Relevance of pricing for gas trade with India

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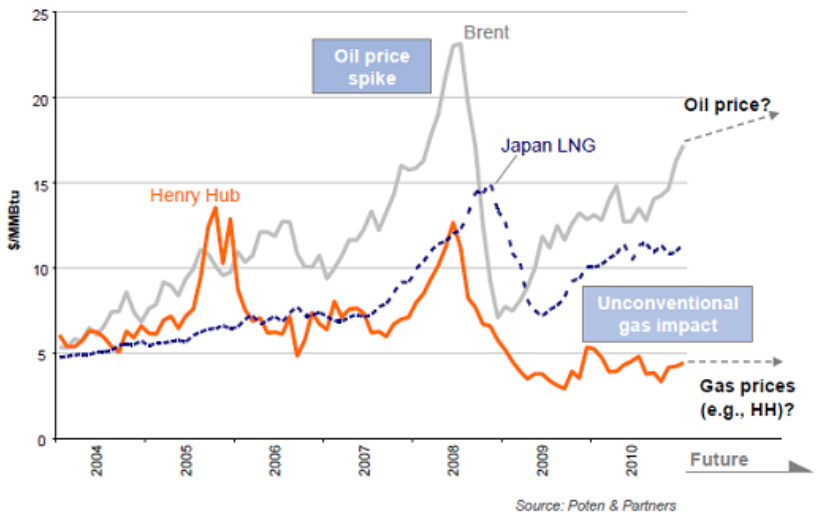
An important factor that governs natural gas demand and supply is the pricing of gas. It plays an important role in enhancing gas trade across the globe. Other than Pricing, Climate change policies will also have notable effect on gas trading, as the same will increase the possibilities of gas replacing other fossil fuels due to lower emissions of green house gases. In developing economies like China & India, per capita consumption is still low (82 cum and 54 cum respectively in 2010[1]). There is huge potential for growth of gas in these two countries, However to make the customers in these countries to switchover to gas, Competitiveness of gas in terms of price is an important factor. Lately both the countries and their respective governments have shown interest in Gas based infrastructure. Hydro carbon vision of India calls for 20% share of Gas in primary Energy against 2010 level of 10%[1]. Already being one of largest importers of Oil, increasing the usage of gas in these countries will certainly impact the global gas trade in a big way. To understand the Price sensitiveness of these markets, in this paper we discuss the role of gas price in demand & supply and demand in India as a function of the price of gas

1.0 Background

Natural Gas prices are governed by various pricing mechanisms. Price mechanisms are adopted to balance the needs and interests of both suppliers and end users. Globally around one fifth of gas supply is priced on oil linkage[2]. Due to abundance / increase of unconventional gas production, Gas prices in the US got disconnected from international gas prices and especially prevalent in Europe and Henry Hub prices bottomed out. Henry Hub Prices have hovered around $3-$5 range since early 2010.Meanwhile rising coal prices and availability of cheaper spot cargoes possibly diverted from Long Term contracts of US have weakened the link between the Gas and Oil prices in continental Europe. In 2009, the average oil-linked contract price exceeded the spot price at NBP by ~$3.5/MMBtu. In 2010, the gap narrowed only slightly, reaching $2.16/MMBtu [World LNG Report 2011[3]], as result European buyers have sought to renegotiate terms with sellers and succeeded in linking some of the volumes they purchase to spot prices rather than oil and Several New entrants have sought to procure gas directly from the spot market. By end 2010, Gap had disappeared at least in the short term

Graph 1.1 Global Natural Gas & Oil Prices[4]



In contrast to European & American markets, most of the Asian contracts are through Oil indexing mechanism in that major part is linked to Japan's average imported oil price (JCC). However, two events, dramatic oil price fluctuations in 2008 and the current significant gap between gas prices and oil prices have opened the door to the possibility that Asian Liquefied Natural Gas (LNG) contracts could potentially shift to some form of linkage to gas-on-gas market prices. Recently few Long Term contracts were signed on Long term basis linked to Henry Hub prices; however those are for the gases that are going to come out of US markets, whereas big players in LNG like Qatar and Australian Companies are still looking for Oil indexed contracts. Thus assuming these Oil index price mechanisms continue to dominate in Asia; in this paper we try to look at the possible prices which could potentially to increase the Gas trade between the nations.

2.0 Demand – Price Sensitivity Analysis

For Gas trade to increase, demand has to keep pace with supply. Competitiveness of Gas i.e. pricing of gas relative to other fuels has a strong influence on fuel choice, and Gas demand is extremely sensitive to the Prevailing Gas Prices. To analyse the effect of gas prices in demand side, Price sensitiveness in India has been taken as case study.

