

Strategic Drivers for Growth of Natural Gas Sector in India

Ayush Gupta

Dy. General Manager, GAIL India Ltd.

Background

Currently, India is the fastest growing economy in the world and projected to become the second largest economy of the world by 2050 as per the Goldman Sachs BRICs report. For the fiscal year 2013-14, the country's economic growth rate stood at 4.7%. The extent to which energy needs of a country are met has a direct bearing on its balanced and sustainable economic, social and environmental wellbeing. Ensuring adequate and reliable energy supply at reasonable prices is fundamental to sustaining the economic growth and to raise levels of human development. Targeted economic growth in such magnitude raises some fundamental issues. Firstly, growth has to be equitable and spread across the country amongst its masses. Secondly, growth must also be sustainable. Thirdly, one of the biggest challenges is to realize the dream of Energy Independence, as envisaged by former President Sh. A P J Abdul Kalam. This will be crucial to maintaining a long- term growth in the economy, which can percolate to the masses. Sustained GDP growth in our economy will necessarily require correspondingly higher inputs on various fronts such as in energy infrastructure, electricity generation, transmission and distribution and skilled human resources in these sectors to drive the growth.

India has 17 per cent of the world's population, and just 0.8 per cent of the world's known oil and natural gas resources. To compound the problem, our existing hydrocarbon resources are fast exhausting besides posing environmental hazards from current and future use. Supply side constraints may already be beginning to constrain our growth. According to the BP Statistical review of World Energy 2011, India is currently, the world's fourth largest consumer of energy. By 2030 it is expected to become the third largest, overtaking Japan and Russia. As per the World Energy Outlook 2011, IEA has projected India's energy demand in 2035 at 1,464 MMtoe. As per the Integrated Energy policy, there would be a requirement of 3-4 times current primary energy supply and 5-6 times the electricity supply for a sustained GDP growth of 8 per cent through 2031-32. On a conservative estimate, this translates into a mammoth target of adding one power plant every week to our power generation capacity till 2031-32. Those responsible towards this must recommit themselves and

collectively ensure that the developmental work of creating the necessary energy and power infrastructure is planned and initiated now before inadequate supply of needed resources becomes a serious bottleneck.

Energy Sector: An Overview (BP Statistical review of World Energy 2011)

	World	Asia Pacific	India
Energy Consumption (MTOE)	12002	3981	524 (4th Largest Energy Consumer)
Energy Mix (%)			
Coal	30%	51%	53%
Oil	35%	29%	30%
Natural gas	24%	11%	11%
Nuclear	5%	3%	1%
Hydro	6%	5.3%	5%
Renewables	1%	1.7%	1%
Oil & Gas Imports (MTOE)	3245	1097	180 (US\$ 120 billion)
Annual Compounded Growth in Energy (10 yrs)			
Total Primary Energy	2.1%	4.0%	4.8%
Natural Gas	2.5%	6.5%	6.6%

To achieve the strategic goal of Energy Independence would require a well- engineered shift in the structure of our energy supplies. We must focus zealously upon developing and promoting indigenous or acquired technology to increase the use of non- fossil-fuel based energy sources. Potential options include hydro, solar, wind, hydrogen, bio-fuels, nuclear and biomass. Nuclear power, bio fuels, solar power, and fuel cells hold considerable promise to fulfill our medium to long term energy needs. Nuclear power for instance, can offer long term solution to the nation’s quest for energy independence. In the near to medium term, though, there is a dire need to manage a transition from

high polluting fuels to low polluting fuels in an energy efficient society. This is where cleaner fuels such as natural gas and renewable can play a big role. Gas, for instance, is amongst the fastest growing primary energy sources worldwide. It can play a significant role in achieving energy security for India, especially in view of the large domestic gas finds across the country. Further, there is a large potential for profitable exploration in the future with only 32 per cent of the Indian sedimentary area having been explored so far. Efficiency in the production and usage of energy in major sectors of the economy must also play an important role in this strategy. On the thresh hold of double digit economic growth rate, India needs to ensure that smart energy and environmentally safe fuels propel its development. We need to decouple economic prosperity from environmental degradation. The two must share a positive and not a negative equation with each other. Thus, Equity, Energy and Ecology shall have to be the interdependent pillars of our economic progress.

