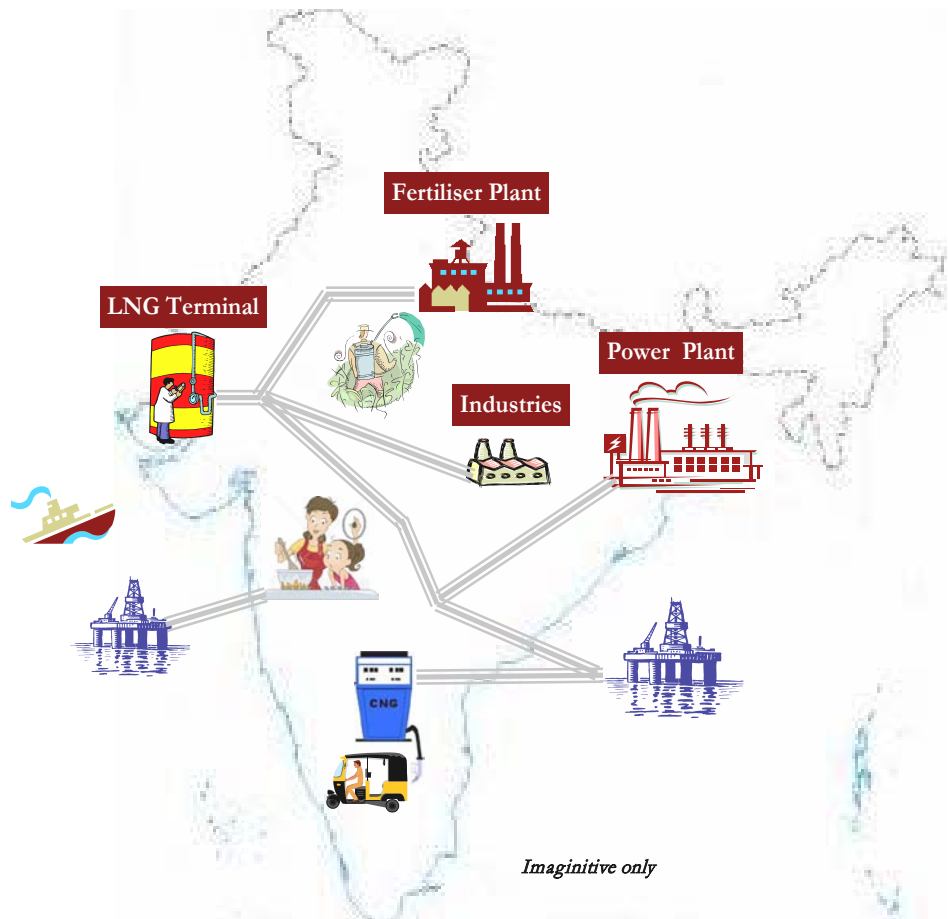


INDIAN NATURAL GAS INDUSTRY



March 2010

INDEX

EXECUTIVE SUMMARY	
I. OUTLOOK SECTION	
<ul style="list-style-type: none"> • Supply Demand Consolidated • Supply – Existing Fields • Supply - New Fields And LNG Terminals • Demand – Power Sector • Demand – Fertilizer Sector • Demand - Petrochemicals & Sponge Iron Sectors • Pricing • City Gas Distribution 	
II. INDUSTRY SECTION	
1. INTRODUCTION <ul style="list-style-type: none"> • Overview • Uses of Natural Gas • Various forms of natural gas • Comparison of natural gas with other fuels • Natural gas processing 	2. MARKET STRUCTURE & SWOT <ul style="list-style-type: none"> • Current Structure of Industry • SWOT Analysis
3. CURRENT PRICING <ul style="list-style-type: none"> • History of gas pricing in India • Current Scenario • Tariff Commission’s recommendations • Pricing of gas under NELP PSC • Pricing of gas under Pre-NELP PSC • Gas pricing formula for KG-D6 gas & R-LNG 	4. REGULATORY STRUCTURE AND KEY LEGISLATIONS <ul style="list-style-type: none"> • Regulatory framework • Major Regulatory bodies • Key Legislations • FDI Policy • Implications of Key Legislation
5. CITY GAS DISTRIBUTION (CGD) <ul style="list-style-type: none"> • Introduction • Typical City Gas Distribution Gas Grid • Advantages of CNG/PNG • Evolution of CGD in India • Current State • Role of GAIL • GAIL's Future Outlook - CGD Business • Policy and Regulations 	6. LIQUIFIED NATURAL GAS (LNG) <ul style="list-style-type: none"> • Background • LNG Sourcing • Estimated LNG requirements in Eleventh Plan • Status of utilization of LNG/Regasification Terminals • Pricing

