

Oil & Gas

Industry overview & regulatory
framework

WIRC

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Contents

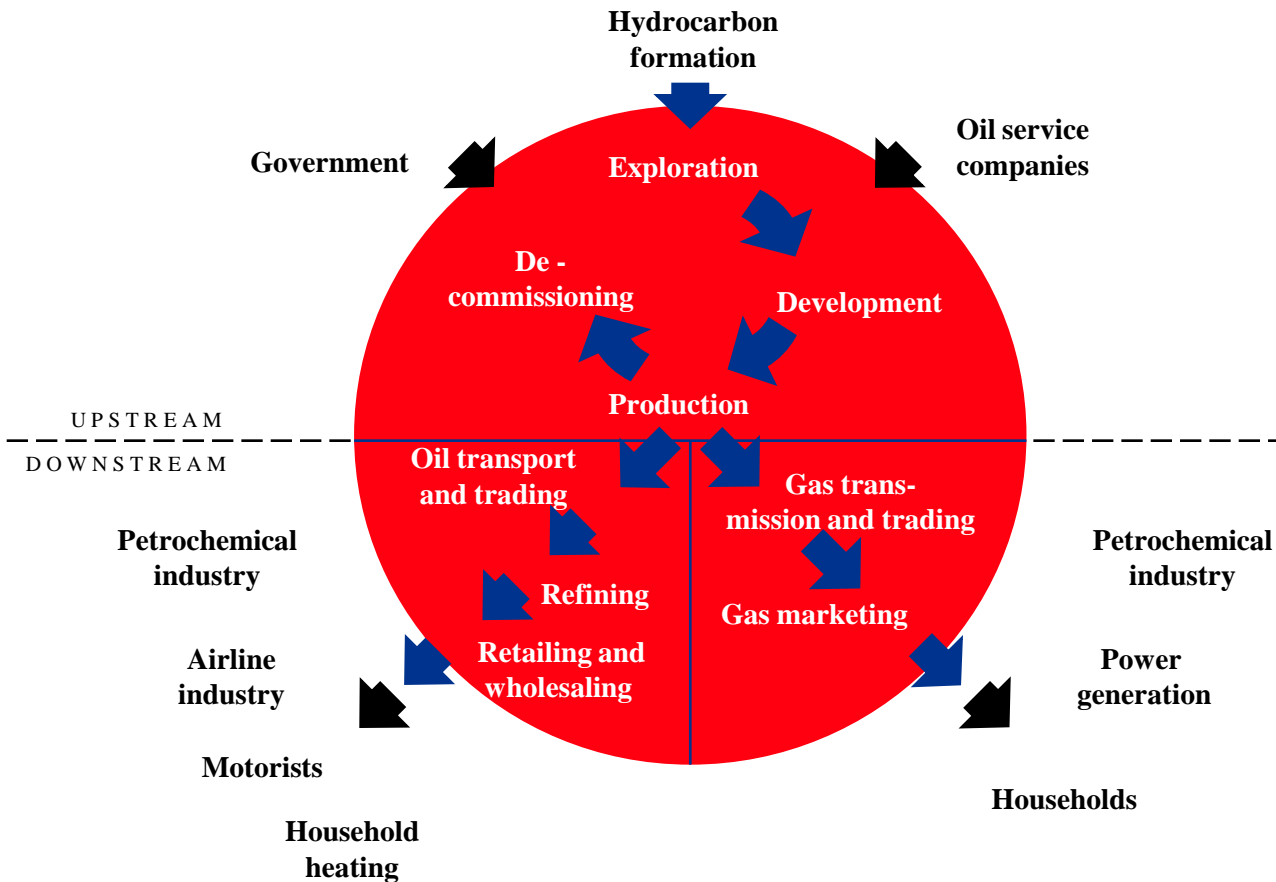


1 The Circle of Oil & Gas Industry

2 India Oil & Gas industry structure

3 India Oil & Gas Regulatory framework
-Upstream
-- Midstream
-- Downstream

The circle of oil and gas industry



Town gas (**heating, cooking**)

Bottled gas (**cooking**)

Gasoline (**petrol**)

jet fuel

diesel

lubricants (**engine oil**)

waxes (**candles**)

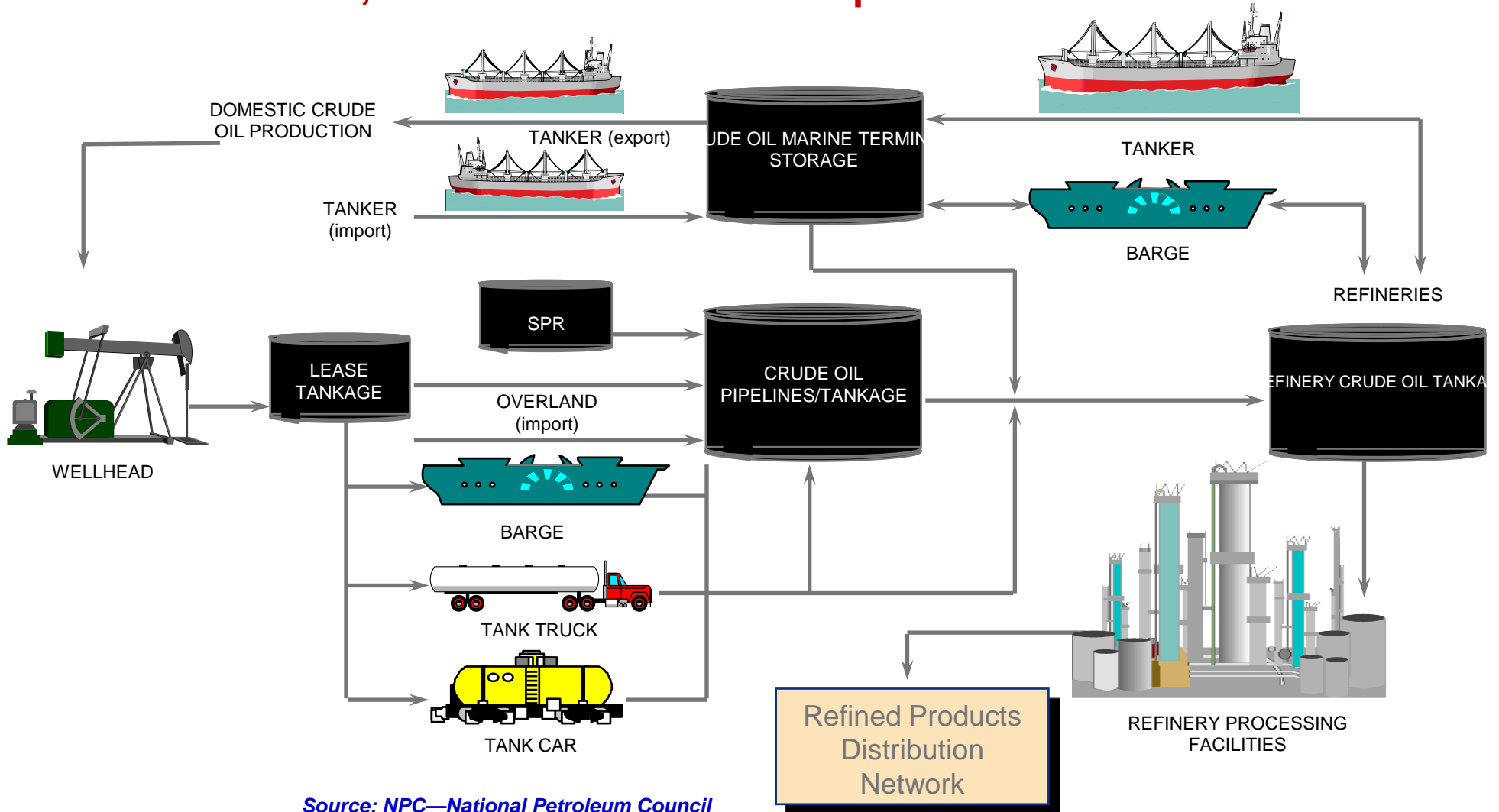
fuel oil (**ships and power generation**)