2.1 Case Study - Natural Gas Market – India

Gas is slowly emerging as a primary source of energy for India, along with coal and oil. The last decade showed strong growth in the Indian gas sector. Gas demand in India is expected to grow as high as 5.4% per year (World Energy Outlook 2010 - IEA Estimate[5].); the growth rate is second highest next only to China. Sudden increase in availability of domestic gas (from Krishna Godavari Field, KG-D6 Block – in production since 2009) at lower rate ($4.20/mmbtu) has fuelled the demand and had set the path for rapid growth. (There are a few other sources of domestic gas which are priced at slightly higher price by about $1/mmbtu)

Table 1.1 Domestic Gas Price's – From Major Sources

Source*	Customers	Gas Price (US $/MMBTU)
NOCs (APM)	Customer outside North East	4.2
NOCs (APM)	Customer in North East	2.52
NOCs (MDP)	Western & Northern Zone (Covering Maharashtra, Gujarat and other States covered by HVJ/DVPL Pipeline)	5.25
PMT Fields	Weighted average price of PMT	5.65
Ravva	GAIL	3.5
Ravva Satellite	GAIL	4.3
CB/OS-2 (Cairns)	GSPC	5.5
Hazira (Niko)	Gujarat State Energy Generation	5.39
	GSPC Gas	2.69
KG-D6	All Consumers	4.2

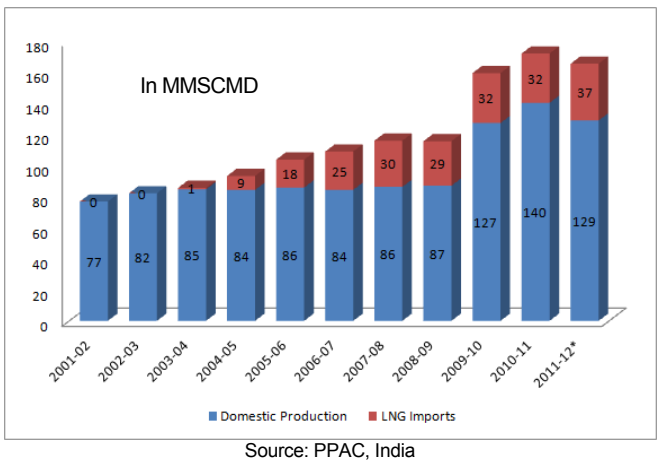
Source: MoPNG, India

*NOC- National Oil Companies, APM – Administrated Price Mechanism, MDP – Market Determined Price, PMT – Panna Mukta Tapti Fields

With additional availability of KG-D6 around 60 MMSCMD, various industries in fertiliser, Power, steel and Refineries etc switched over to domestic gas from KG-D6 block allotted to them. However from March 2011 availability of KG-D6 started coming down to the present level of 38 MMSCMD. This led to the gas users to buy RLNG at higher prices to compensate the deficit from KG-D6 Supplies.

Potential demand for natural gas in India is far exceeding the current domestic output. Therefore, the import of RLNG is set to rise. LNG imports currently cost from $8 (L ong Term) to $17 (Spot Prices)/MMBTU. Total Quantity of Domestic gas went up to the level 140 MMSCMD and recently started coming down to due to lower output from KG-D6 Field. India has long term contract of 7.5 MMTPA, remaining imports are through Short term/Spot Contracts.

Graph 1.2 Gas Production & LNG Imports in India



Source: PPAC, India

In India, both the Power and Fertiliser sectors, where majority of gas demand exists, operate in an environment where the prices of their output are subject to governmental regulations, either directly or indirectly. These sectors are given preference in domestic gas allocation compared to other sectors and therefore other sectors have to heavily rely on LNG imports.

Table 1.2: Domestic Gas availability Vs Power & Fertiliser sector Requirement

Values in MMSCMD	**2010/11**	**2011/12**
Domestic gas available	119.1	111.0
Fertiliser & power at present off-take level	101.5	101.4
Net gas available	**17.6**	**9.6**

Source: Inter-ministerial Committee Report, MoPNG India

In the context of such a large price differential between the Domestic and imported Regasified LNG (RLNG), adjustment in the user side is not easy, since decision to use gas involves a commitment of large investments in the form of fixed capital. The user is constantly facing the risk of not being fully able to pass-on the escalating cost of the gas input to the final customer. This leads to difficulties and delays in decision making and in the finalization of supply contracts.