7. GAS INFRASTRUCTURE

- Background
- Current pipeline network
- New pipeline network

8. GAS UTILIZATION POLICY

- Background
- Guidelines for sale of gas by NELP contractors
- Order of Priority for Gas Allocation
- KG-D6 Gas Allocation
- Implications of the Gas Utilization Policy

9. SUPPLY

- History of gas production in India
- ONGC Production
- Oil India Limited Production
- Private/Joint Ventures Production
- Coal Bed Methane (CBM) Production
- New Fields (KG-D6, Deen Dayal, NEC-25)

10. DEMAND

- Evolution of Demand in India
- Power Sector
- Fertilizer Sector
- Petrochemicals Sector
- Sponge Iron Sector
- Gas Demand Projections by Major Agencies

III MARKET PLAYERS

- Petronet LNG Limited
- Mahanagar Gas Limited
- Indraprastha Gas Limited
- Gujarat State Petronet Limited
- Gujarat Gas Company Limited
- GAIL (India) Limited

IV ANNEXURES

- A.1: Expected New Gas-Based Power Plants Capacity Addition post FY10
- A.2: Existing Power Plant Capacity Added in 1Q-3Q FY10
- A.3: Existing Liquid fuel based GT Power Plants in India (February 2009)
- A.4: Future Gas-based Power Projects not considered in demand projections
- A.5: Summary of Existing Gas-Based Power Plants (Feb. 2009)
- A.6: Existing Gas-based Fertilizer Plants in India
- A.7: Existing Naphtha-based Fertilizer Plants With Expected Pipeline Connectivity and Commissioning Date
- A.8: Existing Fuel Oil/LSHS-based Fertilizer Plants With Expected Pipe Connectivity and Commissioning Date
- A.9: Currently Closed Fertilizer Plants With Expected Pipeline Connectivity and Commissioning Date
- A.10: New Fertilizer Units Planned Under XI Plan
- A.11: Existing Naphtha Based Ethylene Plants in India
- A.12: CGD: Details on First and Second Round of Bidding
- A.13: CGD - City-wise Consumer Profiling, Potential Gas Demand and Pipeline Connectivity
- A.14: List of Customers Nominated by the GoI for Supply of KG-D6 Gas

LIST OF TABLES

INTRODUCTION

- Typical composition of natural gas
- Comparison between CNG and LNG
- Comparison of various fuels

PRICING STRUCTURE - CURRENT

- Summary of current gas pricing
- Comparison of consumer gas prices
- Summary of gas pricing from different fields

POLICIES AND REGULATIONS

- Regulatory framework
- Volume consideration to determine Natural Gas Pipeline Tariff
- Bidder evaluation parameters for City or Local Natural Gas Distribution Network

CITY GAS DISTRIBUTION

- Emission Properties of Auto Fuels (gm/100 km)
- Ignition Properties of Auto Fuels
- Evolution of City Gas Distribution Sector
- CNG Stations in Gujarat State (As of Aug-2008)
- GAIL Joint Venture Companies
- GAIL Customer Coverage
- GAIL – Potential CGD Demand (2009-14, 2015-20, 2021-25)
- CGD Players (non-GAIL) and Area of operation
- Eligibility Criteria for CGD Authorization
- Choice of Operator for CGD
- Bid Evaluation Criteria for CGD Authorization
- Performance Bond Requirement after Securing Authorization

