

## LNG in INDIA

Carlos Barberán

Indian gas sector is undergoing a significant transformation in terms of policy, regulations and infrastructure. The assumption and consideration while assessing the demand universe and the price sensitivity of demand were primarily based on the existing policies and regulations. However, we acknowledge the fact that several policy revisions are proposed and currently under deliberation. These policy revisions are likely to impact the growth of demand tremendously. The following are the key policy revisions under consideration:

- **Pooling for power and fertilizer-** The Government is considering a proposal to implement pooled price mechanism in the country for power and fertiliser sector. Power and fertilizer continue to consume major quantum of domestic gas. However, the domestic supply is not sufficient enough to match with the growing demand from these sectors resulting in shortage of gas supplies. LNG in the international markets is available at higher costs and could impact the viability of new projects on a standalone basis. Pooling of LNG with domestic gas will reduce the pooled price by spreading the higher costs of imported gas over larger volumes of cheaper domestic natural gas.
- **Diversion of gas to priority sector-** Despite significant additions from the KGD6 basin to the domestic gas production, there has been as a continuing domestic supply deficit in the Indian gas market. This has eventually lead Government to shift to a policy of preferential allocation of cheaper domestic gas to the priority sectors (power and fertilizer), which is likely to increase the demand for LNG in the non priority sector. Government has already issued a notification to Indian producers for adopting the preferential allocation of gas to KG D6 customers, in case of shortfall of production. This would result in diversion of cheap domestic gas to priority sector, leaving the non-priority sector such as Sponge iron, steel, refinery and petrochemical high and dry for gas resulting in increase of demand for expensive LNG.
- **Revision of fertilizer policy for new investments-** The existing urea policy has not been able to encourage investments in Brownfield and Greenfield projects mainly due to shortfall of domestic gas supply and lower floor and cap for the imported urea prices. The basic fuel cost assumption under the new policy is based on the KG D6 gas. However, the reality of the Indian gas market has moved far away, as the KG D6 production has declined and no new domestic source at the assumed price has been recently added. The LNG is available at \$ 10-\$15 /MMBTU which far exceed the cost of fuel used as basis for floor and cap prices of urea. The Government of India is, therefore, exploring the option of increasing the floor and the cap of urea prices and linking the same to upward prevailing gas prices in market. This policy revision will significantly impact the Greenfield investments. Many existing players have already laid plans for new capacity additions.
- **Peaking Power Regulations -** In 2010-11, India witnessed a peak power deficit of 12 GW (-9.8%). The variability between the seasonal load profiles causes a peaking power demand surge. In long term, a scenario may arise wherein on overall basis despite being energy surplus; India may continue to have peaking power deficits. Hence, , an optimal mix of base



load and peaking capacity is important for reducing the overall economic cost of power in the system. Further, peaking capacity is also critical for maintaining system reliability. The cost of lack of reliability is very high for electricity users. Gas based generation fits well for time of the day power for intermittent and peaking applications because of starting time, ramp up rate and efficiency in part-load operation. CERC realised the need to meet peak demand and suggested measures to incentivize generators for setting up power stations for meeting peaking power requirements and issued draft regulations for a separate tariff for peaking rates. Once it is implemented, gas based generation being expensive would automatically get reserved for peaking requirement.

Historically India's gas production has been dominated by the National Oil Companies (NOCs) - Oil & Natural Gas Corporation Ltd. (ONGC) and Oil India Limited (OIL). Pre 1991, the Blocks for exploration and production were allotted on nomination basis to ONGC and OIL. However, in the year 1997, GoI liberalized the Oil & Gas upstream sector and introduced New Exploration Licensing Policy (NELP). The NELP regime encouraged private participation by providing level playing field to public and private entities. RIL commenced production from its most prolific field KG D6 on April 2009, since then the production has reached a level of 60 MMSCMD, contributing to ~40% of the domestic production. However, the production declined to 50 MMSCMD.

**The total domestic production in the year 2010-11 stood at 142 MMSCMD.** Apart from the KG D6 gas, the onshore fields in states of Assam, Andhra Pradesh and Gujarat are other major producers of gas. Smaller quantities of gas are also produced in the states of Tripura, Tamil Nadu and Rajasthan. OIL is operating in Assam and Rajasthan, whereas ONGC is operating in the western offshore fields along with other states. Gas produced by ONGC and a part of the gas produced by the JV consortiums is marketed by GAIL (India) Ltd. Gas produced by OIL is also marketed by OIL, except in Rajasthan where GAIL is authorized to market its gas. Gas produced by Cairn Energy from Lakshmi fields in Gujarat and by Gujarat State Petroleum Corporation Ltd. (GSPCL) from Hazira fields is sold directly by the companies at market determined prices.

### **The importance of the Coal**

Coal accounts for ~84% of thermal power generation capacity followed by gas (15%) and Liquid fuels (1%). Further, the major part of planned capacity is also based on coal. India is world's third largest producer of coal. Coal prices in India are largely regulated and substantially lower than international spot prices. If we were to compare the economics of a power plant on domestic coal and LNG, domestic coal stands out as being very competitive. Even if we compare the economics of a power plant based on LNG and international coal prices, LNG is not competitive.