2.2 Sector wise:

2.2.1 The Power sector

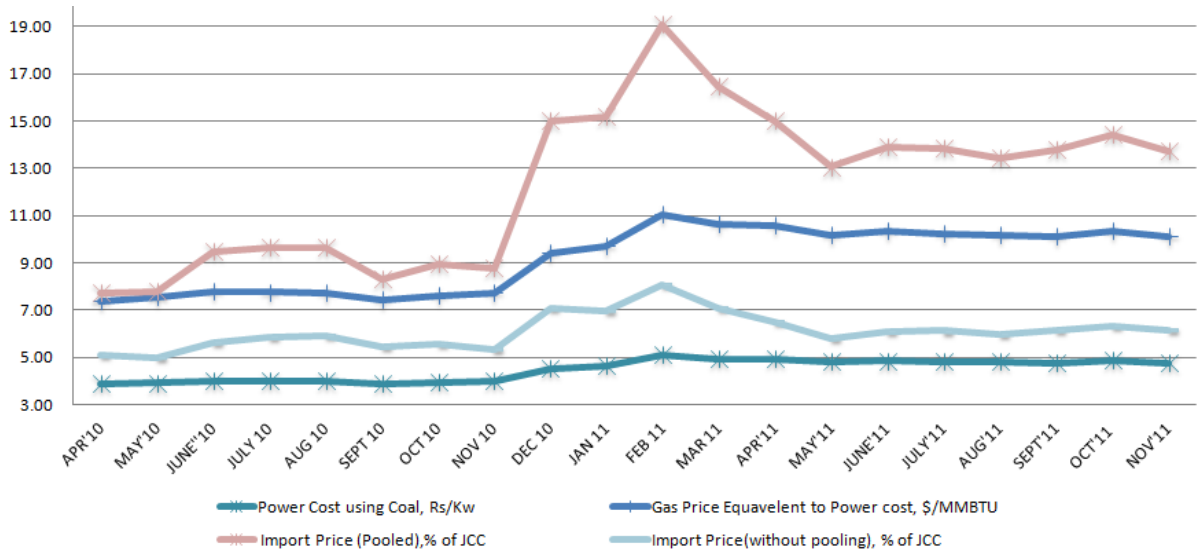
The Power sector's decision to invest in gas based power plants will depend upon the price of gas relative to other fuels mainly coal. Environmental considerations on Coal usage will also play a role depending on the government policies. Since there are lot of uncertainties over it, the same has not been taken to consideration. In China & India, coal is known to be the cheapest fuel for electricity, where coal is available at low prices vis-a-vis gas at 11-17 $/MMBTU. So long as gas price is high, gas would have only little impact on power generation in India. At present coal accounts for 84% of thermal power generation in India. However Domestic coal mining is not keeping pace (due to Environmental constraints on Mining /rehabilitation issues etc) with increasing requirement for coal as fuel for Power Sector. Imports are also becoming costly due to competition from China and others. Considering the fact that domestic coal is inadequate, the options before the country are to import coal or to use liquid fuels such as Fuel Oil (FO) / Low Sulphur Heavy Stock (LSHS) or Diesel (gasoil) or to import LNG. Though handling gas is much cleaner & greener than coal, power cost to the end consumer is highly controlled by government, thus choice of the fuel here purely depend upon the price.

India imports nearly 50% of coal from Indonesia for its use, thus to find the gas price that can compete with the imported coal, Indonesian coal price reference (HBA) has been taken and analysed. The HBA is the minimum price used for all Indonesian exports. It is calculated using a basket of indices, including the price is a monthly average of the Indonesia Coal price Index (ICI-1), Platts-1, Newcastle Export Index and the global COAL Index from the previous month.

With coal prices 110-125 $/MT, the power cost in a typical coal plant in India comes around 4.5-4.7 Rs/Kw, to generate power from Gas plants at this economics, Landed price of Gas

Price has to be around 9-10 $/MMBTU. Since gas imports at this low price is not feasible, to make the imports viable, Gas power plant has been using a mixture of imported gas and Domestic gas. The price of domestic gas is cheaper at a landed cost of around 6.5$/MMBTU. 70 % of Domestic and 30% of Imported RLNG looks to be ideal, at this mixture, Gas Power plants can absorb RLNG priced at Freight on Board (FOB) price of 12.5 - 13% of JCC (assuming the gas is from Middle East – Refer Annex 1). After 2014, the domestic gas prices are expected to be revised upwards. Hence from 2014, the above mix would not help in lowering the power cost. After 2014 affordable price would have to be lower than the above said level.

Graph 1.3 Competiveness of Gas in terms of % of JCC with Coal



2.2.2 Fertiliser Sector:

Fertiliser sector in India is influenced greatly by subsidies, Hence absorption price of gas of this sector depends up on the Government Policies. Existing policy on urea is based on Import Parity Price (IPP) benchmarked with suitable floor and ceiling prices of USD 250/MT and USD 425/MT respectively. Plants producing within these benchmarks will be able to get compensation equivalent of the 'losses' occurred due to selling Fertiliser at government fixed price.

Affordability of RLNG for Urea plants

In natural gas based plants, feedstock accounts for 80% of the Cost of production (COP) and for 1 MT of Urea production requires typically 5.5 Giga Calories (Average energy requirement of Urea plants in India),

The requirement of Gas in scm = (5.5 Gcal / MT x No. of MTs) / (NCV of gas in Kcals) i.e. 1 Lakh MT of Urea requires 62 MMSCM of RLNG (at 8990 kcal per SCM NCV), As 5.5 Gcal is equivalent to 22 mmbtu (at 8990 kcal /SCM NCV), Therefore, 1 G cal = 4 mmbtu.

Hence, Cost of Feedstock (RLNG) = 5.5 x 4 x Price of gas in $ per mmbtu

For example, if the gas price landed is $ 20 per mmbtu, then

Cost of Feedstock is $ 440 per mmbtu (which is generally taken as the variable cost)

The fixed cost is generally assumed at 25% of the Cost of Feedstock or $ 100

Therefore, the final cost of production is $ 540 per ton. If the Landed price of imported Urea is less than $ 540 per ton, RLNG at $ 20 (landed).