LNG TERMINALS

- World-wide Natural Gas Imports and Consumption (billion cubic meters)
- World-wide LNG Exports (billion cubic meters)
- Summary of Existing and Proposed LNG Terminals in India
- Summary of current/proposed LNG supply contracts
- Operational Statistics of LNG Terminal
- Historic Japanese Cocktail Crude (JCC) Prices (\$/barrel)
- Final Consumer Price built-up for R-LNG

GAS INFRASTRUCTURE

- Summary of current gas pipeline network in India
- GSPL: Existing Pipeline Network
- Summary of Future Pipeline Network (Length, Capacity, Capex and Current Status)

GAS UTILIZATION POLICY

- Summary of Original Gas Allocation and Off-take (as on Nov-2009)
- Summary of Additional Allocation made in Oct-2009 (mmscmd)
- Summary of Current Gas Allocation

SUPPLY - OVERVIEW AND EXISTING

- Historic Natural Gas Supply Break-up (Source wise) – India
- Oil India Ltd. – Existing Gas Sales Contract
- Historic Production: Private and Joint Venture Fields (mmscmd)
- CBM Activities in India

SUPPLY - NEW FIELDS

- Factsheet : KG-D6 (KG-DWN-98/3)
- KG-D6: Historic Production Estimates
- Reliance Simulated Production Profile for KG-D6
- Factsheet : Deen Dayal Field (KG-OSN-2001/3 block)
- Factsheet : NEC-25 (NEC-OSN-97/2)
- Reserve Sensitivities of NEC-25 Block by GCA

DEMAND

- Historic Industry-wise Natural Gas Consumption
- Historic Target versus Achievement in Power Sector Capacity Additions
- Fuel Contribution for Power Generation: Comparison with world
- Sectoral Off-take for Natural Gas: Comparison with world
- Existing Ethylene Capacity in India
- Natural Gas demand projections by major agencies

OUTLOOK (SUPPLY DEMAND CONSOLIDATED)

- Natural Gas Demand-Supply (2005-12)
- Projected domestic gas allocation mix in 2011-12
- Natural Gas Supply Projections (2005-12)
- Natural Gas Demand Projections (2005-12)

OUTLOOK (SUPPLY - EXISTING)

- Production Outlook: Private and Joint Venture Fields (mmscmd)

OUTLOOK (SUPPLY - NEW FIELDS AND LNG TERMINALS)

- Reserve Sensitivities of NEC-25 Block by GCA
- LNG Supply Projections
- Monthly Fuel Consumption by Japan in January-2010

OUTLOOK (DEMAND - POWER)

- Projections for capacity addition in Power Sector (in MW)
- Power Sector: Natural Gas Demand Projections

OUTLOOK (DEMAND - FERTILIZER)

- Fertilizer Sector: Natural Gas Demand Projections

OUTLOOK (DEMAND - PETROCHEMICALS & SPONGE IRON)

- Petrochemical Sector: Natural Gas Demand Projections
- Sponge Iron : Natural Gas Demand Projections

OUTLOOK (PRICING)

- Future APM Gas Production Profile (mmscmd)
- Comparison of domestic gas prices
- Comparison of domestic fuel prices
- Cost comparison of natural gas with other fuels in power plants
- Cost comparison of natural gas with other fuels in fertilizer sector
- Cost of Production of Urea: Indigenous/Abroad
- Average LNG import prices: China, Japan and Korea, 2007-2009 (\$/mmbtu)
- Projection of R-LNG Prices
- Fuel Price Comparison for Various CGD Consumers
- Monthly Fuel Consumption by Japan in January-2010

OUTLOOK (CGD)

- Cost Benefit Analysis of Piped Natural Gas for Domestic Consumers
- Cost Benefit Analysis of Piped Natural Gas for Small Commercial Establishment
- Cost Benefit Analysis of Piped Natural Gas for Large Commercial Establishment
- Cost Benefit Analysis of Piped Natural Gas for Small Industrial Units
- Cost Benefit Analysis of Compressed Natural Gas for Different Automobile Segments
- State-wise Demand Estimates for CGD (mmscmd)
- Comparison of CGD Infrastructure with Neighbouring Countries (As on Aug-2008)