Natural Gas in India

Natural Gas has emerged as the most preferred fuel due to its inherent environmentally benign nature, greater efficiency and cost effectiveness. The demand for natural gas has sharply increased in the last two decades at the global level. In India too, the natural gas sector has gained importance, particularly over the last decade and is being termed as the fuel of the 21st century. The MOPNG's Hydrocarbon Vision 2025 report indicated that natural gas should be the preferred source of energy. Natural Gas is emerging as an important component of the world's total primary energy consumption. Asian gas market is the primary driver of the growth of the world gas industry. In Asia, the share of natural gas in the total primary energy basket has grown from 2.2 per cent in 1971 to a level of 9.4 percent in 2001 and is expected to grow further, led by emerging markets like China, India and Korea. Globally, natural gas constitutes 24% of the energy basket while in India it accounts for a mere 11%. Indian gas market is in the transition phase, moving away from a supply-constrained scenario to a multi-source, multi-market entity. Government of India has taken a series of measures on the supply side to develop the gas sector in India. As a result, a major new hydrocarbon province is already emerging in the east coast of India. Also, LNG imports commenced at the end of year 2003. With these developments, the challenge is not only the organization of competitive gas supplies but also the aggressive development of gas pipeline networks to provide access to the growing market. The success of CNG in the automotive sector in Delhi and Mumbai augurs well for the development of the nascent retail gas market and these emerging segments shall support the potential anchor segments of Power and Fertilizer.

Natural gas sector in India is also witnessing significant changes in the recent past and

is set to grow at a very fast rate in coming 15-20 years. The growth in the sector will hold the key to achieving the dream of Energy Security/ Energy Independence for the country.

Factors affecting the growth of Natural Gas sector in India

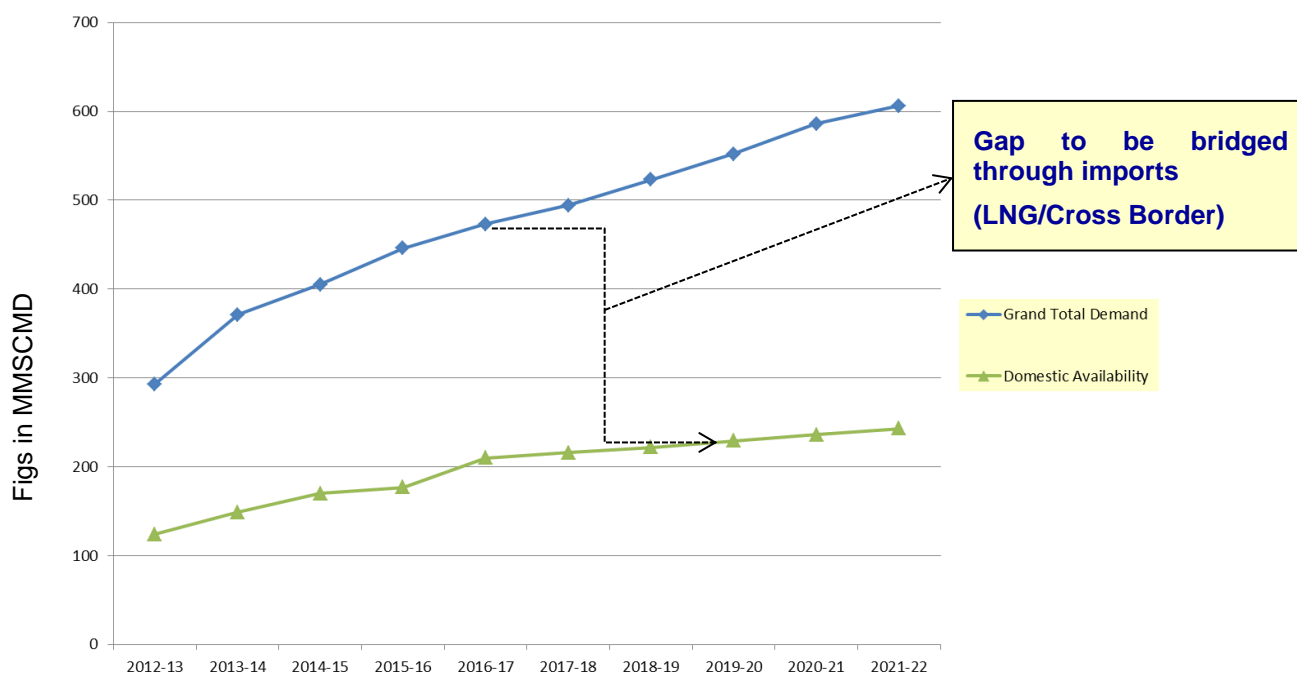
Various studies have been carried out in India and abroad to analyze and discuss the impact of several factors on the developments taking place in the natural gas sector. Most of these studies are country or region specific. Until 2004-2005, Indian Gas Sector was not opened up and was as such a highly regulated sector. Since then a number of changes have taken place to encourage private participation with an aim to give a boost to the much needed growth in the sector. Some of these changes and reforms are still being carried out. Since then, a few studies have been carried to track these developments and discuss the issues which are critical for the growth of natural gas sector in the country.