However, at prescribed cap of 425$/MT of Urea the affordable landed price of RLNG would be around 14$/MMBTU which would correspond to FOB price at 11% of JCC approximately.

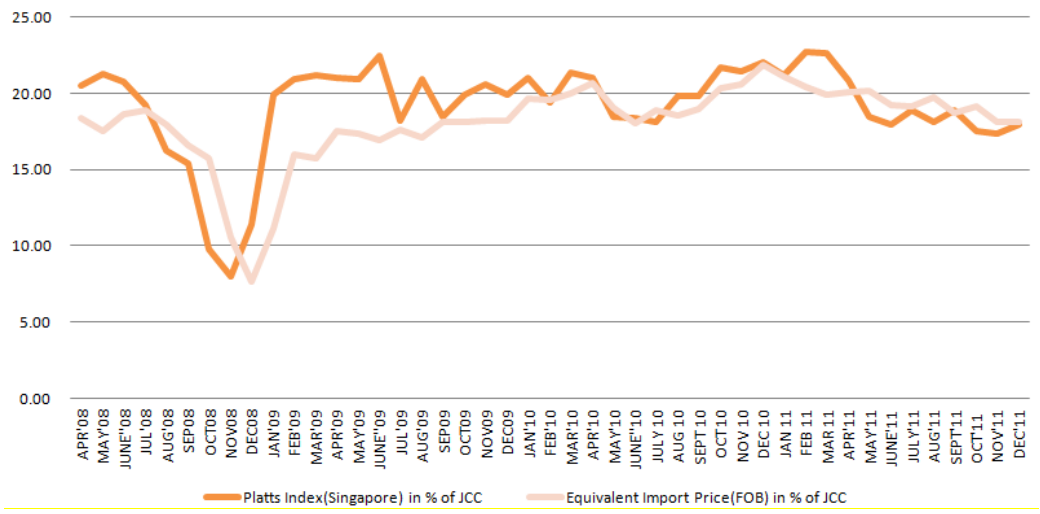
2.2.3 Industrial Sector and Refineries & Petrochemicals

In industrial sector gas competes against coal, Oil products, renewable (Biomass or solar). Though gas has advantage of easy handling, non requirement of storage at customer premises, relative pricing is a critical factor that determines the degree of substitution and hence gas demand. Higher energy costs will ultimately make the final products less competitive in market and can lead to Industries shutting down or lowering the production

Refineries generally use Naphtha and FO as an alternative fuel/feedstock to fire their captive power plants and Hydro Cracker units and in industrial sector they are being is used as alternative fuel for Gas. Refineries has to export these Naphtha which is produced by its own to replace it with Gas as a Fuel, so to find the affordability of gas, export parity price of Naphtha has been taken. In Industrial sector, since gas has to compete with Retail Price, delivered price of Naphtha and FO has been taken to find the competitiveness of Gas.

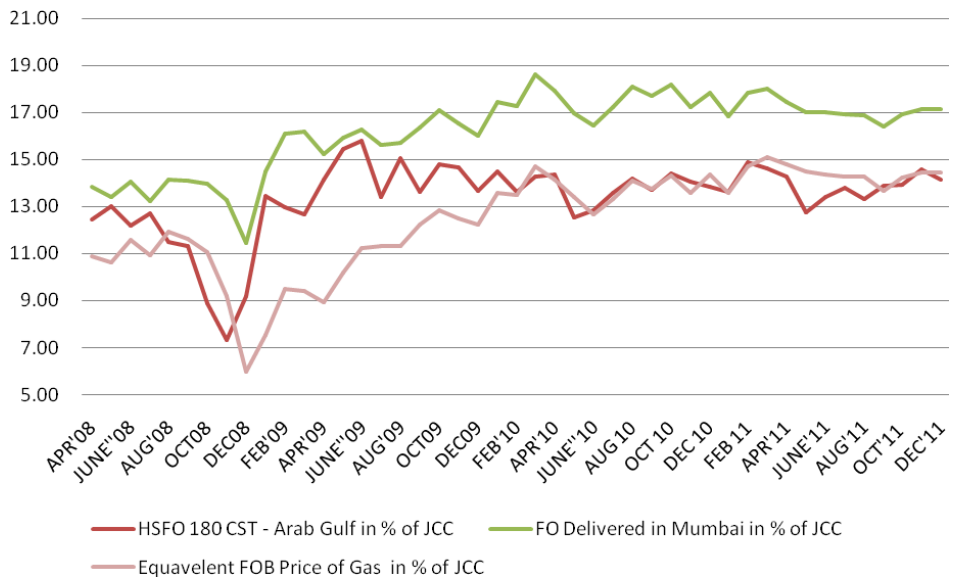
With International Price of Naphtha at the range of 80-110 $/MT, Data shows that Gas Price with higher linkage to JCC is viable. FOB price at the range of 15-17 % of JCC (assuming the Gas is from Middle East – Refer Annex II) could replace the Naphtha in Refineries and slightly lower percentage in case of Industries. However with installed Refining capacity of 193 MMTPA, the Quantum of Naphtha released by replacement of gas would have softening effect of global Naphtha prices as well India's Retail Prices, this may bring down the affordability of Gas at higher linkage of oil prices in Long term.

