CHAPTER - VIII
IMPORTING LNG FROM NORTH AMERICA

Introduction:

We have so far built scenarios on (i) India’s Oil Imports and their impact on Indian economy, (ii) policy framework for exploration and production of oil and gas domestically (iii) Oil and Gas assets acquisition initiatives abroad, and (iv) cross-border gas pipeline for gas imports. We will in this chapter examine the scenario with regard to importing LNG from USA.

Why look for other supply sources of LNG?

India has so far been heavily reliant on the Middle East (Qatar) to supply its LNG needs through the long term agreement with Petronet for its Dahej Terminal. While this agreement had initially a low price and moderate indexation to crude oil, over a period of the last few years the formula has slowly moved up to a level where the linkage will be soon 100% to Japanese Crude Cocktail (JCC) at > 12%, thereby making the LNG received from Qatar fairly expensive and directly linked to crude oil.

The RasGas Formula:

RasGas LNG to Dahej Terminal: Prices of LNG have been arrived at, based on a formula provided in the contract signed by Petronet LNG (PLL) and Rasgas, Qatar. The contract provided for stepwise increase in the prices of RLNG to the terminal. The pricing formula is structured to reflect a gradual linkage with crude oil prices as per publically available information.

The price of LNG is linked to the JCC (Japanese Crude Cocktail) price and the FOB prices are determined as per an agreed formula.

Salient features of the pricing contract are listed below:

- For the period up to December 2008, the FOB price of LNG was fixed at $ 2.53 per mmbtu, (Million British Thermal Units) based on the JCC crude price of $ 20 bbl.
- For the subsequent five years (2009-2014), the price to be computed was based on JCC-linked formula.
• From January 2009, the price formula has been linked to the 60 months’ average JCC price for the next five years with +/- 4 $/bbl as floor and ceiling.

(ICRA Credit Rating, Petronet LNG Limited, February, 2010, p.4)

However, the shipping distance from Qatar to India is fairly short leading to very low shipping cost (USD 0.35/mmbtu). It may also be noted that Petronet has contracted some quantity of LNG (1.4 mmtpa) from the Gorgon field in Australia at a crude indexed price (14%) that is proposed to bring to its Kochi terminal, which again leads to a high landed price of gas (>USD 18/mmbtu) making it uncompetitive. Therefore, the resellers are finding it difficult to market the gas.

Thus recently the search for cheaper gas as well geopolitical tension in the Middle East has prompted policy makers and planners to look for a diversity of supply of LNG from other sources, so that India is not solely reliant on one country or region for its supply security, especially as there will be increasing reliance on LNG as a source of natural gas for the Indian market.

Why North America?

Let us review what a recent edition of the Alberta Oil Magazine has to say in this connection. (Kirsten Smith, March 05, 2014), “An in-depth look at the race to the LNG starting line”, Kirsten Smith, Alberta Oil Magazine, March 05, 2014):

“The shale gas revolution has fundamentally changed the supply outlook for North American natural gas production. Burgeoning U.S. domestic supply has driven out Canadian exports, necessitating a shift to new international markets for Western Canadian Sedimentary Basin producers. However, as Canadian project developers set their sights on higher-priced Asian markets, they will be competing against projects south of the border to secure any first-mover advantages. They appear, however, to be a step behind in the game.”

“As it currently stands, the lack of access to the North American domestic market for international buyers has left a large disconnect in Henry Hub pricing and the Japanese Crude Cocktail price used to index LNG contracts in Asia. Long-term export agreements are generally being negotiated on a Henry Hub price basis plus liquefaction costs and uplift tied to the JCC or oil price, with North American supplier maintaining a degree of supplier power. As the international market becomes more integrated in nature and more suppliers enter the market, this relationship has the potential to change, which could in turn affect late entrants to the market.”
In order to export LNG from the U.S., an LNG terminal developer can file for two different types of export licenses: one to export gas to Free Trade Agreement (FTA) countries and another license for non-FTA countries. According to information available to the public, since 2010, 36 LNG export facilities have applied to the U.S. Department of Energy seeking FTA export licenses, while 29 of these facilities have also applied for approval to export LNG to non-FTA countries. The U.S. has free trade agreements with 18 countries that require national treatment for trade in natural gas. Under the Natural Gas Act, exports to these FTA countries have been deemed to be in the public interest, making this license relatively easy to acquire. Alternatively, the non-FTA license is much more complicated to receive as each application is placed in a processing order and assessed in the light of the cumulative impacts of prior licence approvals on domestic market conditions. Unfortunately since this licence is necessary to strike contracts with non-FTA Asian buyers, it is a precondition to facility proponents in their making foreign investment decisions.

