

Gas Demand-Supply in India – A perspective

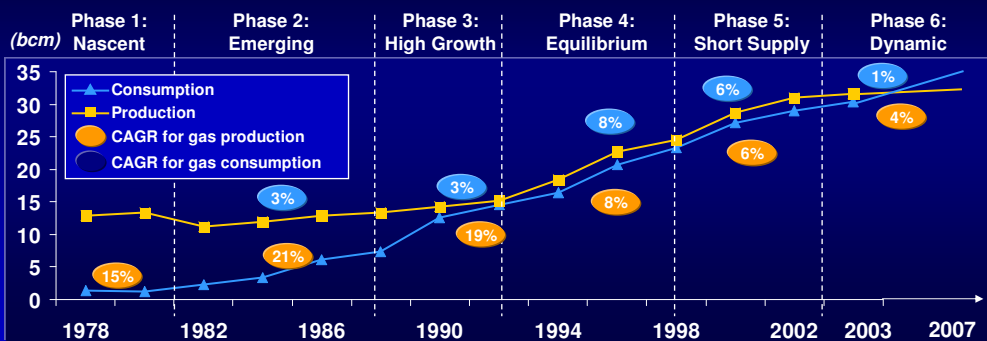
7th PETRO INDIA 2008

September 25, 2008

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The Indian gas market has grown steadily over the past three decades



■ Size of the Indian gas sector (2007): 35 bcm (96 mmscmd)

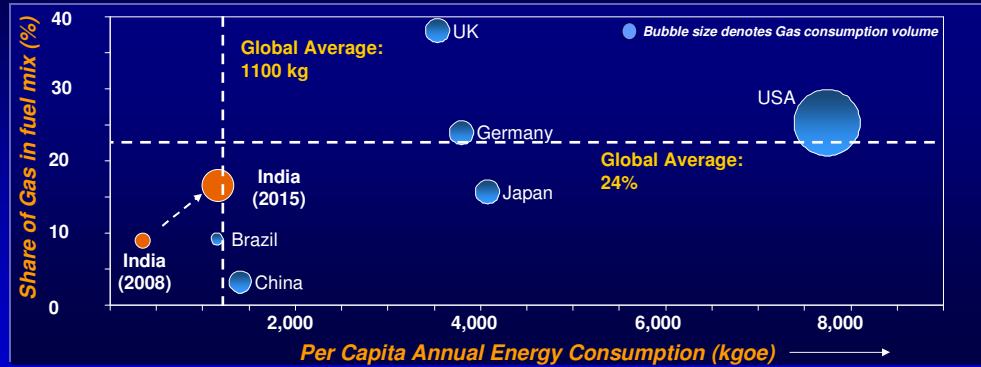
■ Shortfall: ~25 bcm (68 mmscmd)

■ Consumption growth (1978-2007): 12% p.a.

■ Production growth (1978-2007): 3% p.a.

However the relevance of gas markets in India is still lower than in many countries

Energy Consumption Profile

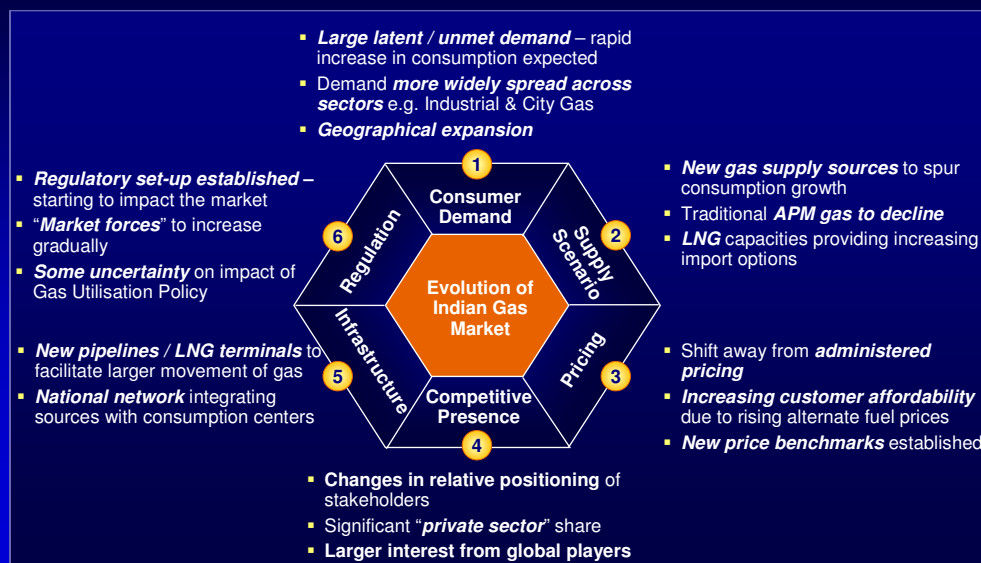


- India's per capita energy consumption in India (~ 360 kg of oil equivalent) **significantly below** other leading economies (~1200 kg in China, 7500 kg in USA)
- At ~9%, the share of gas in the fuel mix of the country is **below world average** of 24%
- Rapid **economic growth** & discovery of large **domestic Gas reserves** will **increase** per capita energy consumption and the share of gas in the country's fuel mix