Graph 1.4 Competiveness of Gas in terms of % of JCC with Naphtha



In case of FO as replacement fuel, taking the fact that currently international FO prices are at range of 70-100$/MT, In industries Gas at FOB price of 12-13 % of JCC (Assuming gas is from Middle east) is viable,

Graph 1.5 Competiveness of Gas in terms of % of JCC with Naphtha



2.2.4 Transportation Sector

In Transportation sector, Compressed Natural Gas is used as fuel in place of Diesel and Petrol. In India, Diesel prices are controlled by Government, thus Gas has less or no price advantage over diesel. However Petrol is decontrolled Product, which is linked to the International oil prices and revised on fortnightly basis. Based on current prices of petrol, Gas Price on FOB basis with linkage of 14-15% has definite price advantage.

Table 1.3 The delivered cost of CNG to end customers is shown below:

(Values are in Rs/Kg)

LNG Basis	@12% of JCC Price	@14% of JCC Price)
Gas Cost	44.84	51.16
Capex / Opex Return	6.52	6.52
Sub-total	51.36	57.68
Excise Duty@14.43%	7.41	8.32
VAT@5%	2.94	3.30
Total Sale Price of CNG	**61.71**	**69.30**

The present RSP of Petrol & HSD is as under:

High Speed Diesel (HSD) : Rs. 46.21/ litre (w.e.f. 1/11/2011)

Petrol : Rs. 73.51 / litre (w.e.f. 1/12/2011)

2.3 Demand Estimates at Different Prices

Demand varies with the different price points as the affordability of various consumers is different. Three scenarios have been considered to predict the gas demand of India - low, medium and high.

The 2010 Year-end consumption in India is around 171 mmscmd. Out of this 171 mmscmd, 145 mmscmd came from domestic sources while the rest was through LNG. Three scenarios are considered to predict the gas demand of India - low, medium and high.

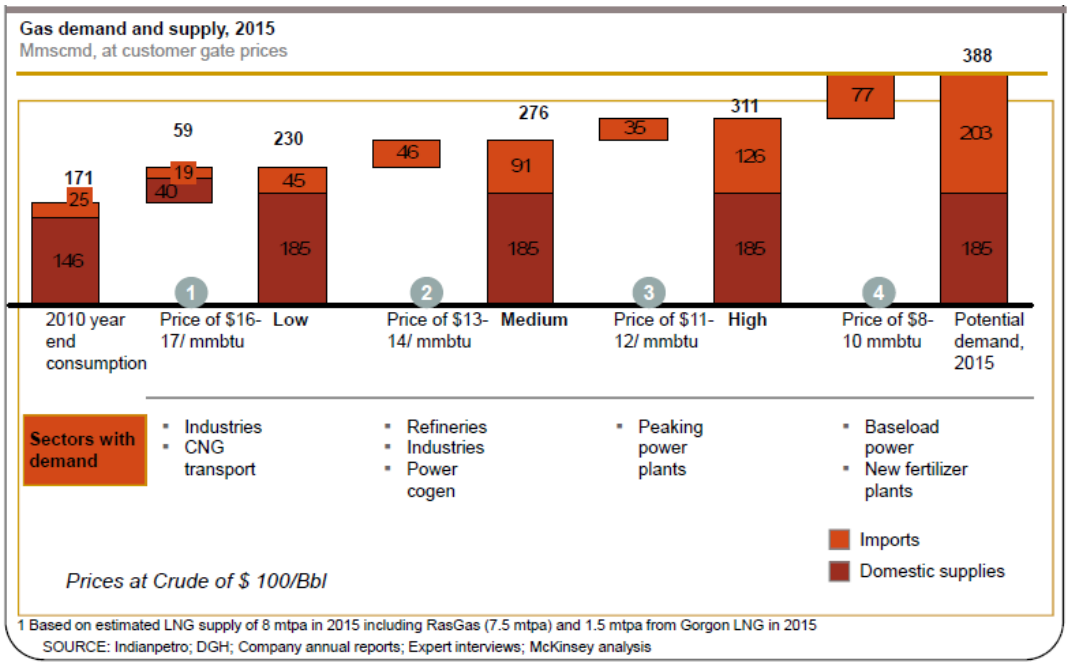
In the low case, if gas supply commitment can be made at price of 16-17$/MMBTU, then there will be demand of around 230 mmscmd in 2015 at a rate growth of 6 per cent pa. In this scenario, the Indian market will consume its domestic production, the current contracted LNG (around 30 mmscmd) and a further 20 mmscmd of incremental LNG.

In the medium case, if gas supply commitment can be made at $13-14 per mmbtu, then additional demand of 45-50 mmscmd will generate and total demand will reach to around 276 mmscmd. At this price range, demand from additional sectors will be unlocked as the use of natural gas will be economical, despite of switching cost and required additional investment. This additional demand will be driven primarily by refining and petrochemical industry.

Gas price of $11-13 will increase the demand to 311 mmscmd by 2015 as there will be demand from gas based peaking power generation. There is further potential to increase the demand to 387 mmscmd if we can provide gas at a price point of $8-10 per MMBTU.