LIST OF FIGURES

INTRODUCTION

- Natural gas processing flow diagram

MARKET STRUCTURE AND SWOT

- Comparison of R-LNG Prices with Domestic Gas Prices
- Market Participants and Area of Operation
- Natural Gas Industry: Market Structure

PRICING STRUCTURE - CURRENT

- History of gas pricing in India – Schematic diagram

CITY GAS DISTRIBUTION

- Schematic Diagram of Typical CGD Grid
- GAIL – CGD Expansion Plans
- Current Regulatory Framework for City Gas Distribution (CGD)
- CGD Authorization Process: Schematic Diagram

LNG TERMINALS

- Petronet LNG Limited LNG pricing formula
- India's Current Gas Infrastructure – Schematic
- Map showing overall route of EWPL pipeline
- Break-down of New Projects Pipe Length wise
- Break-down of New Projects Capacity wise

SUPPLY - OVERVIEW AND EXISTING

- Historic Natural Gas Production – India
- Historic Gas Flaring (% of Gross Production) - India
- ONGC–Gas Production Break-up (offshore/onshore)
- India– Gas Production Break-up (FY09)

SUPPLY - NEW FIELDS

- Schematic Diagram of Future Development of KG-D6

DEMAND

- Historic Break-up of Industry-wise Natural Gas Consumption
- Power Sector Capacity Additions (MW)
- Power Capacity Addition Under XI Plan (MW)
- Fuel Portfolio of Power Generating Capacity
- Break-up of India's Fertilizer Capacity
- Break-up of Feedstock for Urea Production

OUTLOOK (SUPPLY DEMAND CONSOLIDATED)

- Gas Supply Break-up (2008-09)
- Gas Supply Break-up (2011-12P)
- Natural Gas Off-take in 2008-09
- Natural Gas Demand in 2011-12

OUTLOOK (SUPPLY - NEW FIELDS AND LNG TERMINALS)

- KG-D6 Production Profile

OUTLOOK (PRICING)

- Henry Hub Natural Gas Futures Prices (\$/mmbtu)
- Break-even Gas Price analysis for Power Industry

LIST OF BOXES

INTRODUCTION

- Evolution of Reliance gas pricing formula for KG-D6 gas
- Gas pricing formula for Petronet LNG Ltd LNG
- What is holding up global LNG prices?
- PNGRB Authorization Debate: What went wrong?

CARE Research has taken a realistic outlook on existing gas-based capacity, expected capacity addition and switches from liquid-fired capacities; to forecast natural gas demand till 2011-12. Further, a possible gas allocation mix in 2011-12 from domestic fields has also been formulated, based on the current policy guidelines and our outlook on ascribed value of gas against alternate fuels. Our pricing outlook involves a detailed analysis of competitiveness of natural gas with other alternative fuels for key sectors. Our outlook for CGD covers detailed discussion on implication of relevant regulations and analysis of pay-back period in case CGD consumers opt to switch to natural gas.

CARE Research expects gas deficit to continue through 2011-12, as the large existing unmet demand in power and fertilizer sector coupled with the switch capacities would outpace incremental gas supply. India's natural gas supply mix is expected to be dominated by new domestic fields and LNG imports, whereas power and fertilizer shall continue to be one of the biggest consumers of gas. On the pricing front, we expect gas prices to be market determined going forward, and imported R-LNG to lose competitiveness to domestic gas supplies. We expect that although CGD offers huge demand potential, regulatory policies are less conducive.

The report is divided into four sections. Section I presents CARE Research's viewpoint on supply, demand, allocations and pricing of natural gas Industry in next two years. Section II provides an in-depth study of the Indian natural gas industry encompassing its evolution, current pricing and regulatory structure. Section III provides brief profile of key players in the industry and their historic financials, while Section IV contains various key data tables as an Annexure to the report.