Source: BP Global Statistical Review of World Energy, A.T. Kearney analysis

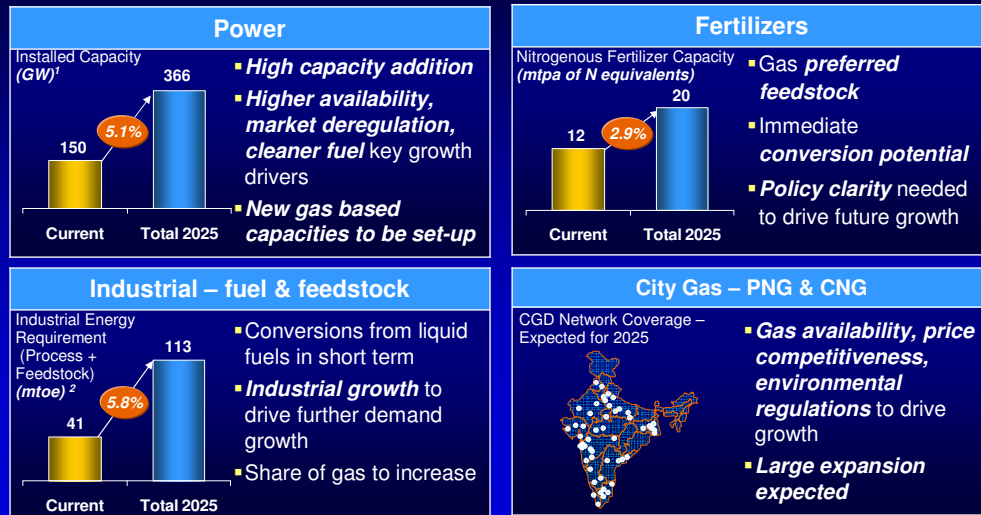
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The Indian Gas market is in a dynamic phase - changes on multiple dimensions



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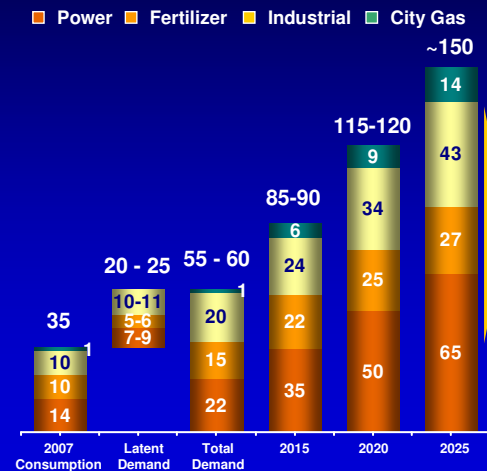
We expect a significant growth in across all end user segments...



Note: (1) Inclusive of existing captive capacity (~20 GW)
 (2) Excluding demand for existing captive power generation;
 Source: A.T. Kearney Analysis

...leading to rapid growth in demand for natural gas

Potential gas demand in India (by sector) (bcm)

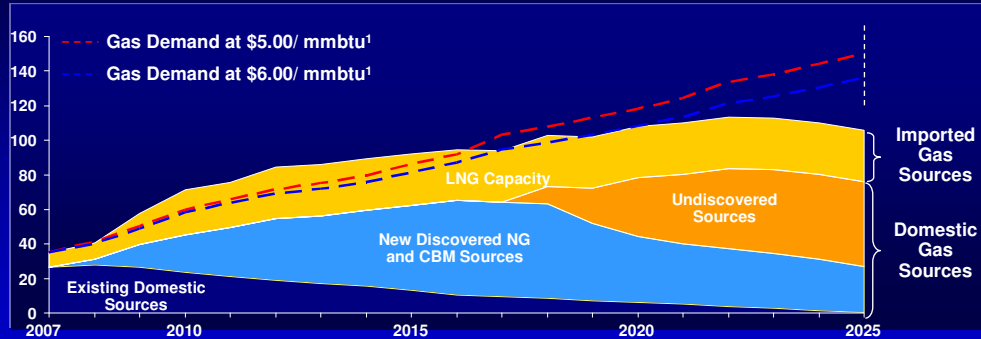


- Latent Demand for Gas offers immediate potential
 - 6-7 GW of power generation capacity on liquid fuels
 - Over 3.5 mtpa of Nitrogenous fertilizer capacity running on liquid fuel
- Industrial offtake of gas expected to increase
- City gas (PNG and CNG) to be more relevant consumption sector