Affordability of industries is calculated by considering their switching cost and price of crude oil at $100 per barrel.

Graph 1.6 Gas Demand & Supply Estimate - India



3.0 Supply

Demand will increase when price falls, but lower prices may discourage investments in upstream exploration and extraction. Global gas resource availability is vast and it's widely spread all over the world. Conventional recoverable resources alone are equivalent to 120 years of current consumption; while with total recoverable resource could sustain today's production for 250 years. However there are certain factors (Viz Resource Size etc.,) that determine the viability of developing these Natural gas resources

Though each of these factors needs to be addressed, but main factor in which Investment in exploration and development of these resources depend on is again Price of gas. For example Gorgon discovery was made in 1981; however FID was taken in 2009 only. (ExxonMobil Signed GSPAs with PetroChina and Petronet LNG India in 2009). The giant Shtokman field was discovered in 1988, but FID decision is yet to be made. According to IEA Estimate 2010, Remaining Recoverable resources of Natural gas in the world is 810 tcm and indicative production cost varies from 2-9 $/MMBTU(Details given in Table 1.2).

Table 1.4 Remaining Recoverable resources and Indicative production cost

	Conventional		Tight Gas		Shale Gas		CBM	
	tcm	$/MMBTU	tcm	$/MMBTU	tcm	$/MMBTU	tcm	$/MMBTU
Europe & Eurasia	136	2-6	11	3-7			83	3-6
Middle East	116	2-7	9	4-8	14			
Asia/Pacific	33	4-8	20	4-8	51		12	3-8
OECD North America	45	3-9	16	3-7	55	3-7	21	3-8
Latin America	23	3-8	15	3-7	35			
Africa	28	3-7	9		29			
OECD Europe	22	4-9			16			
World	**403**	**2-9**	**84**	**3-8**	**84**	**3-7**		

Considering the fact that most of these gas resources are in Middle East (125 Tcm) & Russia (230 tcm including rest of Eastern Europe) and with future major demand centres lying in China & India, investment in transportation infrastructure will also be needed. Thus Gas price should be high enough to pay off the transportation cost also.

4.0 Conclusion

While future of gas is brighter especially in countries like China & India, this may be the golden age for Gas. However, future gas trade is more sensitive to the level of gas prices relative to those of other fuels. Gas with reasonable price will be a 'dream' for developing countries like India and will help to diversify its energy portfolio and strengthen its energy security. At the same time Gas Price should encourage investments in the supply side, huge investment are made LNG projects in Australia with eye on increasing Asia-Pacific demand.

5.0 Bibliography

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Annex I

Table 2.1 Indonesian Coal Price Reference and Equivalent Gas Cost

	HBA*	Landed Cost Coal			Power Cost	Equivalent Gas
Unit	USD/MT	Rs/MT	US$/MMBTU	$/MT	Rs/KW	$/MMBTU
FEB'10	87.84	6572.36	5.46	136.92	3.90	7.51
MAR'10	86.50	6504.89	5.40	135.52	3.86	7.39
APR'10	86.50	6504.89	5.40	135.52	3.86	7.39
MAY'10	88.00	6580.49	5.46	137.09	3.91	7.53
JUNE"10	91.00	6731.69	5.59	140.24	4.00	7.80
JULY 10	90.50	6706.49	5.57	139.72	3.98	7.75
AUG 10	90.00	6681.29	5.55	139.19	3.97	7.71
SEPT 10	87.00	6530.09	5.42	136.04	3.88	7.44
OCT 10	89.00	6630.89	5.51	138.14	3.94	7.62
NOV 10	90.00	6681.29	5.55	139.19	3.97	7.71
DEC 10	109.00	7638.89	6.34	159.14	4.54	9.41
JAN 11	112.40	7810.25	6.49	162.71	4.64	9.72
FEB 11	127.05	8548.61	7.10	178.10	5.08	11.03
MAR 11	122.43	8315.76	6.91	173.25	4.94	10.62
APR'11	122.02	8295.10	6.89	172.81	4.93	10.58
MAY'11	117.61	8072.83	6.70	168.18	4.80	10.19
JUNE'11	119.03	8144.40	6.76	169.68	4.84	10.31
JULY'11	118.24	8104.59	6.73	168.85	4.81	10.24
AUG'11	117.21	8052.67	6.69	167.76	4.78	10.15
SEPT'11	116.68	8025.96	6.67	167.21	4.77	10.10
OCT'11	119.24	8154.99	6.77	169.90	4.84	10.33
NOV'11	116.65	8024.45	6.66	167.18	4.77	10.10

*Indonesian Coal Price Reference (HBA)

Table 2.1 Competitiveness of Gas in % of JCC with Coal

	Equivalent Gas	RLNG (30%)	Domestic (70%)	JCC	Middle East	Australia
Unit	$/MMBTU	$/MMBTU	$/MMBTU	$/bbl	% of JCC	% of JCC
FEB'10	7.51	9.88	6.50	78.90	8.33	8.21
MAR'10	7.39	9.47	6.50	76.54	8.07	7.94
APR'10	7.39	9.47	6.50	79.87	7.73	7.61
MAY'10	7.53	9.92	6.50	84.96	7.80	7.68
JUNE"10	7.80	10.82	6.50	79.67	9.44	9.32
JULY 10	7.75	10.67	6.50	76.35	9.66	9.52

