determination

Which?

Comparatively, in volume terms, the HH price has better prospects than the NBP because more gas

¹² Relative to what the supply and demand balance should permit if the market was competitive.

is traded at the New York Mercantile Exchange (NYMEX).¹³ However, in terms of volatility, in the short run, the NBP price is more advantageous than the HH price. Worth noting also, is the fact that the UK gas market would potentially interact more with other European gas markets (and their oil products-indexed gas prices). With respect to exchange-traded LNG contracts fig.1 (below) shows the price trends of the different consuming markets across the globe. If either the NBP or HH price becomes the relevant benchmark, what will happen to Asian buyers in terms of pricing?

Where?

Essentially, liquidity requires that price balances the acts of buying and selling, so that the marginal convenience yield¹⁴ reflects the opportunity cost of buying spot LNG rather than futures. Most transactions may involve cash-settlements, as in dated-Brent, but a storage market is vital for the exchange-traded LNG contracts to be competitively traded.

Consequently, Dubai's LNG storage Hub (DHUB) is a suitable option if it collaborates with Qatar's IMEX and satisfies the above condition.

LNG projects confer equity on its partners, in the form of liquefaction capacity and off-take rights which they generally use to service their downstream supply commitments. To the extent that downstream¹⁵ gains are higher than exchange-related benefits, it is unlikely that such stakeholders would trade in the Middle East. Irrespective of where the hub is situated, the key issue is therefore making it attractive to all stakeholders in the industry, and not only exporters.

How and why?

It may be observed from fig.1 that NYMEX and NBP prices are more volatile than the Japanese, Spanish and Korean prices, while fig.2 reveals that a trend or correlation exists between Japan's LNG price and the Atlantic Basin markets' prices. A premium of about \$1/MMBtu can be estimated from the data over the period. To ensure competition, it is essential that these markets interact continually to determine or influence the price of any Exchange-traded LNG contracts. This paper, therefore, asserts that comparing the price levels across regions on each trading day would effectively ensure this.

In proposing a pricing system, let "A" represent the higher of HH and NBP prices, and "B" the transport cost of a Middle East LNG vessel to and from the Atlantic Basin. The efficient opening price for a tradable LNG spot contract can, therefore, be set as "A" minus "B". This simply means the *higher of HH and NBP prices less transport cost to and from the Atlantic Basin*. Such a mechanism is further justified by the emerging relationship, depicted in fig.3, between Japan's delivered price for spot LNG from the Atlantic and the *higher of HH and NBP prices*.

A review of the 19 month data (in fig.3) shows a premium that equals the transport cost to and from the Middle East. It is interesting to note that the graphs

¹³ The NYMEX is the first and most experienced exchange for spot trading gas in the world.

¹⁴ This is also called marginal value of storage.

¹⁵ In the consuming markets of Europe and the US.

Figure 1: Price trends of global LNG consuming markets (2006–2008)