tar, bitumen (**roads and roofs**)

plastics, synthetics

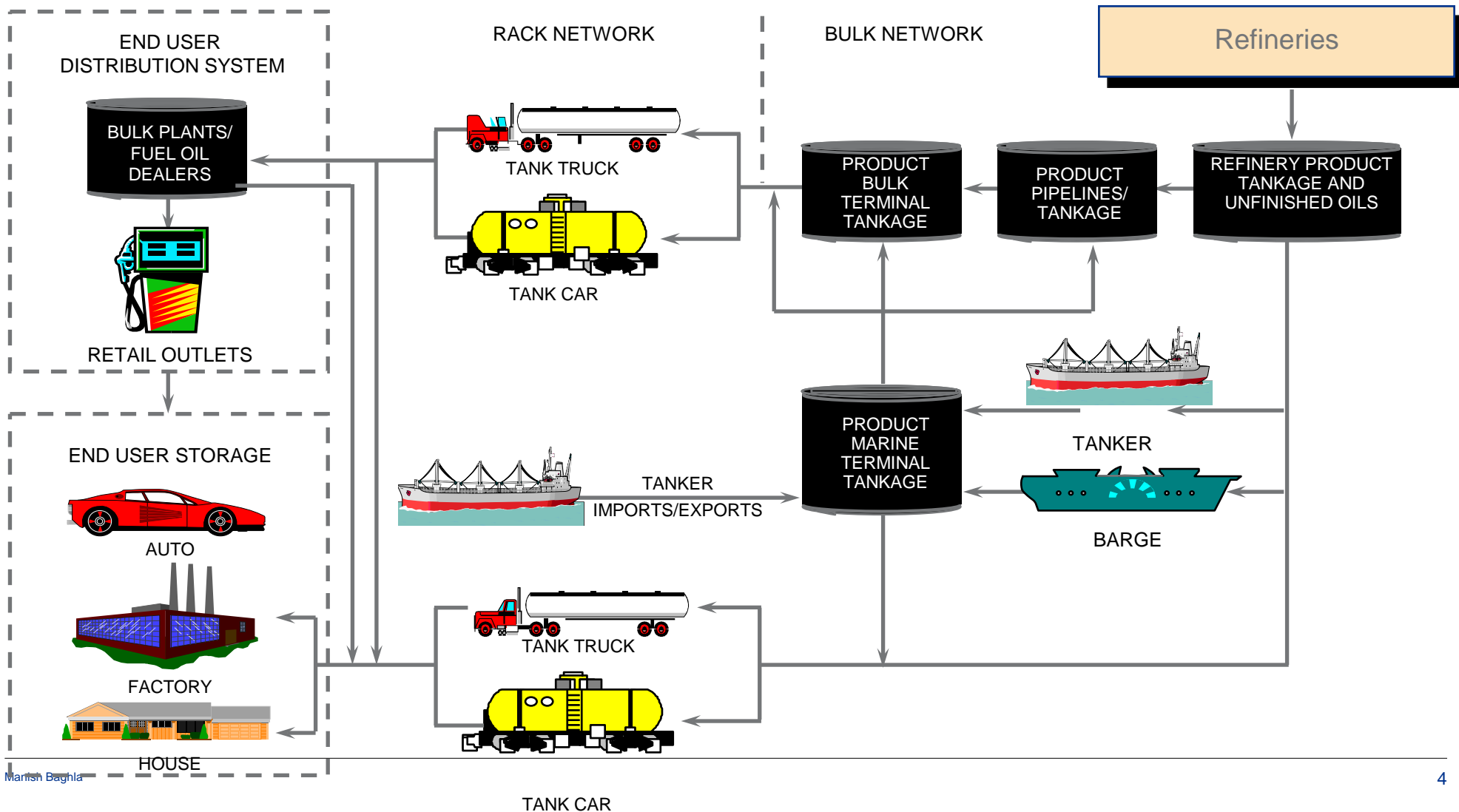
The Crude Oil Distribution System

The crude, bulk terminals and transportation network...



The Refined Product Distribution Network

The bulk products, distributor, rack & consumer network...



Industry Terminology

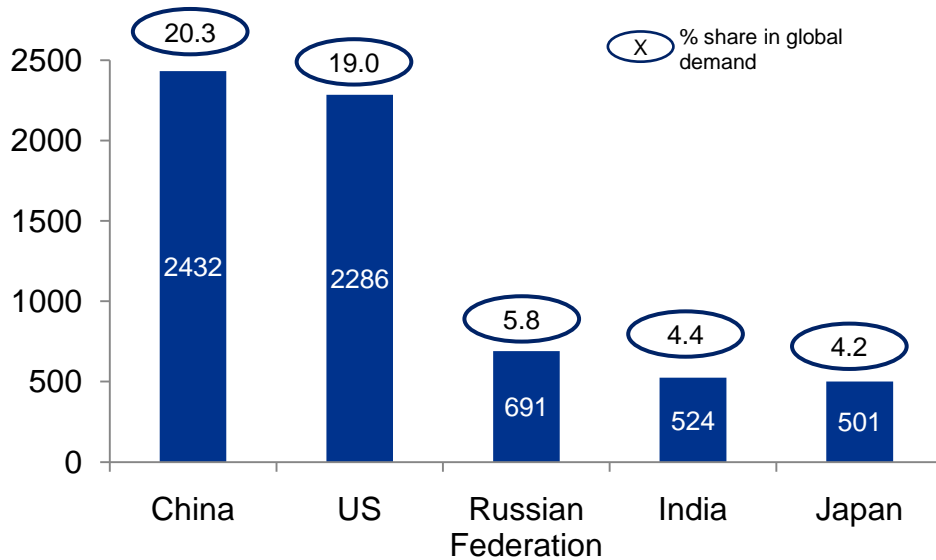
Areas	Technology/activities
Upstream <ul style="list-style-type: none">• Prospecting & Development	Survey, Interpretation, Drilling, Deep-sea exploration & development
Midstream <ul style="list-style-type: none">• Gas transportation & processing• Petroleum Pipelines	Gas Pipelines, LNG terminals, LNG re-gasification terminals, Floating Storage re-gasification units (FSRU), CGD network Crude & petroleum products pipeline
Downstream <ul style="list-style-type: none">• Refineries & Chemicals• Marketing	Up-gradation, Hydro-treating, Hydro-cracking, desulphurization, Storage & transportation, Coal to liquids (CTL), Petro-retailing, etc.