The thermal power generation capacity in India is set to expand massively. Ministry has accorded environmental clearances to a large number of coal and gas-based power plants with an aggregate capacity of 193 GW. Another 509 GW are at various stages in the environmental clearance cycle. This means that there are around 700 GW of coal and gas plants waiting to be built in the coming years.

It is worthwhile to note that power sector is facing severe coal supply crisis as the domestic coal production has not kept pace with additional generation capacity.

As regards the natural gas supply, the present natural gas supply to the power sector is 72 MMSCMD and present additional unserved demand is 8.22 MMSCMD.

Ministry has indicated an additional demand of around ~76.5 MMSCMD (inclusive of current unserved demand), thus resulting in total demand requirement of 148.52 MMSCMD for Power Sector by 2014. The domestic gas availability will be insufficient to meet demand for gas by the power sector considering limited visibility of future domestic gas supplies.

Even If we consider domestic gas production by ONGC and GSPC coming up in next three to four years; under the Gas Utilization Policy, the new gas based power plants are accorded the priority after the fertiliser and existing power plants in the list of sectors that are to be allocated gas. LNG as a standalone option is not practical on account of its costs and inherent volatility of prices. If at all it is to be considered as a part of the basket, it has to be blended with domestic gas.

We believe that any IPP should explore various sourcing options available in the LNG market internationally and on domestic gas front should focus on acquiring allocations from the new discoveries expected in near future. Even a part allocation of domestic gas would aid the IPP to pool its LNG imports and domestic supplies at plant level and result in power generation at a reasonable cost.

**The Oil Ministry is mulling a ban on the supply of scarce domestically produced natural gas to merchant power plants.**

**As per the proposal, domestic natural gas, which is available at one-third the price of imported LNG, will only be supplied to companies that sell all power produced from this gas at regulated tariffs.**

Merchant power plants are units that do not enter into any long-term power purchase contract for the sale of power and instead sell their output in the spot market. Tariffs in the spot market depend on the supply and demand situation and have on many occasions been several times that of regulated tariffs.

The Ministry said: "a scarce natural resource cannot be used for profiteering."

*"It is felt that domestically available scarce gas (which is substantially cheaper than the imported LNG) should be made available only to those power plants that are willing to sell power to the grid so that power is available to people at large at regulated rates,"*

Against the demand of 230 million cubic metres per day, India produces about 166 mmscmd, including close to 45 mmscmd from Reliance Industries' eastern offshore KG-D6 fields.

KG-D6 gas and other domestically produced gas is priced at 4.20 \$/MMBTU , while imported gas in its liquid form (called liquefied natural gas, or LNG) costs upward of USD 13-14 per mmBtu.

Of the 21.87 mmscmd of KG-D6 gas that has been allocated to 27 power plants in the country, at least two of them are merchant power plants that sell power during peak seasons to private entities with an average price premium.

*"In view of the scarcity of domestic gas, the current and future allocations of domestic gas will be subject to the condition that the entire electricity produced from this gas shall be sold under long-term Power Purchase Agreements to the grid/distribution companies at regulated tariffs approved by the regulator(s)."*

The total overall demand for fertilizer in year 2025 is expected to be 203 MMSCMD

Current operational LNG import capacity is 13.6 MMTPA. India joined the global LNG market in March 2004 when the Dahej LNG terminal went into operation. Petronet LNG Limited (PLL), was promoted by GAIL, IOCL, Bharat Petroleum (BPCL) and ONGC later GDF and ADB joined the consortium. PLL expanded this terminal from 5 to 10 MMTPA in early 2009. PLL has plans to further increase the capacity of this terminal to 12.5 MMTPA around 2013. The second existing LNG terminal is operated by Shell and Total. The capacity of this terminal is 3.6 MMTPA terminal located in Hazira, which was commissioned in April 2005. Both are located on the western coast and could be further expanded to 15 and 10 MMTPA respectively. The third terminal, the Dabhol- Ratnagiri LNG terminal, is expected to become operational in 1Q2012, after many delays. It has a total capacity of 5.5 MMTPA, with about 2.9 MMTPA available for merchant sales.

**The LNG import capacity could be extended, if all planned terminals come to fruition.** However, those investments are likely to face some difficulties and delays related to lack of capital and difficulties to secure new supplies. Only seven LNG liquefaction plants have taken a Final Investment Decision (FID) since mid-2005. The Gorgon LNG facility in Australia, which took the FID in 2009, will sell 1.5 MMTPA to the Indian gas market. However, the Indian gas market might be less ready to accept LNG prices at the same level as Japan, Korea or even China whose re-gasification capacity is increasing rapidly. **Six large LNG re-gasification terminals along the coast of China are under construction and are expected to be under operation by 2015.** The following graph and figure depicts the existing and proposed re-gasification capacities in India as of today and their expansion in near future.

We can even expect more regas terminals through FRSU projects.