

APGAS Forum 2007

Natural Gas for India - Prospects & Challenges

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India economics-energy snapshot

India is a unique economy. Young population and growth in per capita income are main drivers for the developing economy.

GDP growth rate	Over 8 percent during last 4 years
FOREX reserves	US\$ 218 billion as on July 31, 2007
GDP composition	Services sector contributes more than half
Income per capita	US\$ 734 per annum at current prices
FDI Inflow	US\$ 15.7 bn (2006-07) up 184% from 2005-06
Geographical Area	7 th largest country in the world. (2.42%)
Population	1.12 billion, 2 nd most populous country (16%)

India economics-energy snapshot

Oil & gas sector is crucial to Indian economy. Apart from fuelling it, the fiscal contributions by sector are significant.

Largest contributor to exchequer in 06-07 (30%)

~US\$ 39 bn

Sixth largest crude oil consumer in world

2.6 mbopd

% of crude import to total imports & exports

25% & 38%

5 of 6 Indian F 500 companies are oil & gas companies

Ranks 6th in World refining capacity with 3.4% capacity of world

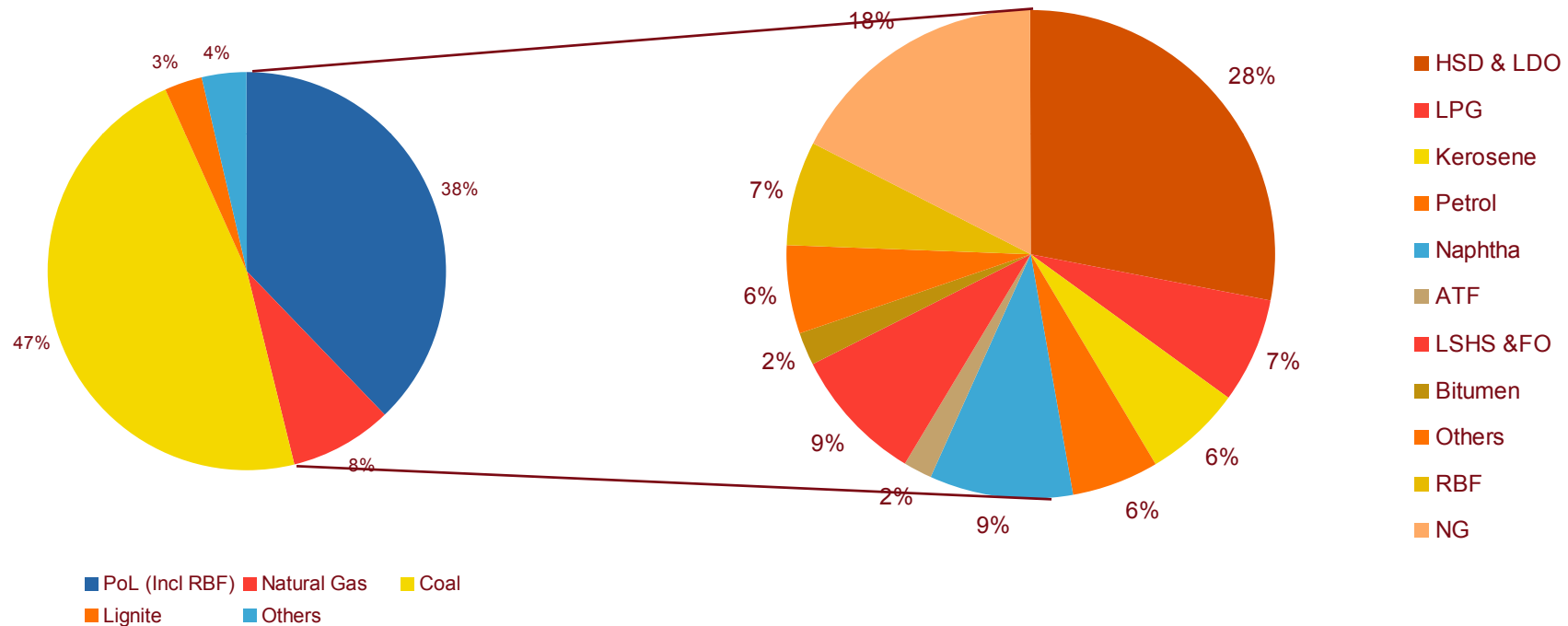
Largest greenfield refinery in the world – 540,000 bopd

Overview of gas sector in India

Coal is primary source of primary commercial energy and diesel is the highest consumed refined fuel in 2005-06.