AUG 10	7.71	10.52	6.50	74.70	9.67	9.53
SEPT 10	7.44	9.62	6.50	76.04	8.32	8.19
OCT 10	7.62	10.22	6.50	77.25	8.96	8.83
NOV 10	7.71	10.52	6.50	82.24	8.78	8.66
DEC 10	9.41	16.21	6.50	86.22	14.97	14.86
JAN 11	9.72	17.23	6.50	91.83	15.17	15.06
FEB 11	11.03	21.61	6.50	95.90	19.10	18.99
MAR 11	10.62	20.23	6.50	103.05	16.43	16.33
APR'11	10.58	20.11	6.50	111.88	15.02	14.93
MAY'11	10.19	18.79	6.50	118.69	13.05	12.96
JUNE'11	10.31	19.21	6.50	114.70	13.87	13.79
JULY'11	10.24	18.98	6.50	113.45	13.82	13.73
AUG'11	10.15	18.67	6.50	114.63	13.41	13.32
SEPT'11	10.10	18.51	6.50	110.62	13.75	13.66
OCT'11	10.33	19.28	6.50	110.88	14.41	14.32
NOV'11	10.10	20.00	6.50	110.88	15.06	14.97

Assumptions: (Middle East)

Shipping Charges	:0.3	$/MMBTU
Regasification	:1.0	$/MMBTU
Transportation + Margin	:1.7	$/MMBTU

Assumptions: (Gorgon)

Shipping Charges	:0.7	$/MMBTU
Regasification	:1.0	$/MMBTU
Transportation + Margin	:1.7	$/MMBTU

Annex II

Table 2.1 Competitiveness of Gas in % of JCC with Naphtha

Month	Naphtha	Naphtha	Naphtha Delivered	JCC	Naphtha	Naphtha Delivered	FOB
Unit	$/BBL	$/mmbtu	$/mmbtu	$/bbl	% of JCC	% of JCC	% of JCC
APR'08	102.61	20.75	21.62	101.11	20.52	21.38	18
MAY'08	113.69	22.99	21.95	108.01	21.28	20.32	18
JUNE"08	125.25	25.33	25.72	121.93	20.77	21.09	19
JUL'08	125.46	25.37	27.91	131.62	19.28	21.21	19
AUG'08	108.37	21.91	27.31	135.14	16.22	20.21	18
SEP08	91.97	18.60	22.98	120.56	15.43	19.06	17
OCT08	49.77	10.06	19.16	102.56	9.81	18.68	16
NOV08	29.09	5.88	10.75	73.68	7.98	14.59	11
DEC08	31.00	6.27	7.22	54.88	11.42	13.16	8
JAN'09	42.58	8.61	7.81	43.17	19.94	18.09	11
FEB'09	46.84	9.47	10.24	45.29	20.91	22.62	16
MAR'09	46.53	9.41	9.98	44.40	21.19	22.48	16
APR'09	49.35	9.98	11.29	47.42	21.05	23.82	17
MAY'09	54.01	10.92	12.06	52.26	20.90	23.08	17
JUNE"09	65.86	13.32	13.06	59.36	22.44	22.00	17
JUL'09	62.92	12.72	15.30	69.91	18.20	21.88	18
AUG'09	70.37	14.23	14.65	67.99	20.93	21.54	17
SEP09	66.80	13.51	16.22	73.00	18.50	22.22	18
OCT09	69.20	13.99	15.75	70.18	19.94	22.44	18
NOV09	76.21	15.41	16.64	74.76	20.61	22.26	18
DEC09	78.28	15.83	17.51	79.47	19.92	22.03	18
JAN'10	80.66	16.31	18.27	77.68	21.00	23.51	20
FEB'10	75.76	15.32	18.45	78.90	19.42	23.39	20
MAR'10	80.84	16.35	18.33	76.54	21.36	23.94	20
APR'10	83.13	16.81	19.51	79.87	21.05	24.42	21
MAY'10	77.43	15.66	19.20	84.96	18.43	22.60	19
JUNE"10	72.42	14.64	17.37	79.67	18.38	21.81	18
JULY 10	68.57	13.87	17.43	76.35	18.16	22.83	19
AUG 10	73.31	14.82	16.87	74.70	19.84	22.58	19
SEPT 10	74.52	15.07	17.44	76.04	19.82	22.94	19
OCT 10	82.97	16.78	18.69	77.25	21.72	24.20	20
NOV 10	87.26	17.65	19.94	82.24	21.46	24.24	21
DEC 10	93.83	18.97	21.86	86.22	22.01	25.35	22
JAN 11	96.44	19.50	22.42	91.83	21.24	24.41	21