While the Hydrocarbon Vision 2025 developed by Ministry of Petroleum & Natural Gas (MOPNG) underlines the emphasis for growth of the hydrocarbon sector, other studies carried out by institutions like Petrofed, Infraline talk about the underlying factors such as the demand-supply gap, Gas Pricing, LNG Imports, Infrastructure development, regulatory framework etc. At individual levels also, the researchers have tried to identify and critically analyze the important issues that need to be addressed for the Gas sector in India to reach to its fullest potential. In the coming years, key factors like Gas Pricing and tariff, Technology, Globalization and Environmental Concerns would lead to a buoyant growth of gas market in India. The **increasing size of the gas markets** will continue to be the driving force for organizing more gas supplies in India. With her favorable geographic disposition, India is poised to emerge as the potential growth hub for natural gas in the Asian region. While the activities are already on for setting up of cross border Iran-Pakistan-India (IPI) and Turkmenistan-Afghanistan-Pakistan-India (TAPI) pipelines, possibilities are also being explored for laying the pipeline from India to Pakistan for transporting natural gas from India to Pakistan.

Energy sector in India is thirsty for natural gas. In the current demand supply scenario for natural gas, the **demand for natural gas** exceeds far more than the supply. While 120 MMSCMD of domestic supplies are contributing for meeting this high demand, the country is importing approx. 46 MMSCMD of gas from various parts of the world in the form of LNG. With these supplies falling short of industry demand, the country is scouting for newer options for sourcing gas. The current demand for natural gas is about 300 MMSCMD which is expected to grow upto 600 MMSCMD by the end of the 13th

five year plan (i.e. by 2022). Out of this, the domestic production may cater upto 250 MMSCMD only. Rest of the demand will need to be met through the import route.

Demand- Domestic Supply 12th -13th Five Year Plan Gap



Along with the **availability**, another important factor which governs the growth of the natural gas sector in the country, is the **price** at which it is available. With large scale plans for infrastructural development as well as the expansion in CNG & CGD sector, the country today has a huge appetite for natural gas but at a price that is affordable for the industry & the end consumer. The demand of gas in the country is highly price sensitive. The end consumer not only requires an assured supply on long term basis but also compares the price to the other available alternate fuels like coal, naphtha etc. and its overall production cost for using natural gas. The deliberations in the country with respect to fixing of gas prices for domestic production including the decision to review the gas pricing formula recommended by the Rangrajan Committee needs to be concluded in a time bound manner to bring clarity on domestic gas pricing.

Traditionally, the countries like UAE, Qatar, Australia, Russia.....which have surplus gas reserves, have been dominating the international gas supply market & thereby

controlling the prices in the market. However, recent developments in the US with respect to **development of shale gas** can prove to be the game changer for the entire gas sector across the globe including the Indian natural gas sector. With India making efforts for making investments & sourcing gas from the shale gas assets in US, the industry is closely looking forward to not only the increased availability of gas but also significant reduction in the gas import prices. The progress made in Europe and China on development of Shale gas assets also needs to be closely monitored as the same will have a huge impact on the global gas markets.