Commercial Energy (345 MMTOE)

POL and Gas (159 MMTOE)

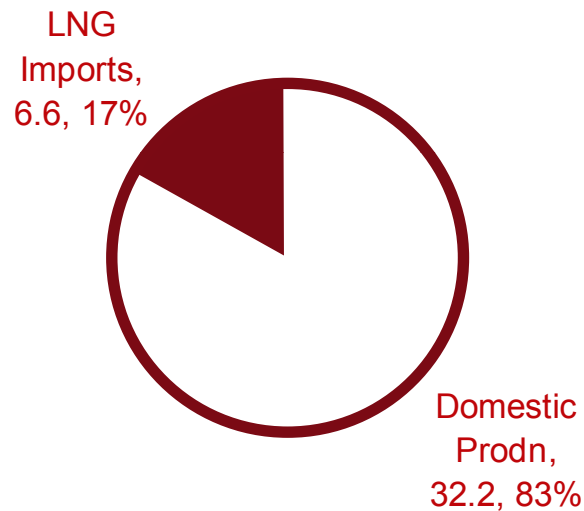


Source : MoPNG, PwC Analysis

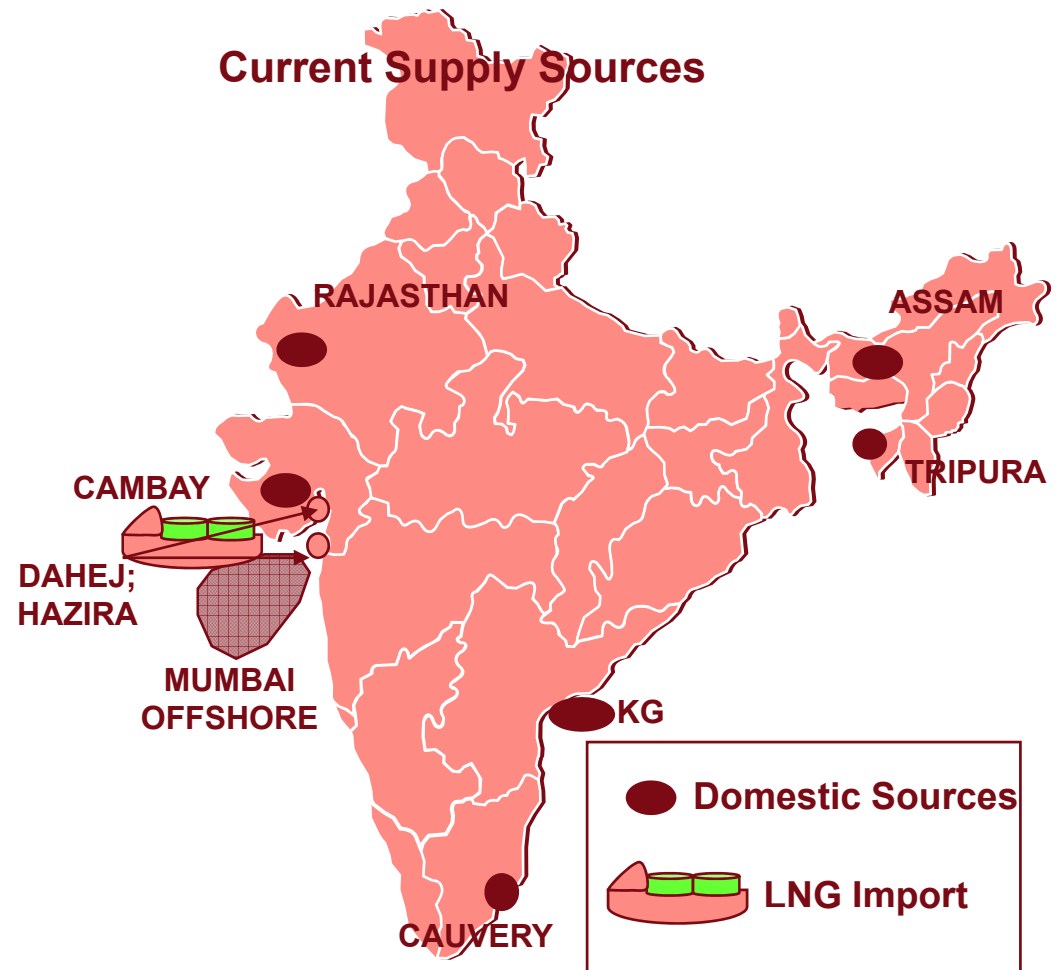
Overview of gas sector in India

ONGC dominates the gas supply scenario in India followed by Pvt JVs and R-LNG.