Figure 8.1: Natural gas trading hubs in North America


The same article states that since 2011 the U.S. Department of Energy (DOE) has approved five non-FTA LNG export licences, totaling 6.4 billion cubic feet per day, four of which are located on the U.S. Gulf Coast with the fifth off the coast of Maryland. These terminal conversion projects to liquefy and export natural gas are brownfield in nature, they are existing import facilities with supply infrastructure in place and generally known cost structures. This will give these facilities a distinct cost advantage when setting long-term price contracts, as capital costs will be lower and less susceptible to cost overruns.
Canada on the other hand has approved seven export facilities, out of a total 14 separate project proposals, which would all be new builds. These projects are clustered on the Pacific coast between Kitimat, and Grassy Point, British Columbia, and will also require new pipeline infrastructure to transport the gas from producing regions in the northeastern part of the province. It is not likely that all of these projects will move forward. As costs increase, this will reduce the potential spread for producers between North American domestic and international market prices.

In fact competing international projects from Australia have already encountered these issues. The cost of Chevron’s Gorgon plant, originally estimated at $37 billion, is now expected to come in 46 per cent over budget at $54 billion.

Though Canada seems have started later than USA, the Canadian producers will also see some distinct advantages. Canadians are used to the idea of exporting resources. In contrast, the U.S. DOE has been approving export licenses on a very case-by-case basis and has stated that it will assess the cumulative impacts of each export authorization on domestic supply and demand fundamentals as it moves forward.

*The Alberta Oil Magazine* states that presently approved projects in the U.S. are also at a slight cost disadvantage based on final shipping route distances to Asian markets. While there have been project applications filed for the U.S. Pacific Northwest coast, specifically in Oregon, these projects have yet to receive non-FTA export licenses. Countries that have free trade agreements with the US are:

**Table 8.1**: Countries that have free trade agreement with US

<table>
<thead>
<tr>
<th>Australia</th>
<th>Bahrain</th>
<th>Canada</th>
<th>Chile</th>
<th>Colombia</th>
<th>Dominican Republic</th>
</tr>
</thead>
<tbody>
<tr>
<td>El Salvador</td>
<td>Guatemala</td>
<td>Honduras</td>
<td>Jordan</td>
<td>Korea</td>
<td>Mexico</td>
</tr>
<tr>
<td>Morocco</td>
<td>Nicaragua</td>
<td>Oman</td>
<td>Panama</td>
<td>Peru</td>
<td>Singapore</td>
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</tbody>
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It is clear from the table that other than Korea there are no major gas importers in the above list.

Let us examine the proposition of North American gas exports in greater detail:

The key reason for focusing on North America is to take advantage of the abundant supply of shale gas in USA and Canada whose price is now completely delinked from crude oil
prices. Therefore, import of the gas into India will be possible at economic rates that are not liked to crude oil prices. Since none of the other supply sources of LNG to India (primarily Qatar and in future Australia) are offering natural gas delinked from oil price (which reflects the geopolitical risk premiums and the OPEC cartel determined pricing), there is a window of opportunity to contract gas at prices delinked from the crude oil pricing trends. The costs and benefits of such a strategy have to be evaluated in forming a strategy for sourcing gas from North America. This strategy has the possibility of eliminating the linkage to crude, but it also adds the risks and uncertainty of the US and Canadian market (price volatility of the regional market as well as regulatory regimes of US and Canada) and also the costs of local pipeline transportation, liquefaction, and shipping of LNG to India. These risks have to be clearly understood, evaluated and mitigated and passed on the end consumers and investors.