I. Outlook Section

- An executive summary is provided that briefly provides CARE Research's viewpoint on the industry
- Outlook on demand includes two year forecasted domestic demand emanating from various sectors like power, fertilizer, petrochemicals, sponge iron and CGD.
- Outlook on supply provides two year forecasted domestic supply from existing and new fields as well as LNG imports.
- Outlook on gas allocation includes mix in 2011-12 from domestic fields has also been formulated, based on the current policy guidelines and our outlook on ascribed value of gas against alternate fuels.
- Outlook on gas pricing and city gas distribution has also been provided.

II. Industry Section

- Introduction to the industry, including the market structure, current pricing framework, key Government policies with their implications and SWOT
- Separate Chapters are framed for CGD, LNG Terminals, Gas Infrastructure and Gas Utilization Policy
- Supply overview and data on industry wise gas offtake;
- Evolution of gas demand in India and role of natural gas in various sectors

III. Company Section

- This section provides the brief profiles of the key players along with their five year historical financial statement and key financial ratios.

IV. Annexure

- This section provides detailed lists of various gas-based and alternative fuel-based plants that have been used by **CARE Research** to formulate demand outlook.
- This section also provides various key data tables as under:
 - CGD: Details on First and Second Round of Bidding
 - CGD - City-wise Consumer Profiling, Potential Gas Demand and Pipeline Connectivity
 - List of Customers Nominated by the Government for Supply of KG-D6 Gas

For an in-depth understanding and analysis of the Indian Natural Gas industry and **CARE Research's** outlook on the sector with its sector-wise forecast of gas supply and demand as well as pricing and CGD for each year till FY 2011-12 and other key trends in the industry foreseen, please refer to the Report on the *Indian Natural Gas Industry, March - 2010* by **CARE Research**.

The subscription to this report includes half-yearly updates for the next 1 year from the date of subscription.

Kindly click on the link below to subscribe a copy of the same

<http://www.careratings.com/content/ResourceCenter/IndustryReport.aspx>

For any queries regarding the content and scope of the report kindly reach us at

careresearch@careratings.com

Ms. Revati Kasture

Head – Industry Research

(D): +91-22-6754 3465

revati.kasture@careratings.com

Mr. Dhimant Kothari

Manager

(D): +91-22-6754 3479

dhimant.kothari@careratings.com

Mr. Prashant Tarwadi

Deputy Manager

(D): +91-22-6754 3331

prashant.tarwadi@careratings.com



CREDIT ANALYSIS & RESEARCH LTD.

4th Floor Godrej Coliseum, Off Eastern Express Highway,

Somaiya Hospital Road, Sion East, Mumbai – 400 022.

Tel: +91-22-6754 3456 Fax: +91-22-6754 3457

All Rights Reserved. No part of this report may be reproduced or transmitted in any form without prior written permission from CARE

DISCLAIMER

This report is prepared by CARE Research, a division of Credit Analysis & REsearch Limited [CARE]. CARE Research has taken utmost care to ensure accuracy and objectivity while developing this report based on information available in public domain. However, neither the accuracy nor completeness of information contained in this report is guaranteed. CARE Research operates independently of ratings division and this report does not contain any confidential information obtained by ratings division, which they may have obtained in the regular course of operations. The opinion expressed in this report cannot be compared to the rating assigned to the company within this industry by the ratings division. The opinion expressed is also not a recommendation to buy, sell or hold an instrument.

CARE Research is not responsible for any errors or omissions in analysis/inferences/views or for results obtained from the use of information contained in this report and especially states that CARE (including all divisions) has no financial liability whatsoever to the user of this product. This report is for the information of the intended recipients only and no part of this report may be published or reproduced in any form or manner without prior written permission of CARE Research.

Published by Credit Analysis & REsearch Ltd. 4th Floor Godrej Coliseum, Off Eastern Express Highway, Somaiya Hospital Road, Sion East, Mumbai – 400 022. Tel:+91- 22-6754 3456 Fax:+91-22-6754 3457