Current Gas Supplies (2005-06) BCM

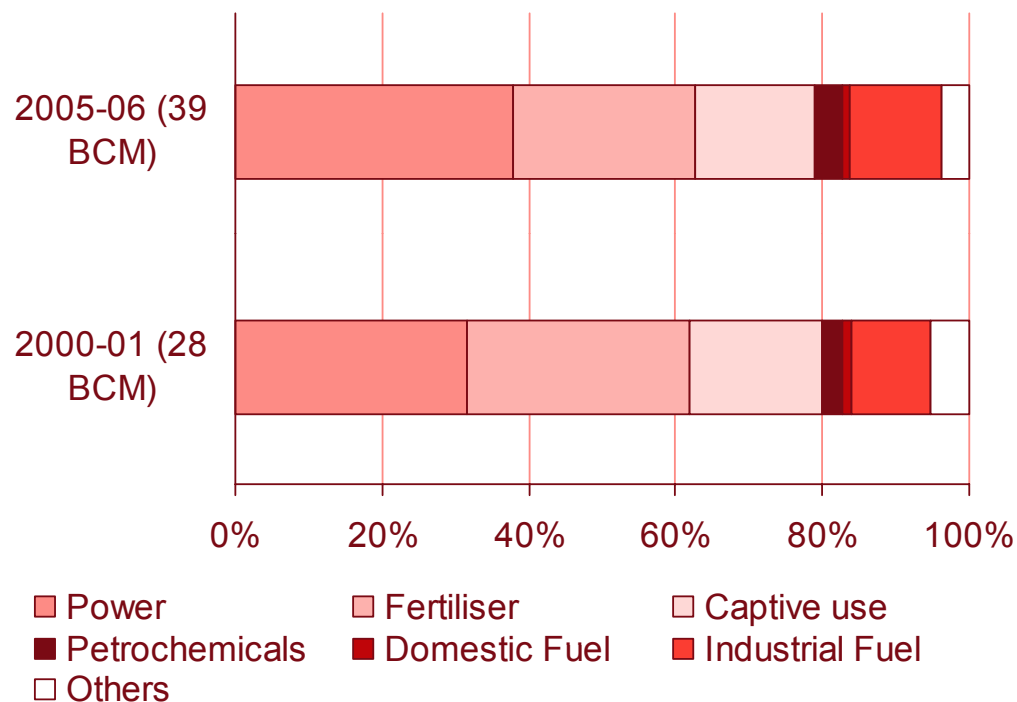


- Domestic Reserves: 37.8 TCF
- R/P Ratio: 33.5 years



Overview of gas sector in India

Power & Fertiliser sectors are the anchor markets while Industrial and City Gas sectors are the growing markets.



Sector	Share of Gas
Power	12%
Fertiliser	58%
LPG+Other	31%
Petrochemical	43%
Domestic, Industrial and other fuel	Balance

Source: MoPNG

Overview of gas sector in India

Current infrastructure is limited in scope and reach.



LNG Terminals:

- Dahej (5MMTPA)
- Hazira (2.5MMTPA)

Transmission Network:

- 6,300 km

City Gas Distribution:

- 10 cities

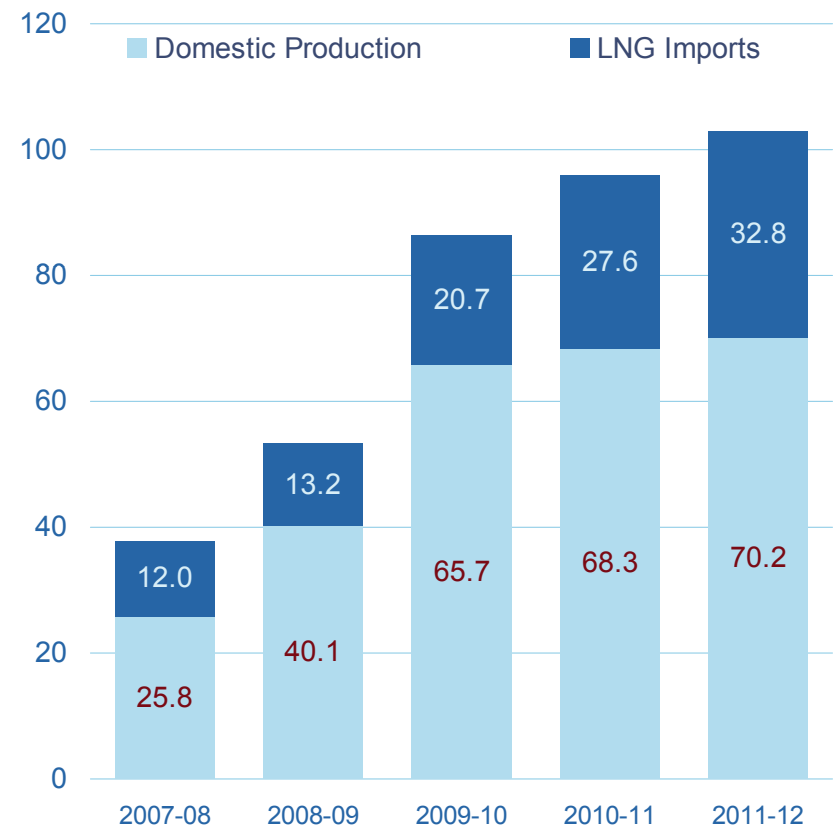
Near term gas market outlook

Natural Gas to emerge as the fastest growing fuel in India.