India Oil & Gas industry structure

India's per-capita consumption is far lower than world but still it is the fourth largest consumer of energy

Top five countries consumes more than 50% of world's energy

Primary Energy Demand, 2010
Unit: Mtoe

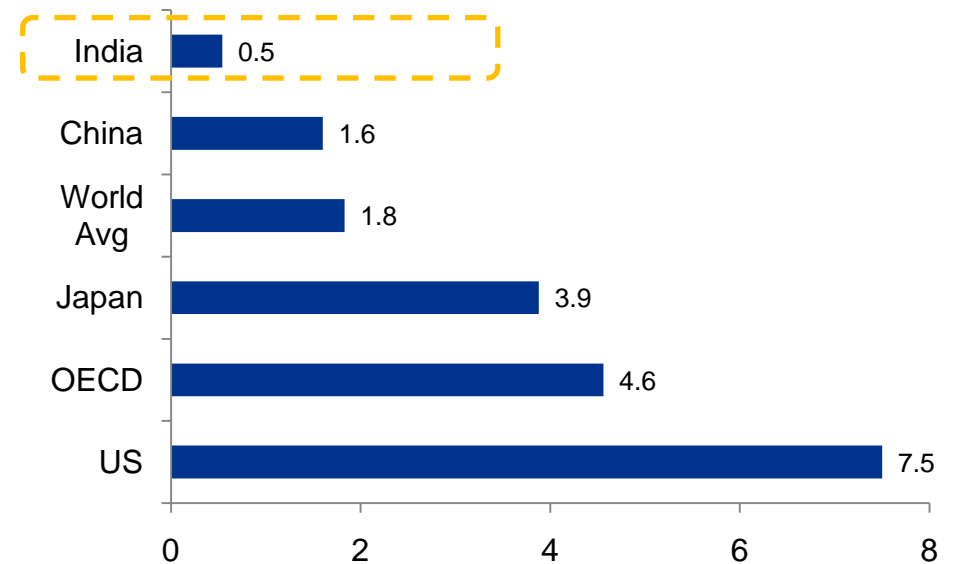


Source: BP statistical Review

- In 2010, China replaces US as the largest consumer of Energy
- In 2009, India replaces Japan as the fourth largest consumer of Energy

Huge variation in per capita energy consumption

Per Capita energy consumption, 2010
Unit: toe



Source: Key World Statistics 2010, IEA

- Per capita energy consumption in India and China is less than the world average
- Low per capita consumption means a huge upside potential for energy demand

India – Energy in global perspective

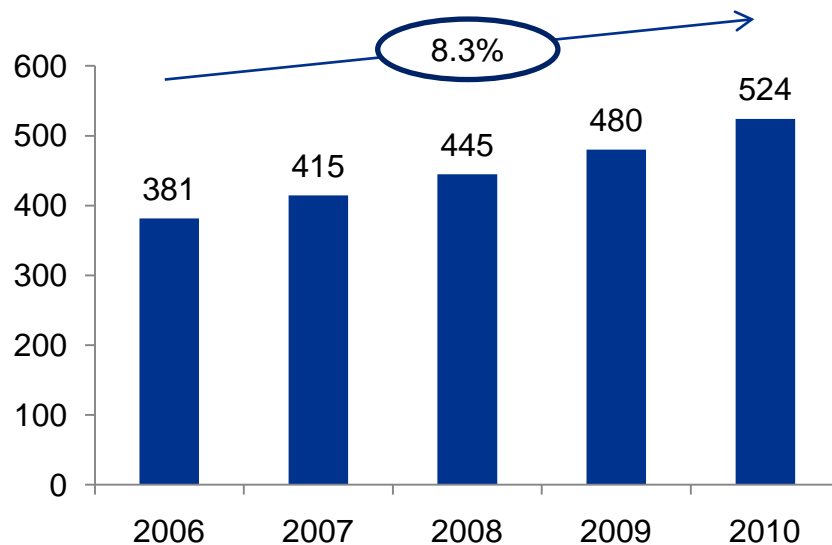
From 1980 to 2010, together, China & India have accounted for increase in world's consumption of coal (93 per cent), oil (44 per cent), natural gas (10 per cent) and hydro & nuclear energy (21 per cent).

Commercial Energy Consumption	Units	India		China		India & China	
		1980	2010	1980	2010	1980	2010
Coal	Mtoe	57.1	277.6	305	1713	362	1991
Share of World	%	3.2	7.8	16.9	48.2	20	56
Oil	Mtoe	31.6	155.5	91.8	429	124	584.1
Share of World	%	1.1	3.9	3.1	10.6	4.2	14.5
Natural Gas	Mtoe	1.1	55.7	12.5	98.1	13.6	153.8
Share of World	%	0.1	2	1	3.4	1	5.4
Nuclear, Hydro & Renewable	Mtoe	13.1	35.4	13.2	192	26.3	227.7
Share of World	%	2.4	2.3	2.4	12.3	4.8	14.6
Total Primary Commercial Energy	Mtoe	103	524.2	423	2432	526	2956
Share of World	%	1.5	4.4	6.4	20.3	7.9	24.6

India Energy demand is consistently increasing; Oil & Gas share is around 40%

India Energy Demand is growing at a CAGR of 8.3 %

Primary Energy Demand
Unit: Mtoe

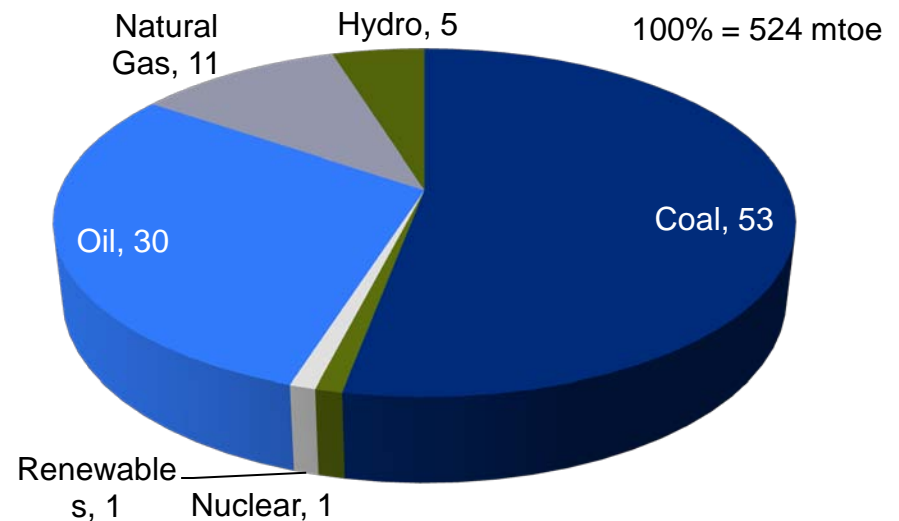


- India energy demand is increasing primarily due to high economic growth
- Energy intensity is expected to decline to 0.67 by 2031-32 from current level of 0.75

Source: BP statistical Review, Integrated Energy Policy

Coal's share is 53% in India's total energy demand in 2010

Energy consumption by fuel
Unit: Percentage



- Share of natural gas has increased from 8% in 2008 to 11% in 2010, due to increased domestic production of gas