Indian companies are not only trying to scouting for sourcing natural gas in the form of LNG from all across the world including buying of stakes in Shale Gas assets in US but also the companies with shale gas assets are interested in acquiring an operating interest in terminals to ship gas to India at less than \$10-\$12.

India is already the world's eighth largest importer of **LNG**. These imports could rise five fold in the next decade as the domestic gas output falls and demand surges.

Leading Indian gas sector companies finds themselves at a critical juncture where the decisions on **strategic, political, economic, social, and environmental issues** will have an impact on their performance for years to come. Each of these issues, in turn could be affected by decisions on how to meet India's growing energy needs. Yet when it comes to the subject of energy in general, and natural gas in particular, there is little or no consensus in the country. The only point of agreement is that in the midst of high oil and rising gas prices, India's thirst for energy will continue to grow. How this thirst is quenched will have a crucial impact not just on India's economic growth, but also on its internal political and social stability, as well as its relations with other states. It is important for these companies to identify the key strategic drivers to increase their share in the National energy basket to understand the relationship and impact developments in the external environment on their business activities, to evaluate possible strategic options in the emerging business scenario in Energy sector and develop a road map for being a dominant player in the Indian Energy sector.

Considering the fact that the share of natural gas in the energy mix for the country is expected to increase steadily & may cross 20% mark by 2025, various organisations will have a crucial role to play not only in terms of developing new sources of gas supply for the country but also in setting up the much needed **infrastructure** for import of LNG as also the transmission & distribution of natural gas to take gas to the end users. These investments not only include expansion of existing pipeline networks and setting up of new LNG import and regasification terminals but also building the

capability in the area of LNG Shipping. The development of national gas grid and the CNG corridors along national highways will give a boost to the gas sector and will ensure availability of gas in different parts of the country. The development of City Gas Distribution networks in major cities and its expansion in other tier-II cities also needs to be taken up aggressively once the availability of gas is ensured.

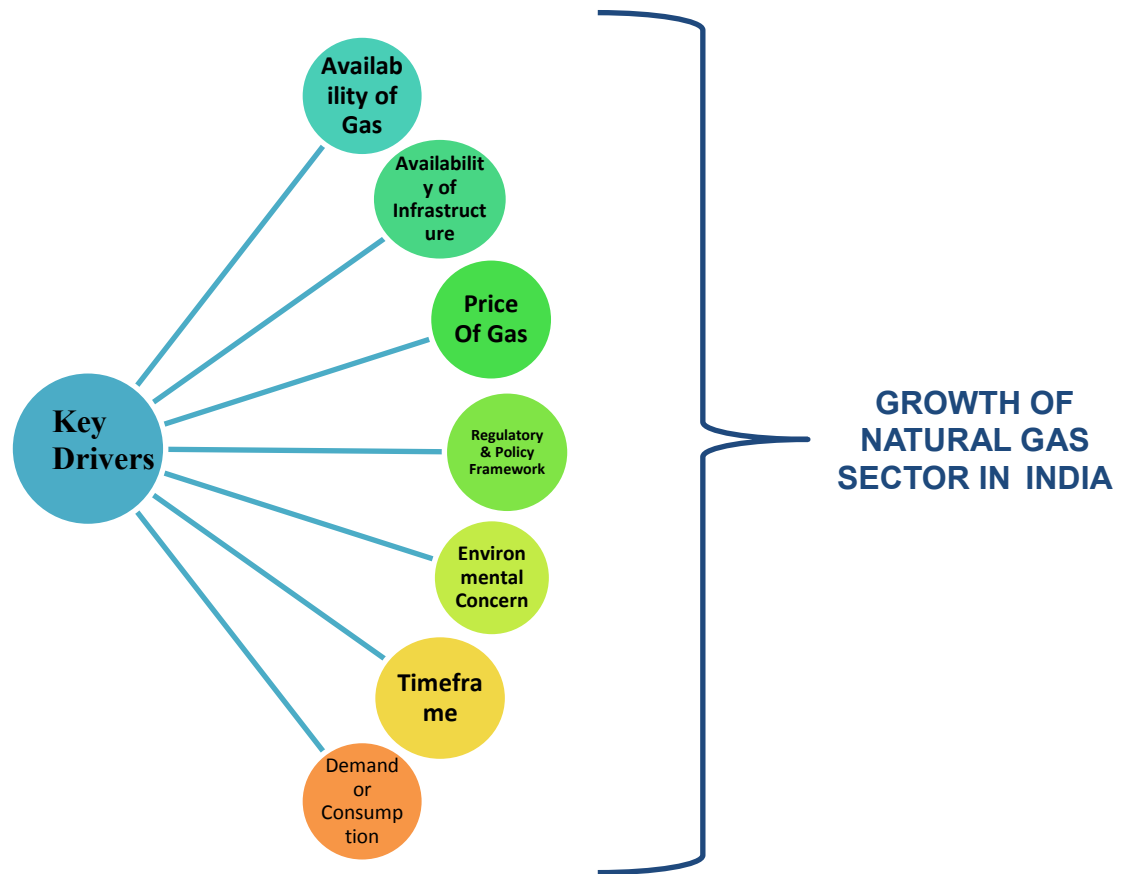
The country as a whole is looking towards various alternatives including the **renewable energy sources** for quenching its ever-increasing thirst for energy. Meeting the energy requirements will hold the key to the overall economic growth of the nation. As of now the renewable energy sources make only a very small and insignificant contribution in the nation's overall energy basket.