Key Facts

- In-place reserves up 50% in last 5 years
- NG Production 2006-07 – 31.6 BCM
- East Coast Discoveries – RIL, GSPC, ONGC
- RIL expected to produce 29.2 BCM w.e.f mid 2008
- LNG Regas Terminals – Dahej (5 MMT), Hazira (2.5 MMT) on west coast.
- Under implementation: Dabhol (RGPPL) (5 MMT), Kochi (2.5 MMT)
- Proposed LNG Regas – Dahej Expansion (5-7 MMT), Mangalore (5 MMT), Ennore (2.5 MMT)

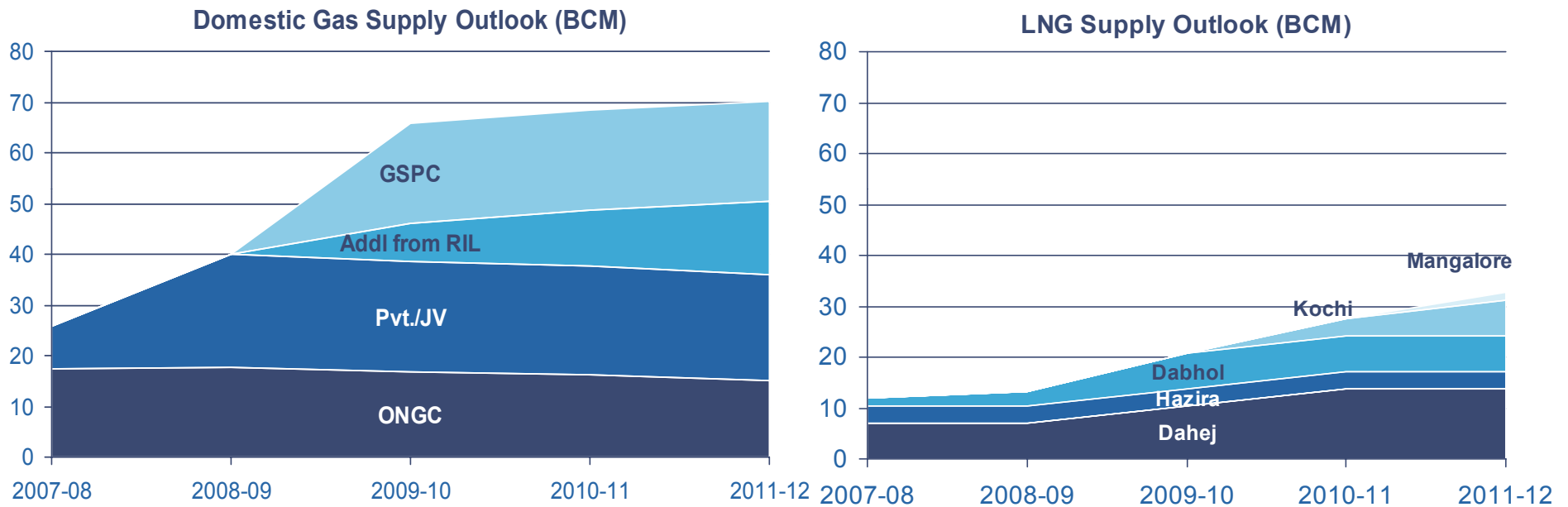
Supply Projections 2011-12 (BCM)



Source: MoPNG

Near term gas market outlook

Supply from domestic sources will have to be supplemented with LNG imports. In the long term pipeline imports may materialise.



Source: PwC Research

- IPI Pipeline: 2,100 km; 60 – 150 MMSCMD
- TAPI Pipeline: 1,680 km at India-Pakistan border; 90 – 150 MMSCMD
- MI Pipeline: 600 – 1,573 km; 18 – 28 MMSCMD (8 options being evaluated)

Gas pricing and regulations

The cost to consumer is determined based on the source of gas. Dual pricing regime. Govt controlled & Market driven price co-exist. Production of Govt controlled gas dwindling.

Prices

National Oil Companies

Govt. controlled pricing US\$ 2/MMbtu: 60% of market share (gradually reducing). Applicable primarily to Power, Fertilizer and small customers