Increasing need for domestic exploration activities

Efficient & reliable energy supplies are a pre-condition for accelerated growth of the Indian Economy

While the energy needs will grow , the indigenous resources are limited

Oil & Gas constitutes of 45% of total energy consumption.
Oil & gas imports meet 82% of total requirements

Petroleum products consumption grew @ 4.5% CAGR since 2002-03 from 104 MMT to 147 MMT in 2011-12

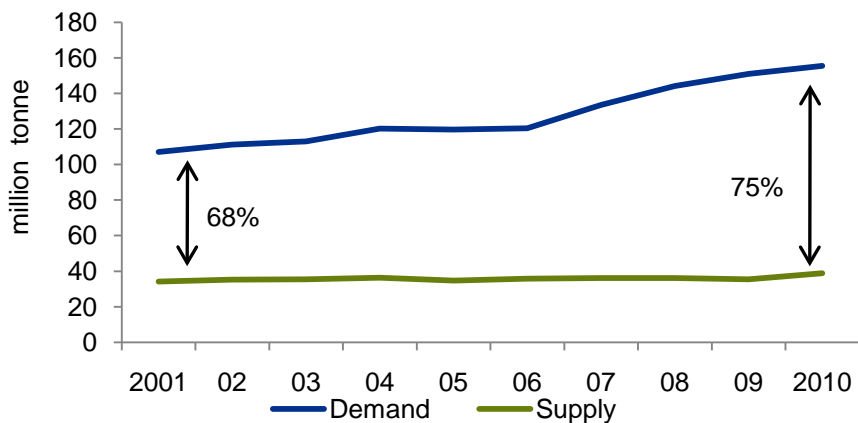
Petroleum products consumption projected to grow @ 5.2% CAGR from 147 MMT in 2011-12 to 245 MMT in 2021-22 (Source: MoPNG)

Gap between India's crude oil and natural gas demand-supply is widening

Crude Oil

- Oil demand is increasing at a CAGR of 4.2% whereas supply is increasing at 1.5% p.a
- Key drivers for increase in oil demand are:
 - Setting up of export oriented refineries
 - Growth in transportation sector
 - Rapid industrialization
- In 2010, India imported around 75% of its oil requirements in comparison to 68% in 2001

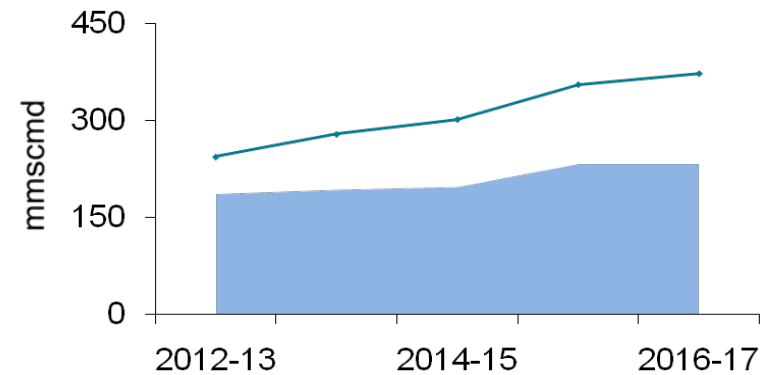
Crude oil demand supply balance



Natural Gas

- Gas demand is increasing at a CAGR of 9.9% whereas supply is increasing at 7.6% p.a
- Key drivers for increase in gas demand are:
 - Switching of liquid fuels to gas by industries and transportation sector
 - Growing power demand
- In 2004, India started importing gas and presently it is about 20% of its consumption