Newer discoveries, technological as well as the geo-political developments taking place in the gas sector are driving a lot of research studies across the world to track and analyze the impact of these developments on the future growth of natural gas sector.

With a lot of dependence on import, these developments taking place across the globe and especially the recent **developments in the gas sector in US** will have a significant impact on the availability and prices of natural gas in India. There is a need to closely track and analyze these changes and developments within and outside the country, which will have an impact on the future growth of natural gas sector in the country. With China and India being seen as the emerging economies of the world, the gas sector also is expected to contribute significantly in economic growth of these two countries. A number of national as well as international institutions/organizations are looking forward to making a significant investment in these countries and especially in the natural gas sector.

The development in the natural gas sector offers a huge opportunity for growth in the country. Such a large scale development requires a pool of highly skilled and trained manpower. The hydrocarbon sector in the country is facing a severe **crunch of talented, skilled & experienced manpower**. The industry is losing experience by way of superannuation of old employees, losing talent to other industries as oil & gas sector is no longer a preferred sector among younger generation and above all, the job requires a high skill level to ensure success & safety of projects. With signing up of international trade agreements and setting up of cross border supply & distribution networks, what is needed is the development of a global and competitive workforce to face the challenge of skilled manpower shortage in the sector.

The various factors affecting the growth of natural gas sector in India can be broadly summarized in the following pictorial.



The Road Ahead

A recent study from IEA describes the coming years as the Golden age for Gas. According to the report, the factors that drive natural gas demand and supply increasingly point to a future in which natural gas plays a greater role in the global energy mix. Global uncertainties afflicting the energy sector can be seen as opportunities for natural gas. While replacing other fossil fuels, natural gas can lead to lower emissions of green house gases and local pollutants. It can help to diversify energy supply, and so improve energy security. It can provide the flexibility and back up capacity needed as more variable capacity comes online in power generation. Gas is

particularly attractive fuel in regions such as China, India and the Middle East, which are urbanizing and seeking to satisfy rapid growth in energy demand. These are the very regions that will largely determine the extent to which gas use expands over the next quarter of a century.

With natural gas usage still being in the very nascent stages of development in India, the potential for a large scale growth is really huge. Because of this potential, business entities across the globe are looking towards the development of natural gas sector in India. As a growing economy, India today has a huge appetite for natural gas but at a price which will project gas as a natural choice against other sources of energy. How the soon to be the 2nd biggest economy of the world will manage the uncertainties and the factors affecting future development natural gas sector in India is a subject of interest for all the stakeholders having an interest in the Indian natural gas market.