Private gas, LNG

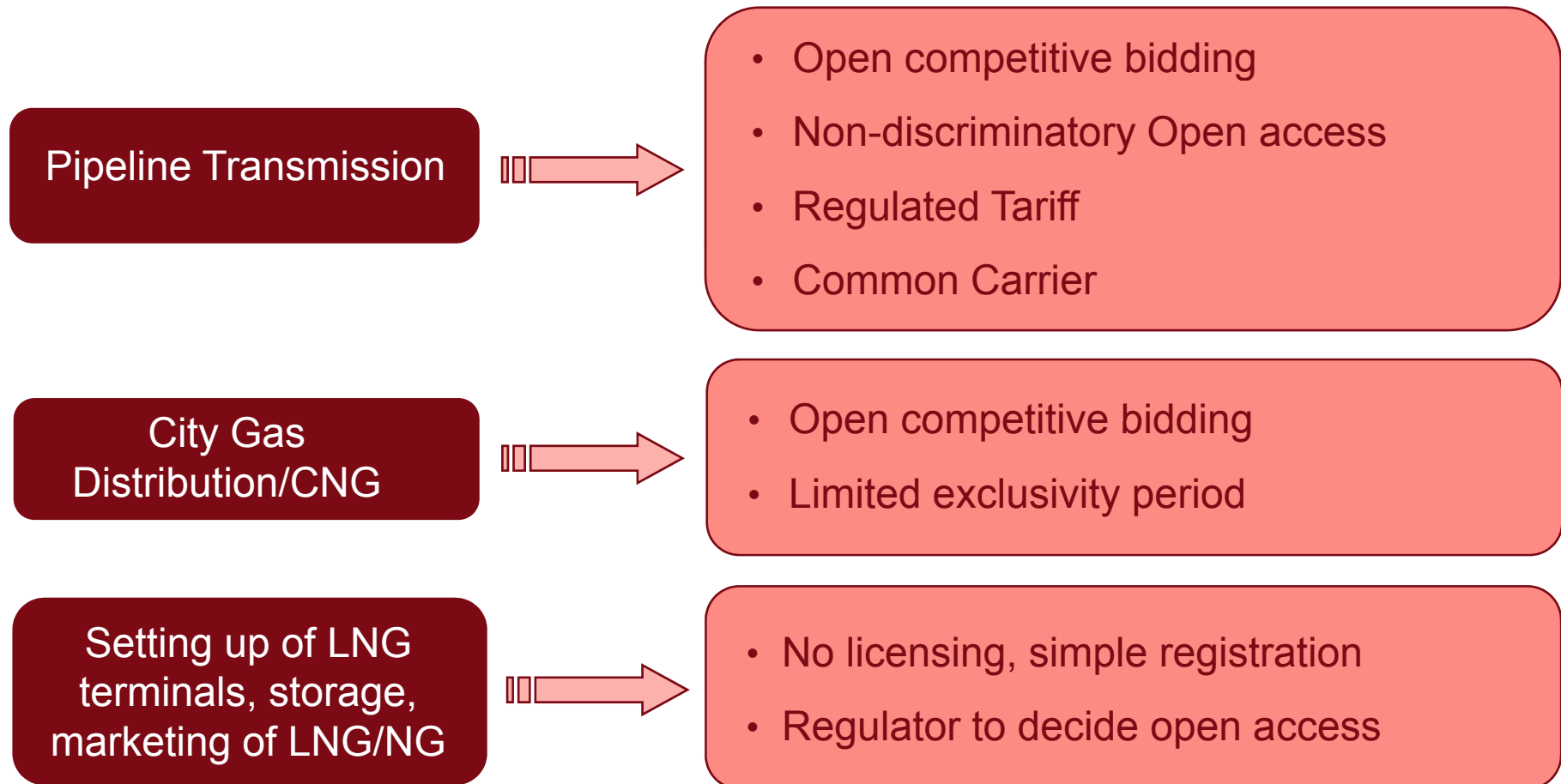
Market determined US\$ 3 to 10/MMbtu

New Exploration Licensing Policy (NELP) - RIL

Recently approved. Linked with Brent (Cap US\$60, Floor US\$25). US\$ 2.5/MMbtu to US\$4.20/MMBtu at delivery point. Cost to consumers approx US\$ 5.50/MMbtu.

Gas pricing and regulations

PNGRB Act 2006 paves way for an independent regulator for the downstream petroleum & natural gas sector.



Long term gas market outlook

India has an ambition of high Economic Growth Rate.

to preserve, protect and promote social harmony and to enforce the law without fear or favour to deal with all obscurantist and fundamentalist elements who seek to disturb social amity and peace.


to ensure that the economy grows at least 7-8% per year in a sustained manner over a decade and more and in a manner that generates employment so that each family is assured of a safe and viable livelihood.

to enhance the welfare and well-being of farmers, farm labour and workers, particularly those in the unorganized sector and assure a secure future for their families in every respect.

to fully empower women politically, educationally, economically and legally.


**COMMON MINIMUM PROGRAMME
OF THE UNITED PROGRESSIVE ALLIANCE**

27th May 2004



The growing influence of these factors, acting on the foundation of India's increasingly dynamic and vibrant economic base, lend credence to the view that India can achieve and sustain higher than historical rates of economic growth in the coming decades. The compounded effect of achieving the targeted annual GDP growth rate of 8.5 to 9 per cent over the next 20 years would result in a quadrupling of the real per capita income and almost eliminating the percentage of Indians living below the poverty line. This will raise India's rank from around 11th today to 4th from the top in 2020 among 207 countries given in the World Development Report in terms of GDP. Further, in terms of per capita GDP measured in ppp India's rank will rise by a minimum of 53 ranks from the present 153 to 100. This will mean, India will move from a low income country to an upper middle income country. This is a very real possibility for us to seize upon and realise.