Natural gas demand supply balance



Source: BP statistical Review

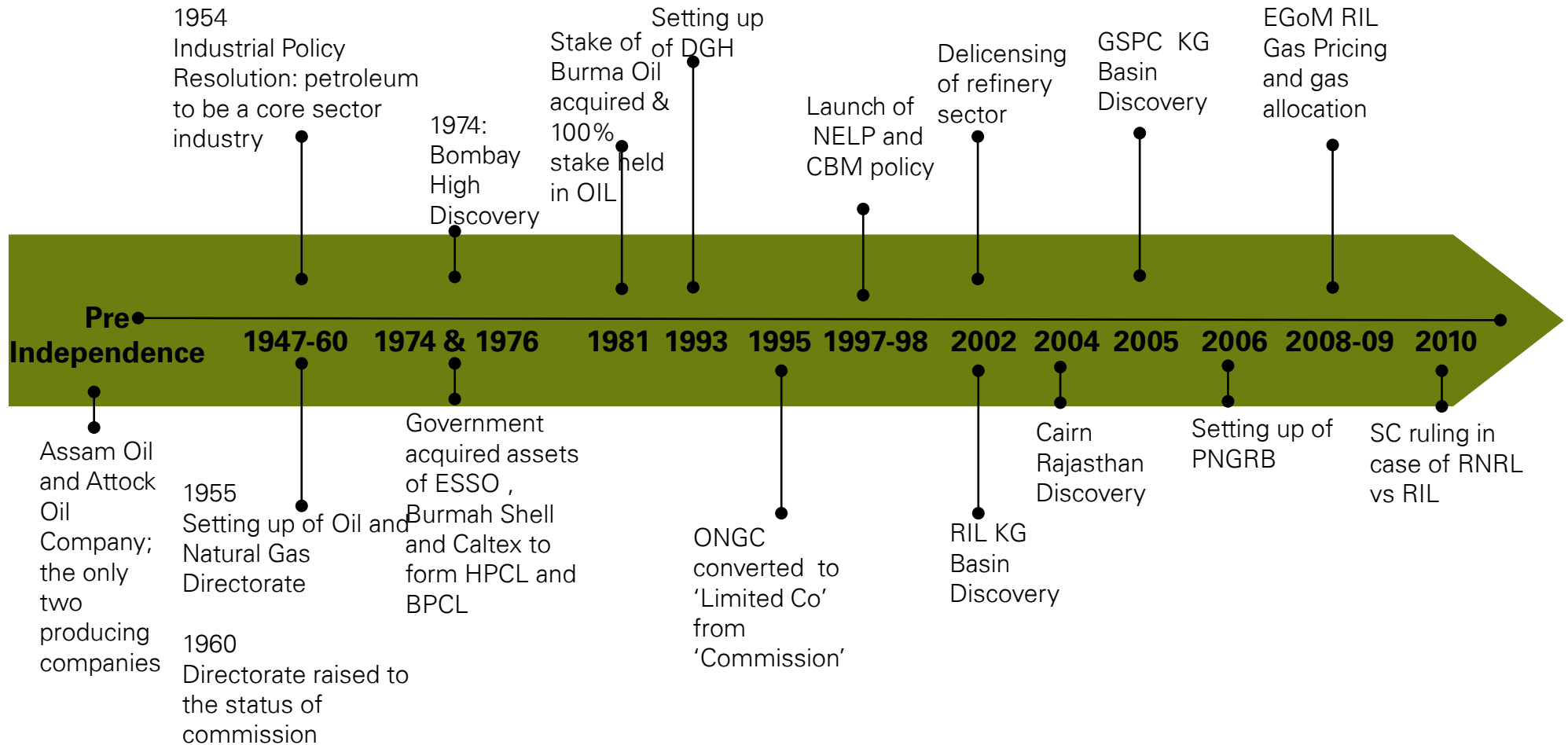
India Oil & Gas Regulatory Framework

India Oil & Gas Regulatory framework

	Upstream	Midstream	Downstream
Governing Ministry	MoPNG	MoPNG	MoPNG
Legal framework	<ul style="list-style-type: none"> Oilfields (Regulation and Development) Act, 1948 Petroleum & Natural Gas Rules, 1959 	<ul style="list-style-type: none"> Petroleum Act, 1934 Petroleum Rules, 2002 	
Regulator	Directorate General of Hydrocarbons (DGH)	Petroleum & Natural Gas Regulatory Board (PNGRB)	
Policies/ Regulations	<ul style="list-style-type: none"> New Exploration Licensing Policy (NELP) Coal Bed Methane (CBM) 	<ul style="list-style-type: none"> Essential Commodities Act, etc. As per regulations issued by PNGRB PCPIR US\$400 mn investment pre-conditions 	
FDI policy	100% under automatic route	100% under automatic route	<ul style="list-style-type: none"> PSU refinery – 49% with prior approval of FIPB Others – 100% FDI Retail - \$400 Mn investment

Multiple laws and regulating agencies both at centre and state level e.g. Environment, Defence, Shipping, etc. existing for each aspect of Oil & Gas activities from offshore operations to onland distribution.

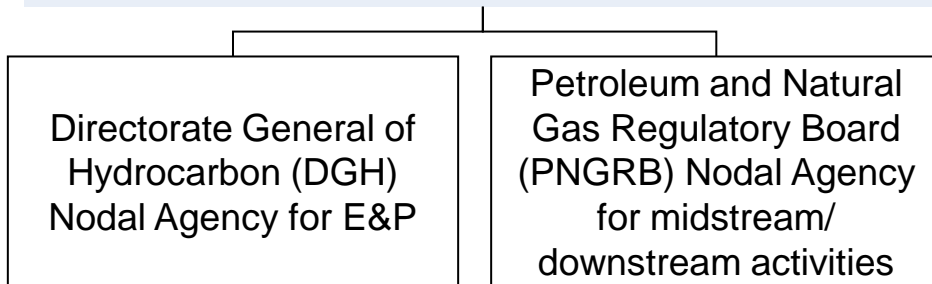
Evolution of Indian Oil & Gas Regulatory framework



India Oil & Gas Regulatory and Policy Framework

Organizational View

Ministry of Petroleum and Natural Gas



DGH Objectives

- Opening up of new unexplored areas for future exploration and implementation
- Review exploration program and development plans of E&P companies
- Re-assess hydrocarbon reserves estimated by operator