North America is strategically situated between two richly priced gas markets: Europe-where gas reserves are declining and the Japan-Korea-Taiwan market (JKT) where the price realizations are the richest.

Figure 8.2: Projected Henry Hub prices of Oil & Gas


The extract below from the World Energy Outlook, 2013 (Released in Nov 2013) brings out the case for North American gas exports quite succinctly.
The North American gas supply scenario:

United States of America is a major producer of natural gas and over the last 5 years the huge increase in shale gas production across the various shale gas fields in North East, South, and Western US have made the market flush with natural gas and dramatically brought down the import of natural gas from Canada as well as from other locations. This surge in domestic gas production in the North America had led to a plethora of export oriented liquefaction projects at various coastal locations. Some of them involve conversion of existing import terminals (idle due to stoppage of gas imports) to dual use export/import terminals, some are green field sites and others involve floating projects located on ships/ Floating Storage and Regasification Units (FSRUs).

It may be noted that while authorization to export to countries that have Free Trade Agreement (FTA) with US is routine (after full due diligence and permissions by the FERC (Federal Energy Regulatory Commission)), the US Department of Energy (DOE) is following a process of review of granting any authorization of export of natural gas to Non FTA countries after a process of review of the implications of such exports on the US economy and its long term energy security. DOE, using reputed consultants, has commissioned studies. These studies (by NERA) have not indicated any major adverse impact on the economic well-being of US arising out of gas exports up to 12 Billion Cubic Feet per day (bcf/day) (quoted in EIA. 2012. The emerging view coming from the highest levels of the US administration is that export projects would be permitted after a thorough review of the project by DOE. The scenarios of export range from 6 bcf/day to 12 bcf/ day. Hence at least 170 Million Tons per Annum (mmtpa) of LNG export projects may be implemented consuming roughly 15-20% of US gas production by 2025/30.(US EIA, Effect of Increased Natural Gas Exports on Domestic Energy Markets, January 2012)

The abundant availability of natural gas in the Gulf Coast of US, robust pipeline infrastructure and availability of technical and construction skills make it a natural choice of several players of locating gas based projects.

As can be seen from the map of US and Canadian gas flows below, while the Gulf Coast of USA is the hub of large volumes of gas, the Western Canadian gas production is also fairly robust, whereas the gas flows from the Marcellus basin in North East USA are also picking up rapidly as a result of the shale gas revolution. The eastern Atlantic Canadian region seems to be particularly deficit in terms of local gas supply, although there are local shale gas fields.
Thus an Indian importer of LNG can evaluate gas supplies from all possible routes:

- Western Canada/USA
- Eastern Canada
- Gulf Coast of USA

However, does it make sense to ship LNG from North America? We will examine this in the following paragraphs.

The key question that confronts policy makers and planners is to make a robust evaluation of the long term viability of LNG imports into India. The analysis of each potential source has to be carried out using the following framework to arrive at the landed price of the gas to India:

- Reliability of the supply sources of gas
- Long term pricing outlook of gas
- Transportation path of the gas to the export terminal
- The charges for liquefaction of the gas
- The shipping cost to India
Based on an analysis done and presented to the committee deliberating on energy security on behalf of the Government of Gujarat by GSPC LNG/ Pandit Deendayal Petroleum University (PDPU) the following numbers were thrown up that I reproduce for the purpose of demonstration:

**Figure 8.4:** LNG cost break-up

**Source:** Presentation made to the committee on energy security on behalf of the Government of Gujarat by GSPC LNG/ Pandit Deendayal Petroleum University (PDPU), slide 8

It can be seen that:

- The gas prices vary based on the location they are bought, but more or less track the Henry Hub (discounted to it at Canada AECO Hub)
- Transportation path costs can be high for remote locations
- Liquefaction costs are lower for brownfield sites, but high for greenfield sites
- Shipping costs vary based on distance to India

However, as of today, the ex-ship price of LNG to India from potential North American export terminals is cheaper than gas that is fully indexed to oil (12-14%), at USD 100/bbl that implies a price of USD 12-14/mmbtu.
What are the risks confronting gas imports from North America will be examined ahead.