**India
Vision 2020**



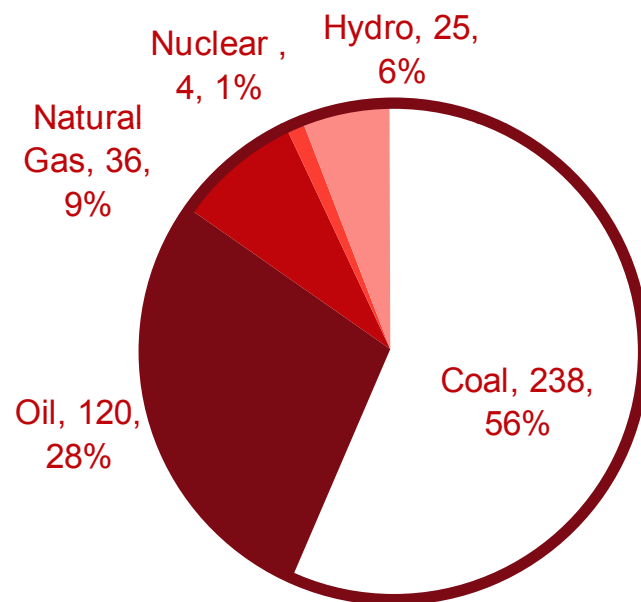
Planning Commission
Government of India
New Delhi

DECEMBER, 2002

Long term gas market outlook

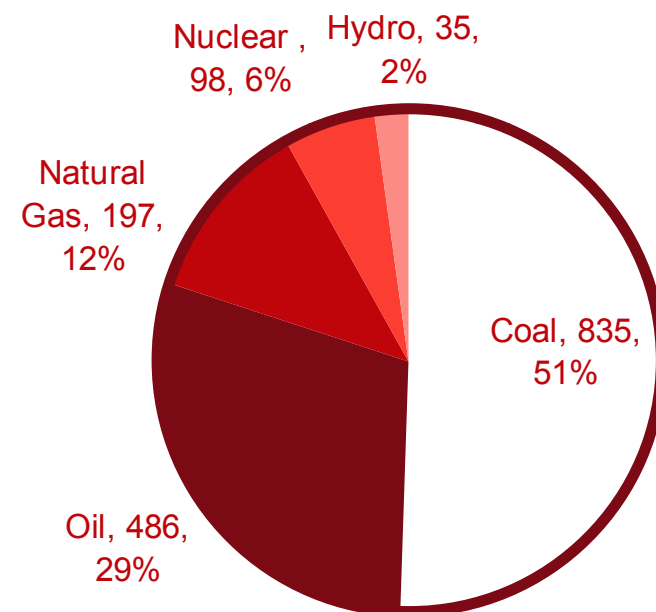
India's dependence on Coal projected to continue. Gas and nuclear emerge as fastest growing fuels.

India's Energy Mix 2006 (423 Mtoe)



Source: BP Statistical Review July 2007

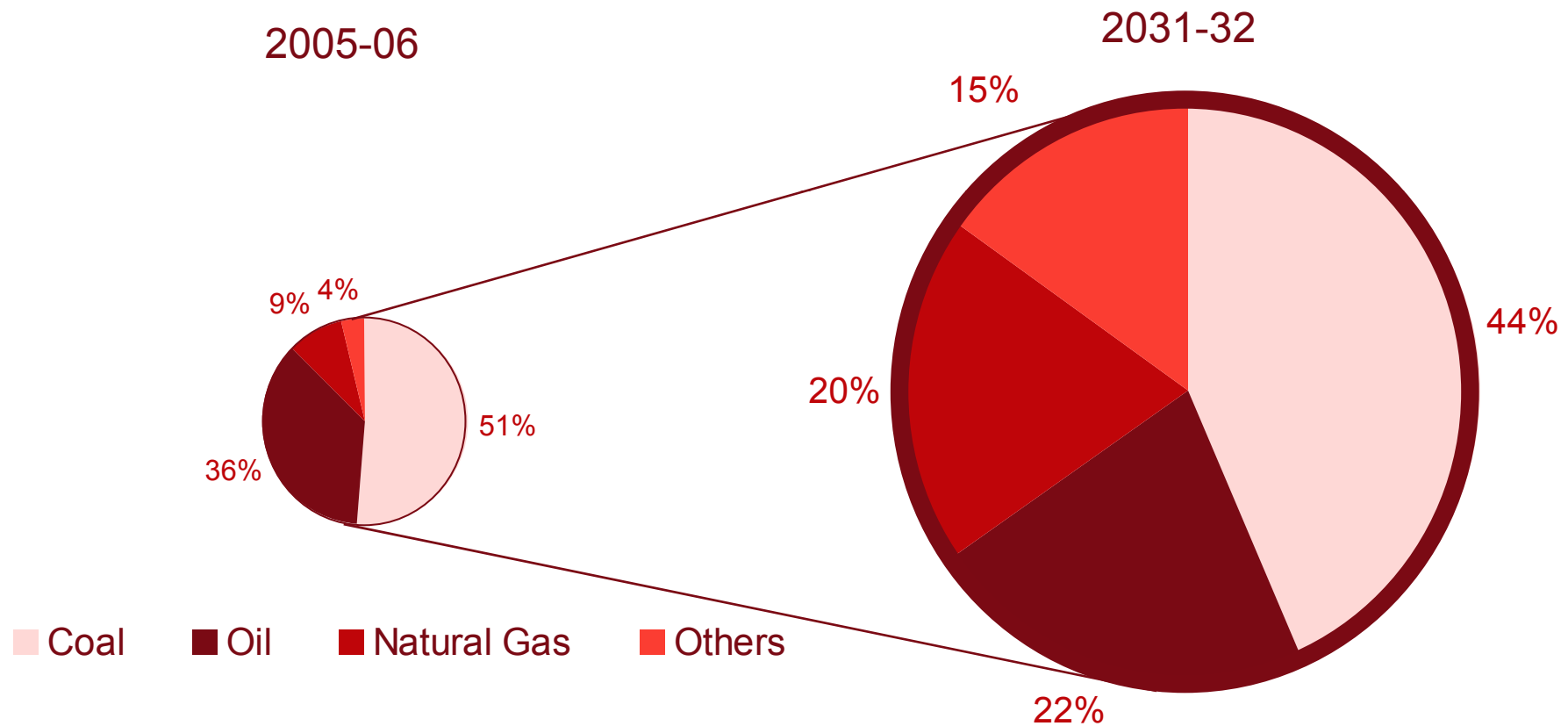
India's Energy Mix in 2030 (1,652 Mtoe)