Bibliography

1. Anne-Sophie Corbeau (2010), "Natural Gas in India", International Energy Agency, November.
2. Amy Myers Jaffe & Meghan L. O'Sullivan (2012), "The Geopolitics of Natural Gas", A Report of Scenarios Workshop of Harvard University's Belfer Center and Rice University's Baker Institute Energy Forum, July.
3. British Petroleum (2012), "BP Energy Outlook 2030", March.
4. Chris Rumley, Marina Kim, Allison Ball and Robert Curtotti (2007), "Natural Gas in India: Prospects for LNG Imports", Abare Research Report 07.23 prepared for Australian Government Department of Resources, Energy and Tourism, Canberra, December.
5. Dagmar Graczyk (2006), "Gas to Power - India", International Energy Agency, April.
6. David Temple (2007), "The Iran-Pakistan-India Pipeline The Intersection of Energy and Politics", Institute of Peace and Conflict Studies, April.
7. Ernest & Young (2011), "Oil & Gas Investment Perspectives for Asia".
8. Infraline Energy Research and Information Services (2006), "GAIL-Infraline Natural Gas in India", Reference Book.
9. ICRA (2011), "Indian Downstream Natural Gas Sector- Ballooning Natural Gas Supply- demand Deficit to Fuel LNG Imports", ICRA Rating Feature.
10. Jyoti Parikh, Probal P. Ghosh, (2009), "Energy Technology Alternatives for India till 2030", International Journal of Energy Sector Management, September.
11. Jacques Lesourne, William C. Ramsay (2009), "Energy in India's Future: Insights", Institut Francais Des Relations Internationales.
12. KPMG (2006), "India Energy Outlook", April.

13. Ministry of Petroleum and Natural Gas (2001), “ Hydrocarbon Vision-2025”.
14. Mike Jackson, (2007), "Natural Gas Sector Reform in India: Case Study of a Hybrid Market Design", The Program on Energy and Sustainable Development at Stanford University.
15. Mike Jackson, (2007), "The Future of Natural Gas in India: A Study of Major Consuming Sectors", The Program on Energy and Sustainable Development at Stanford University.
16. Mckinsey and Company (2008), “Gas in 2020, A Perspective”, In proceedings of Asia Gas Partnership Summit organized by GAIL India Limited and FICCI, 14th-15th April.
17. Mckinsey & Company (2012), “Partnerships: Reshaping Asia Natural Gas Industry”, In proceedings of National Summit organized by GAIL India Limited and FICCI, 23rd-24th March.
18. Ministry of Petroleum and Natural Gas (2012), "Availability and Utilization of Natural Gas" retrieved from <http://petroleum.nic.in/ng.htm>.
19. Obindah N. Wagbara (2006), "How would the gas exporting countries forum influence gas trade?", Elsevier, April.
20. Petrofed (2005),"Fuelling India's Growth- Vision 2030", retrieved from Infraline Energy Research and Information Services.
21. Petrofed (2007),"The Green Imperative: Future of Natural Gas in India- 2030", retrieved from Infraline Energy Research and Information Services.
22. P.R. Shukla, Subash Dhar, David G. Victor, & Mike Jackson, (2007), “Natural Gas in India: Assessment of Demand from the Electricity Sector” The Program On Energy and Sustainable Development, October.
23. PWC (2012),“It is our turn now E & P partnership for India Energy Security”, Energies, Utilities & Mining, 2012.
24. Prabhat Singh (2012), "Fuelling the Tiger", 25th World Gas Conference, 4th-8th June.

25. R V Shahi (2006), "India's Strategy Toward Energy Development And Energy Security", Infraline.
26. Report of the Working Group on Petroleum and Natural Gas Sector for the XIth Plan (2007-2012).
27. Simon Roberts (2006), "Energy As Driver Of Change", Arup Journal, February
28. Shukla P R & Subhash Dhar (2009), "Regional Cooperation Towards Trans-country Natural Gas market. An Economic Assessment for India", International Journal of Energy Sector Management, April.
29. Shamila N. Chaudhary (2007), "Iran to India Natural Gas Pipeline: Implications for Conflict Resolution & Regionalism in India, Iran, and Pakistan", TED Case Studies.
30. Shebonti Ray Dadwal (2009), "Energy Security: India's Options", Strategic Analysis Vol. XXIII No.4, July.
31. Tanvi Madan (2006), "The Brookings Foreign Policy Studies", Energy Security Series, November.
32. U.S. Energy Information Administration (2012), "International Energy Outlook" September.