**Based on our analysis we have evaluated three principal risks:**

- Regulatory risks of the US Department of Energy, or the Canadian National Energy Board withdrawing permissions or permits for gas exports to India;

- This risk is in the nature of a Force Majeure Political Risk and should best be addressed by the sovereigns of US/India/Canada

- The risk of local gas prices (Henry Hub) escalating beyond their historic lows and thereby making gas imports to India uncompetitive

- While analysts believe that there is abundant source of gas available in the US/Canada for export that would not impact prices and there is no foreseeable decline – there is still a risk of spike in gas prices. Henry Hub prices have been at historical low levels (<USD 3.00/mmbtu), but have inched upwards due to unusually cold winters in North East USA/Canada.

- There are mechanisms to hedge this gas price till 2023 or even beyond - but there is a cost associated with that which need to be factored in - however the hedging market in the US is liquid and transparent

- Acquisition of equity gas from suppliers by acquiring assets would also ensure that the gas is available on a cost basis as opposed to market linked price.

- There is also a risk that there may be major decline in crude oil to levels below USD 100/bbl and to levels where the fixed price of imported gas from North America is no longer sustainable vis a vis gas at crude linked prices:

**Table 8.2: Crude linked price of Gas**

<table>
<thead>
<tr>
<th>Crude (USD/bbl)</th>
<th>Gas Price (14% of JCC) in USD/mmbtu</th>
</tr>
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<tbody>
<tr>
<td>100</td>
<td>14.00</td>
</tr>
<tr>
<td>90</td>
<td>12.60</td>
</tr>
<tr>
<td>80</td>
<td>11.20</td>
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<tr>
<td>70</td>
<td>9.80</td>
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<tr>
<td>60</td>
<td>8.40</td>
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</tbody>
</table>

**Source:** Our analysis

Thus at any price of crude below USD 80/bbl the landed price of LNG at crude linked prices become attractive as opposed to Henry Hub linked prices. This risk can be partially mitigated through hedging the spread of crude to NG as well as swapping the gas in the international markets whereby better realizations from markets in Europe or Japan can offset some of this perceived price risk vis a vis the Indian market.
North American LNG imports - a solution for India’s energy security:

Assuming gas prices remain high in the Japan-Korea-Taiwan market and there is limited appetite for other merchant suppliers to supply to India at prices that are delinked from crude oil there is a strong case for adding North American gas at Henry Hub linked prices to the Indian LNG import portfolio. GAIL has already tied up 5.3 mmtpa of LNG from US (3.5 mmtpa from Sabine Pass and 2.8 from Cove Point)

The policy makers and planners must ensure:

• Adequate mitigation of the political risk in US (DOE and FERC interventions or withdrawal of non FTA permission) and Canada through government to government understanding and protocol including agreements on investment protection through bilateral treaty.

• Ensuring that there is adequate bargaining power to achieve economies in liquefaction tariff and that the benefits of brownfield sites are passed on to off-takers.

• Robust gas procurement from liquid local markets and long term hedging strategy, and if necessary acquisition of upstream assets (Marcellus, Eagle Ford or in British Columbia formations) to obtain equity gas at long term cost that protects against any surge of the Henry Hub index

• Ensuring long term investment in LNG shipping by Indian off-takers so as to obtain the benefits of economies of shipping costs (GAIL is reportedly commissioning building LNG carriers to take advantage of this in shipping LNG from US)

To conclude the discussion, it must be noted that there has been recurrent analysis in the American press on the need to relax export restrictions for oil and gas. It is expected that the pressure to export will increase in the view of the difficult time that the US oil and gas sector has been passing through as a result of the recent low price recoveries. We have also noted that about half of the drills have stopped production. In this environment, where politically also a more favorable decision is possible, India may negotiate for long-term import of LNG from USA.
References:


• US EIA, (2013), World Energy Outlook 2013, Energy Information Administration,