Source: Integrated Energy Policy 2006 (Forced Nuclear + Hydro + Gas)

Long term gas market outlook

One of the scenarios places gas consumption potential at 400 BCM and PoL 374 MMT. Even in this case coal requirement would be whopping 818 Mtoe, up 367% from about 175 Mtoe in 2005-06.

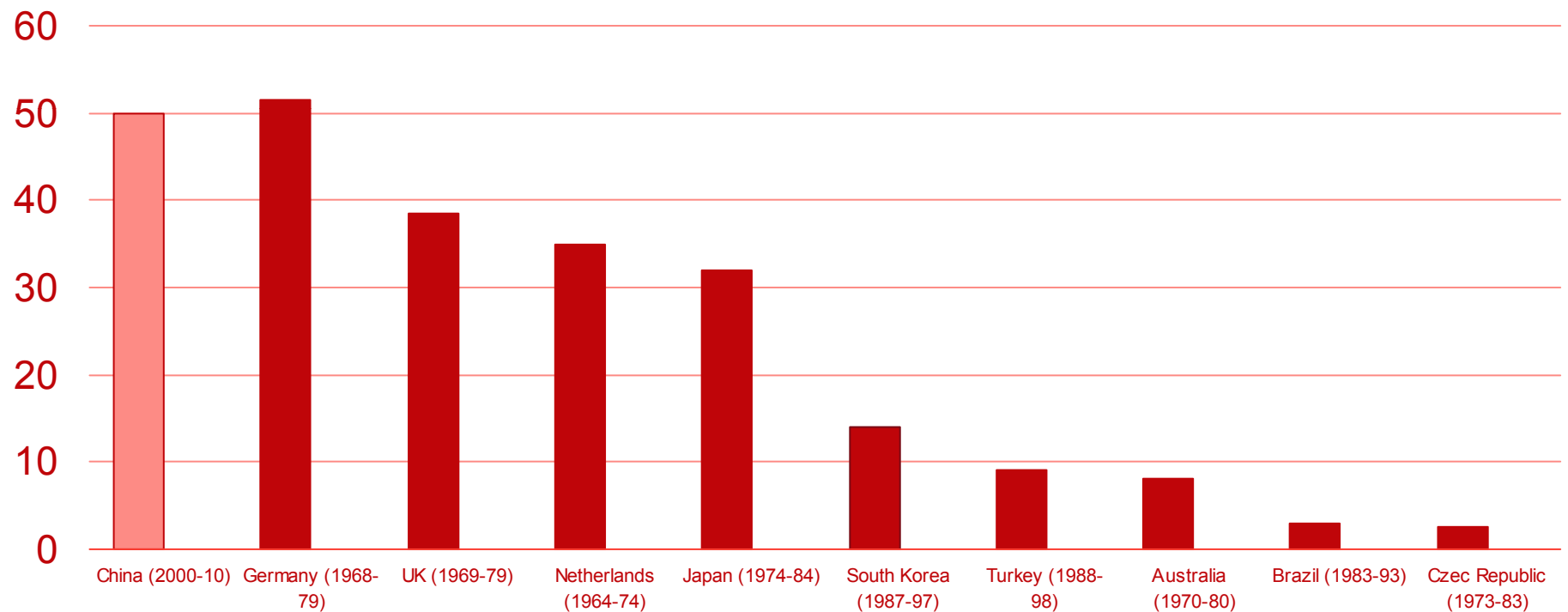


Sources: Integrated Energy Policy, PetroFed - The Green Imperative

Long term gas market outlook

The USA grew at 150 BCM/y in 1965-75. India would possibly join club of such high growth countries in 2004-14.