Notes: (1) Demand estimated for base scenario of 6% GDP growth and at average landfill/ex-regas price of \$5/mmbtu
 Source: A.T. Kearney analysis

Increased domestic supply to cater to large part of demand - , however, imports likely to be critical to bridge the gap

Gas Demand-Supply Projection – India (bcm)

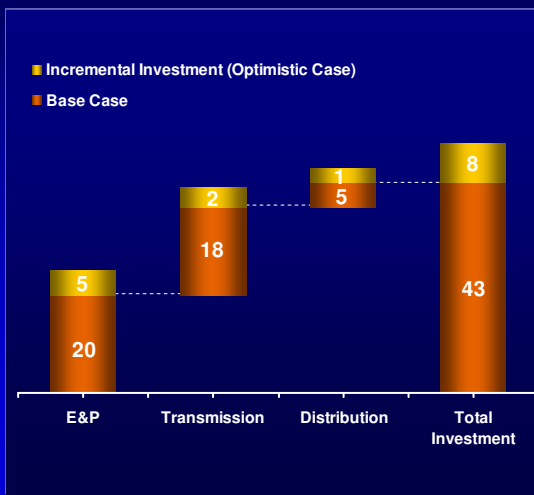


- Demand for gas in India to continue to exceed supply from domestic sources – imported gas to play an important role in bridging the demand-supply gap in the Indian market
- New discoveries from recent NELP rounds critical in shaping the long-term supply scenario
 - Potential for large finds on both east and west coast – KG, Mahanadi, Konkan
- Cross-country pipelines critical beyond 2015 if recent NELP ramp-up not adequate

Note: (1) Long-term average landfill prices for natural gas in India
Source : A. T. Kearney analysis

We expect significant investment across the entire gas value chain

Potential Gas Sector Investments (2007-2017) (\$ Bn)

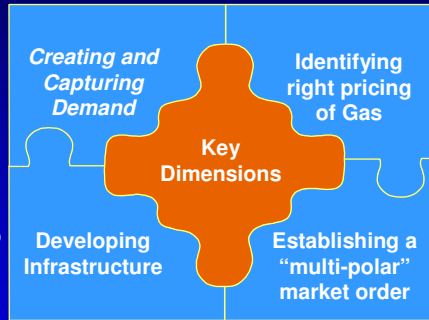


- Overall investment in Gas sector in the next 10 years ~ \$40-50 bn
- Bulk of the investments to be made in upstream and transmission sectors:
 - E&P: Large investment in ongoing and new fields
 - Transmission: projected addition of ~5,000 kms of pipelines
 - Distribution: City Gas networks to be established in ~75 cities
- Increased participation of private sector players
- Significant revenue and profit potential for companies that invest

Source: A.T. Kearney Analysis

Capturing this value and creating a vibrant market would require significant action on four key dimensions

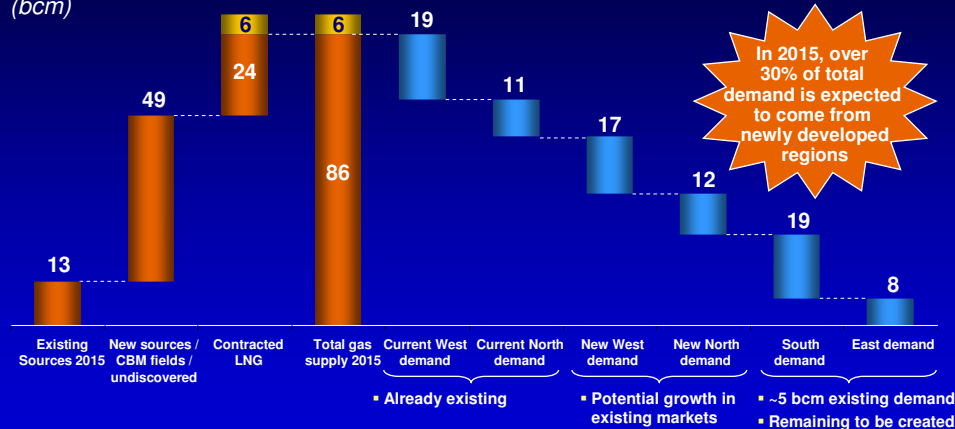
- Identify geographies & customer segments for penetration
- Explore potential of 'non-traditional' customers
- Develop strategies for acquiring new customers
- Expand infrastructure to new geographies – establish pan-India network
- Expand rapidly the distribution network
- Facilitate infrastructure financing