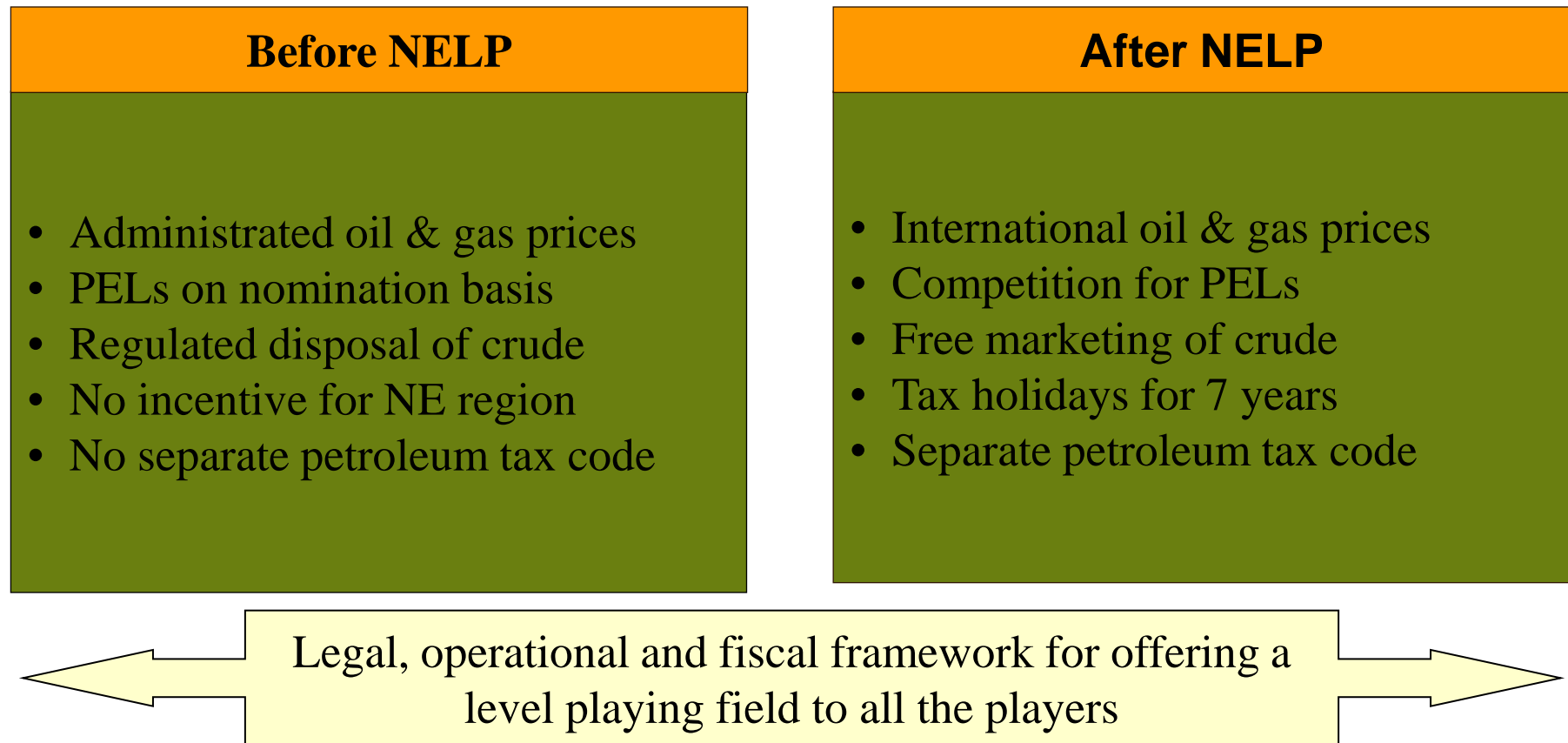
Source: DGH

Contractual Regime

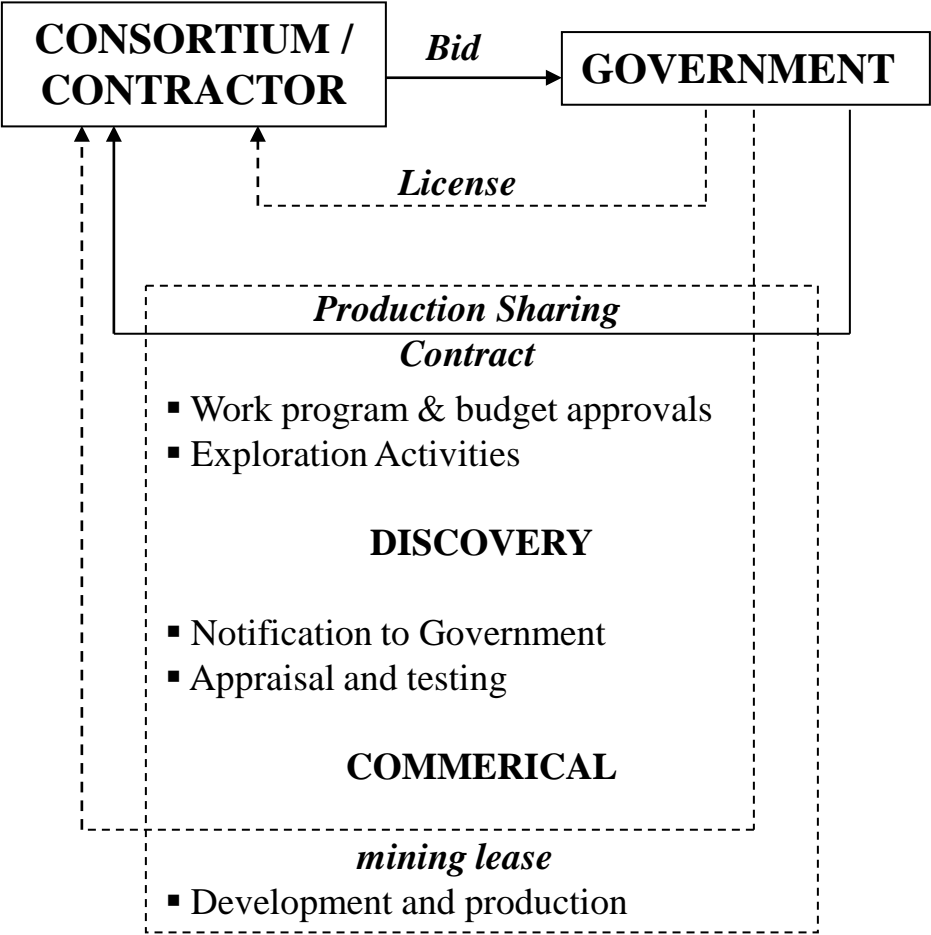
- Transparent bid criteria
- Mandatory and Minimum Work Program
- Fiscal package - % of profit petroleum to be shared with Government
- Two phase exploration period
- Option of not to proceed to next phase available on relinquishing area other than discovery area
- No restriction on repatriation of profits abroad
- 100% recovery of exploration, development & production costs and royalty payments

India Oil & Gas Regulatory Framework - Upstream

Changing face of fiscal and regulatory regime



Changing face of fiscal and regulatory regime



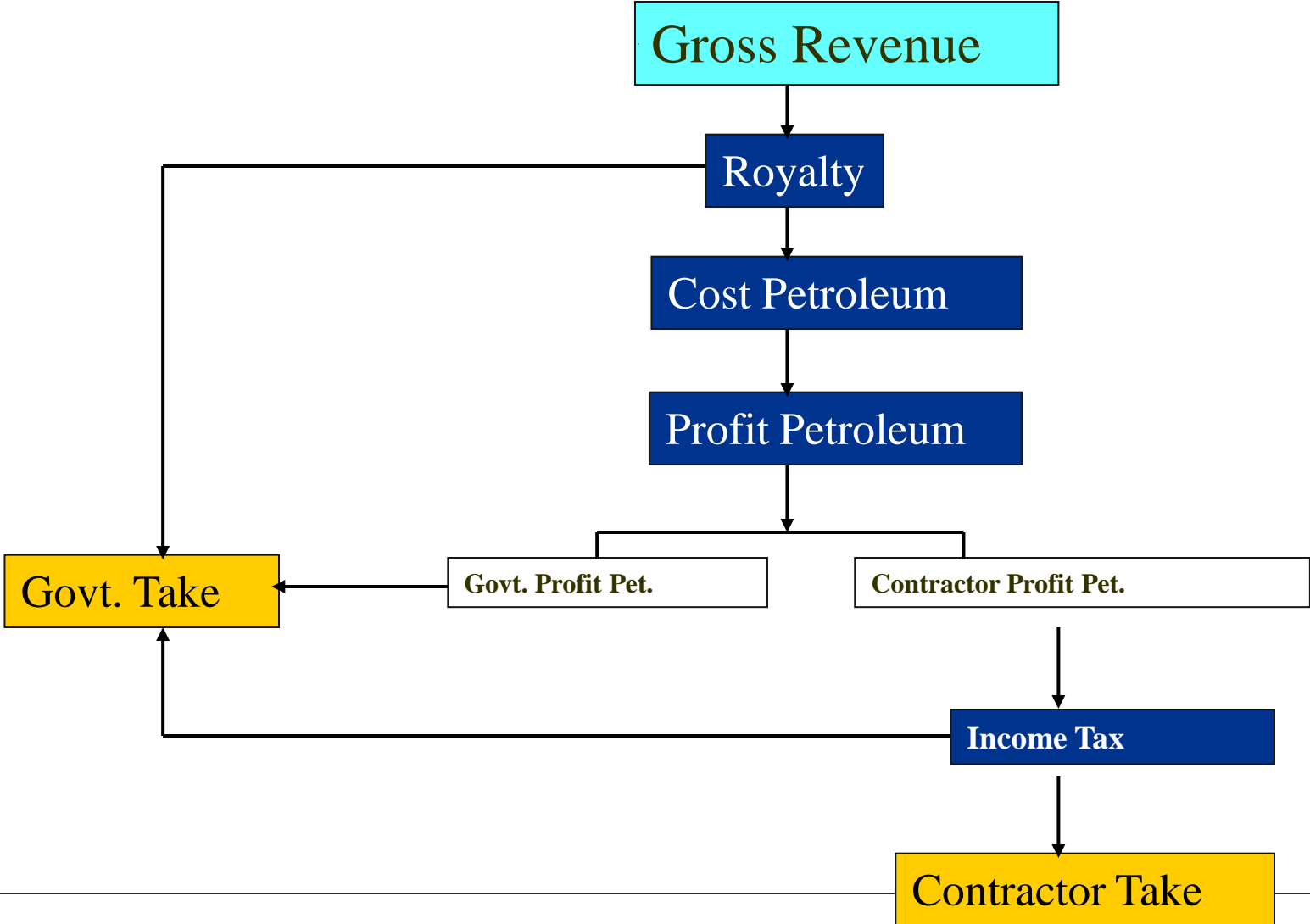
Four major criteria for bid evaluation have been identified against which weights have been assigned for bid evaluation:

- ▶ Technical capability
- ▶ Financial capability
- ▶ Work programme
- ▶ Fiscal package



- ▶ 'Government take' is to be determined
- ▶ 'Government take' will include Royalty, profit petroleum and Income tax accruing to the Government
- ▶ Government take is equal the ratio of Government NPV to project NPV
- ▶ NPV is calculated by applying 10% discount rate
- ▶ The bidder offering highest Government NPV will get maximum points and other bidders will get points proportionately