Growth during Gas Market Emergence [BCM/y]



Source: BP, IEA

Long term gas market outlook



LNG Terminals:

- Dahej expansion by 5-7 MT
- Hazira expansion 2.5 MT
- Dabhol 5 MT
- Kochi 2.5 MT
- Mangalore 5 MT
- Ennore 2.5 MT

Transmission Network:

- 8,400 kM

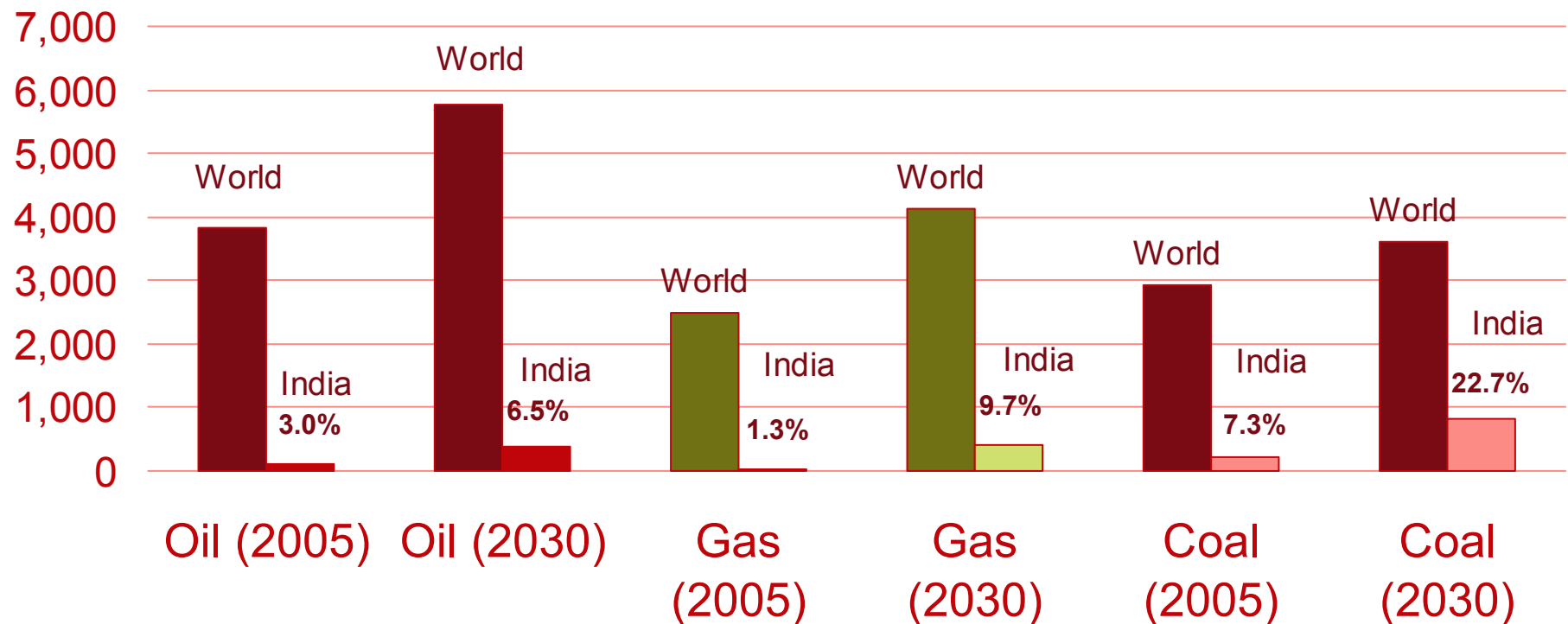
City Gas Distribution:

- 40 cities

Long term gas market outlook

India's fuel consumption will grow at a faster pace than world's fuel consumption leading to higher share in coming year.

India vs World Energy consumption scenario 2030 [MTOE]



Source: BP statistical review 2006, IEP 2006, Planning Commission, Gol, PwC Analysis

Conclusion

End user sector reforms coupled with gas sector reforms are imperatives for gas market development.

- Gas sourcing remains first on Government and companies' priority. LNG and piped gas is proving out of reach for immediate future.
- Development of regulations is a challenge ahead.
- End-use sectors – power, fertiliser, automobile – reforms a must for healthy growth of gas sector.
- Proactive planning for gas sector development needed for infrastructure to be competitive.

Thank you.

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