FEB 11	107.83	21.80	22.61	95.90	22.74	23.58	20
MAR 11	115.38	23.33	23.54	103.05	22.64	22.85	20
APR'11	115.38	23.33	25.43	111.88	20.85	22.73	20
MAY'11	108.34	21.91	26.90	118.69	18.46	22.66	20
JUNE'11	101.90	20.61	25.04	114.70	17.96	21.83	19
JULY'11	105.92	21.42	24.77	113.45	18.88	21.84	19
AUG'11	103.00	20.83	25.62	114.63	18.17	22.35	20
SEPT'11	103.49	20.93	23.68	110.62	18.92	21.41	19
OCT'11	96.19	19.45	24.23	110.88	17.54	21.85	19
(* AVERAGE PLATTS' FOB ASSESSMENTS FOR SINGAPORE IN USD PER BARREL)							

Assumptions:

Shipping Charges	:0.3	$/MMBTU
Regasification	:1.0	$/MMBTU
Transportation + Margin	:1.7	$/MMBTU

Annex III

Table 2.1 Competitiveness of Gas in % of JCC with FuelOil

Month	HSFO 180 CST*	HSFO 180 CST	FO Delivered	JCC	HSFO 180 CST	FO Delivered	FOB
Unit	$/BBL	$/mmbtu	$/mmbtu	$/bbl	% of JCC	% of JCC	% of JCC
APR'08	82.26	12.59	14.01	101.11	12.45	13.86	10.9
MAY'08	91.79	14.05	14.47	108.01	13.00	13.39	10.6
JUNE"08	96.95	14.84	17.13	121.93	12.17	14.05	11.6
JUL'08	109.37	16.74	17.38	131.62	12.72	13.21	10.9
AUG'08	101.46	15.53	19.14	135.14	11.49	14.16	11.9
SEP08	89.12	13.64	17.00	120.56	11.31	14.10	11.6
OCT08	59.62	9.12	14.34	102.56	8.90	13.98	11.1
NOV08	35.24	5.39	9.77	73.68	7.32	13.26	9.2
DEC08	32.99	5.05	6.29	54.88	9.20	11.45	6.0
JAN'09	37.98	5.81	6.26	43.17	13.46	14.50	7.6
FEB'09	38.40	5.88	7.29	45.29	12.98	16.10	9.5
MAR'09	36.68	5.61	7.18	44.40	12.64	16.18	9.4
APR'09	43.83	6.71	7.23	47.42	14.15	15.25	8.9
MAY'09	52.77	8.08	8.33	52.26	15.45	15.94	10.2
JUNE"09	61.26	9.38	9.67	59.36	15.79	16.28	11.2
JUL'09	61.25	9.37	10.92	69.91	13.41	15.63	11.3
AUG'09	66.88	10.24	10.69	67.99	15.05	15.72	11.3
SEP09	64.99	9.95	11.94	73.00	13.62	16.36	12.3
OCT09	67.78	10.37	12.01	70.18	14.78	17.11	12.8
NOV09	71.64	10.96	12.34	74.76	14.67	16.51	12.5
DEC09	70.93	10.85	12.73	79.47	13.66	16.02	12.2
JAN'10	73.57	11.26	13.55	77.68	14.49	17.44	13.6
FEB'10	70.30	10.76	13.64	78.90	13.64	17.28	13.5
MAR'10	71.30	10.91	14.26	76.54	14.26	18.63	14.7
APR'10	74.93	11.47	14.31	79.87	14.36	17.91	14.2
MAY'10	69.58	10.65	14.40	84.96	12.53	16.95	13.4
JUNE"10	66.75	10.22	13.09	79.67	12.82	16.43	12.7
JULY 10	67.74	10.37	13.15	76.35	13.58	17.23	13.3
AUG 10	69.16	10.58	13.53	74.70	14.17	18.11	14.1
SEPT 10	68.06	10.42	13.47	76.04	13.70	17.71	13.8
OCT 10	72.66	11.12	14.05	77.25	14.39	18.19	14.3
NOV 10	75.60	11.57	14.17	82.24	14.07	17.23	13.6
DEC 10	77.98	11.93	15.37	86.22	13.84	17.82	14.3

JAN 11	81.85	12.53	15.46	91.83	13.64	16.84	13.6
FEB 11	93.26	14.27	17.08	95.90	14.88	17.81	14.7
MAR 11	98.52	15.08	18.56	103.05	14.63	18.01	15.1
APR'11	104.36	15.97	19.53	111.88	14.28	17.46	14.8
MAY'11	98.99	15.15	20.19	118.69	12.76	17.01	14.5
JUNE'11	100.43	15.37	19.49	114.70	13.40	16.99	14.4
JULY'11	102.33	15.66	19.21	113.45	13.80	16.94	14.3
AUG'11	99.80	15.27	19.35	114.63	13.32	16.88	14.3
SEPT'11	100.38	15.36	18.13	110.62	13.89	16.39	13.7
OCT'11	100.76	15.42	18.76	110.88	13.91	16.92	14.2
(* AVERAGE PLATTS' FOB ASSESSMENTS FOR ARAB GULF IN USD PER BARREL)							

Assumptions:

Shipping Charges	:0.3	$/MMBTU
Regasification	:1.0	$/MMBTU
Transportation + Margin	:1.7	$/MMBTU