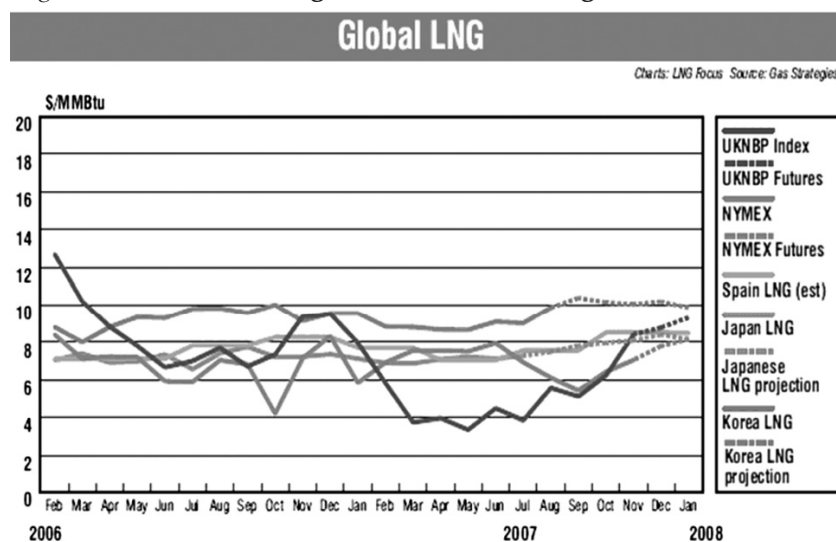
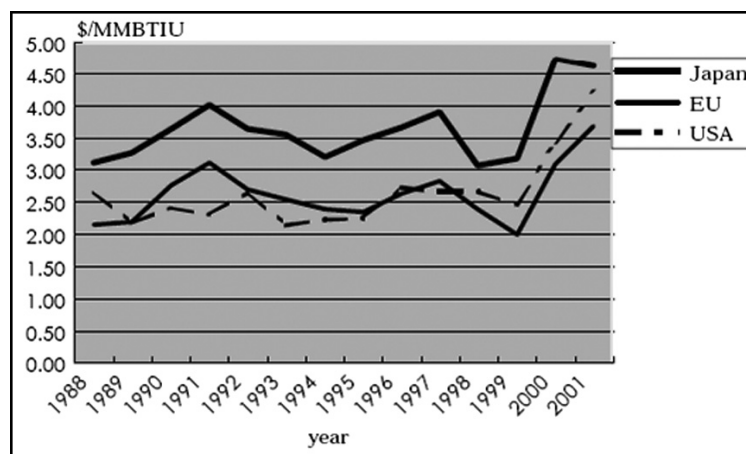
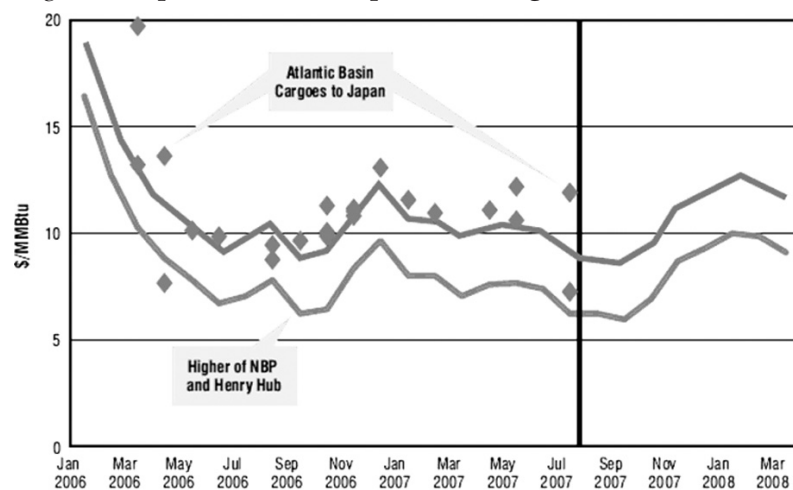


Figure 2: Japanese LNG price compared with HH and NBP (1988–2001)



(Source) IEA "Energy Prices & Taxes"

Figure 3: Japanese delivered price v the higher of HH and NBP¹⁶



in figs 2 and 3 look similar, even though different variables are compared.

The implication is that at any time, LNG price at the exchange is determined by either natural gas prices in the Atlantic Basin (NBP/HH) or market fundamentals within the Middle East. Although they do not have a defined relationship, spot and contractual LNG

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prices are not disconnected because, irrespective of the indexation mode, gas prices reflect the scarcity of other fuels. Oil price is, essentially, a common link between them, but the relationship is lagged through Japan's Crude Cocktail (JCC)¹⁷ and continental Europe's oil-product indexation. Oil and competitive gas prices align over the long term, but in the short term, however, gas market dynamics generate surpluses and shortages that are commercially significant.

The price mechanism, proposed above, efficiently captures the short-term profitability interest of industry players and the long-term effect of oil-price indexation. To attract a large number of arms length transactions to the exchange, therefore, contract prices must be linked directly or indirectly to gas prices in the mature spot markets (as Brent is linked to WTI).

Transparent Regulatory Framework

It is pertinent that contracts are transparently designed, within a sound regulatory framework, to earn the confidence of industry stakeholders and traders. Although, not fundamentally a constraint, it could be a complex issue to handle for LNG due to the various price regimes; lack of storage markets and existing long-term contracts. Alternatively, the exchange could be utilized as a platform for trading long-term contracts in the form of swaps and options to enhance liquidity. A vital issue for consideration is how the combination of physical and paper elements of LNG trade would be regulated.

¹⁷ Market observers and some experts consider JCC price series as reliable and it is widely used for LNG price indexation (escalation clauses) in Northeast Asia.

Conclusion

Exchange-traded LNG contracts, backed by equity stock (storage hub), may be designed and listed by committed investors in the Middle East but its liquidity, however, would be determined to a large extent by other factors beyond the investors' control. Three essential conditions are an effective methodology for price determination, sound regulatory framework and high demand. Gas reserves and supply infrastructure are important, but are secondary requirements for achieving competition.

The exchange may well develop (in volume terms) but we cannot expect to see the transparency that exists in the mature Atlantic spot markets. Given the persistent LNG demand, the region could have a benchmark price for LNG through the exchange. The Middle East can only become an independent region for price discovery, however, when its dominance in the global LNG market begins to have profound pricing impacts in end-user markets. Lack of competitive domestic gas markets, amidst increasing consumption within the region, is also a constraining factor that needs further consideration.