Contract Terms - Sharing of Cashflows



Indian Upstream Sector – Laws & Regulations

Ministries/Regulators

- a) MOPNG
- b) DGH
- c) State Govt (for onshore ML)
- d) Environmental clearances/State Pollution Control Board
- e) DG Shipping
- f) State Sales Tax Department
- g) Customs and Excise
- h) Income Tax Authorities
- i) DG Mines and Safety
- j) Department of Explosive
- k) State Maritime board
- l) Labour Authorities
- m) Defence Authorities
- n) Other regulatory bodies

Laws & Regulations

- a) Oilfields (Regulation and Development) Act, 1948
- b) The Petroleum and Natural Gas Rules, 1959
- c) The Mining Act, 1952
- d) The Oil Mines Regulations, 1984
- e) The Petroleum Act, 1934
- f) The Territorial Waters, Continental Shelf and Exclusive Economic Zone Act, 1976
- g) The Environment Protection Act, 1986
- h) The Water (Prevention and Control of Pollution) Act, 1974
- i) The Air (Prevention and Control of Pollution) Act, 1981
- j) Petroleum & Natural Gas Regulatory Board Act, 2006
- k) Etc.

Market oriented policies are key to sector development

Upstream

- **Exploration rounds: 1980 - 1991**
- **Development rounds: 1992**
- **Speculative Survey Rounds: 1993**
- **Formation of DGH: 1993**
- **JV exploration/speculative rounds: 1995**
- **NELP: 1997/1999 onwards**
- **Revised NELP – Rangarajan Committee: 2013**
- **CBM: 2001**
- **OALP?**
- **Shale Gas: 2013-14?**

Progressively, investor friendly policies have been introduced to attract private players in the area of Oil & Gas exploration

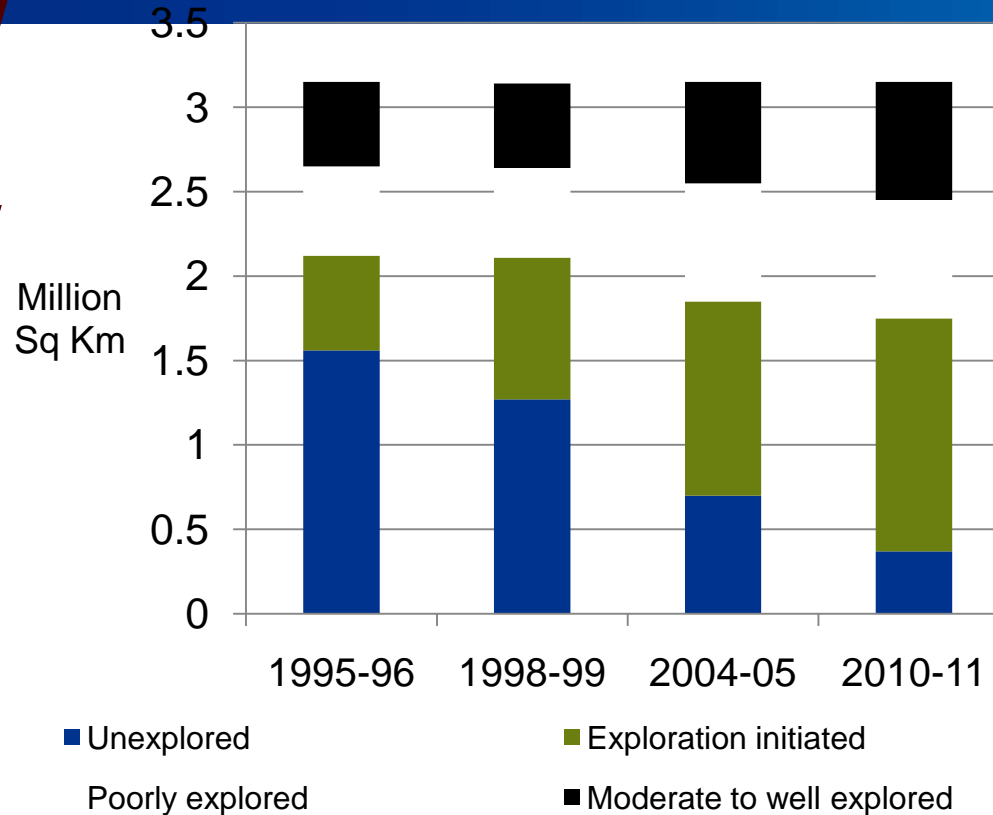
Market oriented policies resulted in positive developments

1947

1990

2000

2010



1 Company

1 Producing Basin

2 Companies

3 Producing Basins

12 Companies

7 Producing Basins

<70 Companies

10 Producing Basins

Total Area – 3.14 million Sq Km: Deepwater – 1.35; Offshore – 0.39; Onland – 1.39
 Area awarded (70%) – Approx 2.15 million Sq Km
 : NELP – 67%; Pre-NELP – 7%; Nomination- 26%

Substantial exploration activities initiated

Litigation & Controversies

NELP

- **KG D6 - Natural Gas Pricing, Cost Recovery**
- **Cairn – Vedanta Deal (Royalty, Cess)**
- **Extensions for exploration period**
- **Environment & Defence approvals**

Petro Product Policy

- **Petrol**
- **Diesel**
- **LPG (Dom) & SKO (PDS)**

Fiscal Issues

- **Definition of ‘Mineral Oil’**
- **Availability of Presumptive Taxation**
- **Profit linked incentive vs investment based incentive**

India Oil & Gas Regulatory Framework - Midstream

Midstream

Evolution of Indian midstream

Evolution of Gas Transmission Network in India

State-owned GAIL was created to develop midstream and downstream gas infrastructure

1984

GAIL completed the first major trans-regional pipeline, the Hazira-Vijaipur-Jagdishpur (HVJ), which spanned over 2800 kms

1991

GSPL commissioned is first Pipeline section Hazira-Mora and soon after commissioned 24" x 45 kms Amboli - Dahej pipeline

2001

Reliance's gas discovery in the KG basin, resulted increased participation from private companies in transmission

2002

PNGRB was formed to regulate and monitor the downstream sector

2007

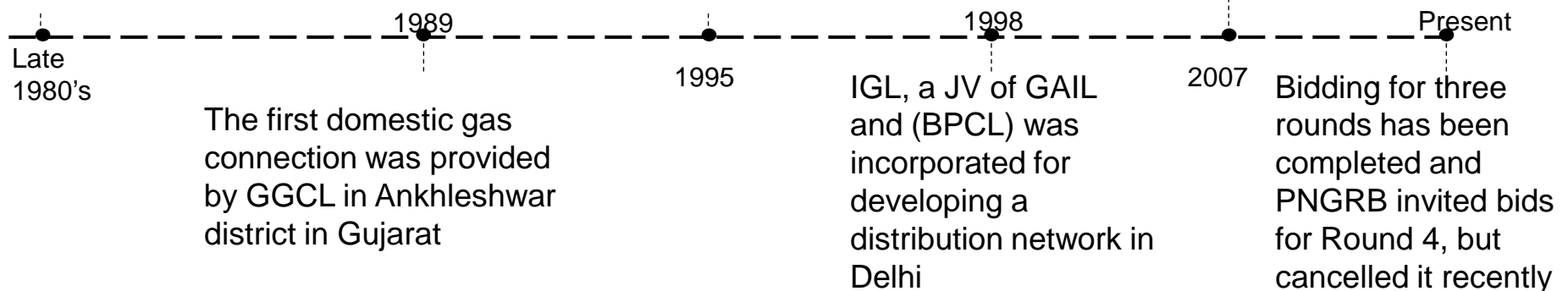
Downstream City Gas Distribution (CGD) – Evolution