- Achieve sustainable pricing levels – linked to economic value
- Encourage customer choice through different "products"
- Ensure right price for producers
- Identify objectives of all key stakeholders across value chain
- Establish mechanisms to align multiple dimensions / stakeholders

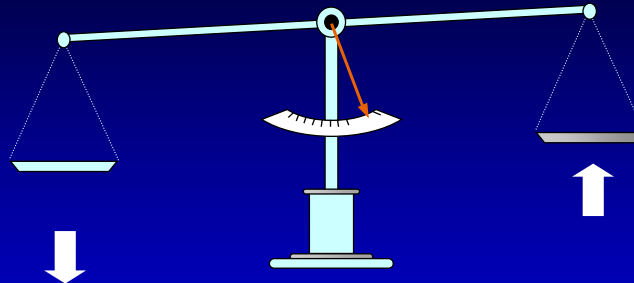
New demand would need to be created – both in existing markets and new geographies

All-India Demand-Supply (2015)
(bcm)



- Can the development of these gas markets be catalyzed through infrastructure spread?
- What models / options can be developed to expedite the development of anchor gas consumers in new markets?

It is essential to determine the 'right price' for gas



Low Price

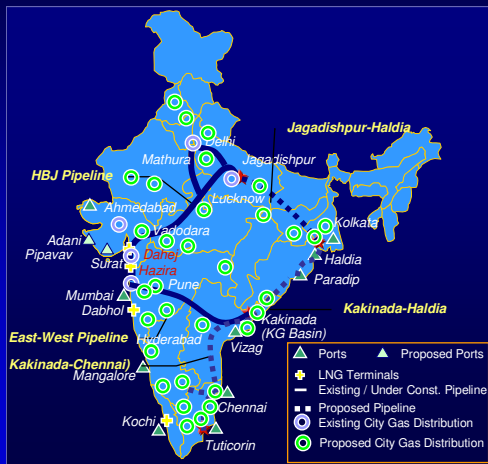
- Stimulate 'priority sectors' for overall economic benefits
- Increase 'substitution demand' for gas
- Enable faster customer penetration
- Lower payback period for conversion

High Price

- Enable faster recovery of investments
- Capitalize on cost advantage of gas over alternate fuels
- Stimulate private sector participation
- Establish incentives for financing

There will be a significant requirement for infrastructure and resources to support the growth in the Gas sector

Growth In Infrastructure



Growth in infrastructure

- Upstream**
 - Significant investments committed and planned
 - NELP blocks being actively explored
- Transmission**
 - Development of regional and national grids
- Distribution**
 - Rapid expansion in City Gas networks – licenses for 70 cities to be awarded by 2009
- Establishment of new LNG terminals to source gas to meet demand supply gap**

Establishing this infrastructure will enable gas suppliers to cater to a wider constituency

The gas sector will gradually shift from being consolidated to one dominated by a number of players

Dimensions	Past...	Future...
Gas Sources	<ul style="list-style-type: none"> Existing supply of ~31 bcm Majority ONGC Major fields: <ul style="list-style-type: none"> Bombay High PMT Ravva Cambay 	<ul style="list-style-type: none"> Supply to ~65 bcm by 2017 Larger supply base Major new fields: <ul style="list-style-type: none"> KG Basin Cauvery Basin Rajasthan Gujarat
Pipelines	<ul style="list-style-type: none"> GAIL, GSPL main operators Few cross country pipelines Major pipelines: <ul style="list-style-type: none"> HVJ; DVPL 	<ul style="list-style-type: none"> Entry of private players Development of National Grid New additions include : <ul style="list-style-type: none"> EWPL; Jagdishpur - Haldia
Pricing	<ul style="list-style-type: none"> Gas prices based on APM LNG prices based on Gas pool account 	<ul style="list-style-type: none"> Gas from NELP fields to be sold at market prices LNG contracts to be linked to international fuel basket
Allocation	<ul style="list-style-type: none"> Government determined 	<ul style="list-style-type: none"> Market determined

Industry stakeholders will have to develop market mechanisms to co-habitate in this environment

Thank You

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