Evolution of CGD network in India

Based on encouraging recommendations of GAIL initiated techno economic feasibility studies for gas distribution, GOI approved gas allocation for Mumbai and Delhi

MGL, a JV of GAIL, British gas and Govt. of Maharashtra was incorporated for distribution of NG in Mumbai

PNGRB was formed to grant licenses to various players through competitive bidding



Midstream Regulatory and Policy Framework

Organizational View

Ministry of Petroleum and Natural Gas

Directorate General of Hydrocarbon (DGH)
Nodal Agency for E&P

Petroleum and Natural Gas Regulatory Board (PNGRB) Nodal Agency for midstream/downstream activities

PNGRB is nodal agency for midstream activities

PNGRB Objectives

Introducing Competition

- Register entities (oil product market companies, LNG owners & Storage facilities operators)
- Authorize entities to lay, build, operate & expand NG Pipelines and CGD Networks
- Lay down technical & safety standards & specification

Regulating Entities & Monitoring Activities

- Open Access in NG Pipelines & CGD Networks
- Unbundling of Entities
- Introducing Bidding for authorization of NG Pipelines & CGD

Protecting Consumers Interest

- Regulate Transmission & Distribution Tariff
- Monitor commodity prices & capacity & take corrective action for restrictive trade practices
- Dispute Resolution
- Ensure Transparency

Key Guidelines laid down by the PNGRB

- For any transmission pipeline to be laid, the design pipeline capacity has to be at least 33% more than the capacity requirement of the entity plus the contracted capacity
- This available capacity is open for use on an open access basis on first come first serve basis
- The board, under the regulation would determine the tariffs and the methodology of determining them for transmission pipelines and local distribution network
- Exclusivity would be provided for 25 years
- Infrastructure status was awarded to cross country pipelines and associated storage facilities in Union Budget 2007 – 08

Midstream Regulatory and Policy Framework

Laying

- PNGRB invites applications from entities interested in laying the pipelines or entities need authorization from PNGRB to lay or expand a pipeline
- Pipelines should have excess capacity of at least 33 per cent then the entities requirement, for leasing out to third parties

Exclusivity

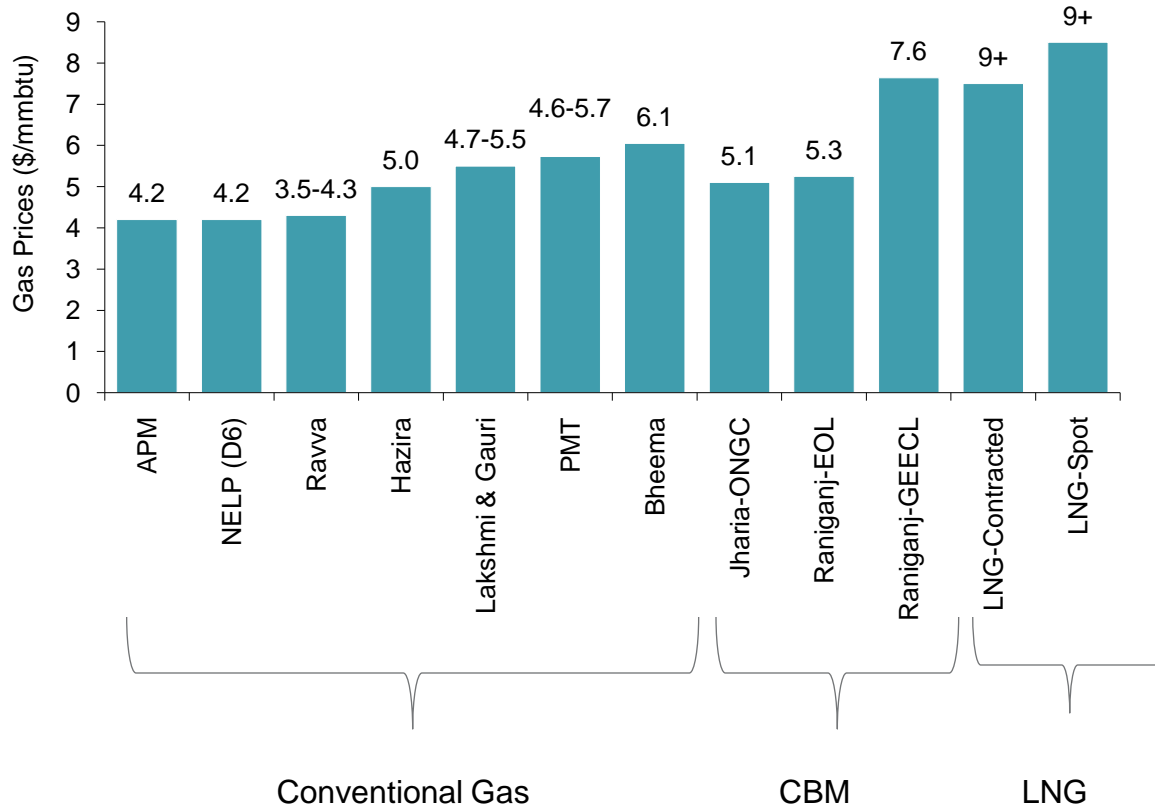
- All transmission pipelines will be either common or contract carriers
- Infrastructure exclusivity for 25 years
- A common carrier pipeline is used by more than one entity on a non discriminatory open access basis.
- A contract carrier pipeline is used by two or more entities that have entered into a contract for at least one year.
- The entity that lays, operates or expands the pipelines will have the right of first use and other entities will have to pay a transportation charge for use of the pipeline

Tariff

- **Existing and ongoing pipelines** : Tariff is determined by considering a reasonable rate of return on capital employed, currently it is 12 percent post tax
- Distance based zonal tariff system is followed which allows a uniform tariff within a zone of 300 km from the delivery point; subsequently, there is a change in tariff at the next zone and so forth
- Tariff to be reviewed after every five years
- **New Pipelines:** Tariff is determined through bidding process. PNGRB has some criteria for short listing the companies and weights are assigned to each criteria:
 - 70% on tariff
 - 40% - Lowness of PV of tariff bid for first tariff zone [25 years]
 - 20%- Lowness of % increase over first tariff zone
 - 10% - Lowness of % increase on second tariff zone (applicable for success)
 - 30%- Highness of PV of natural gas volumes to be transported

Midstream Gas Pricing

Natural Gas Prices in India



Note: (a) North-east APM prices are only 60% of rest of the country
 (b) LNG prices include regasification cost

Source: Infraline, April 2011

APM Prices

- On June 5, 2010, the price of APM natural gas produced by National Oil Companies (NOCs) i.e. ONGC and n OIL, be fixed at US\$ 4.2/MMBTU (Rs 6820/MSCM) less royalty.
- North East prices are 40 percent less

NELP (D6)

- The prices were calculated based on following formula:

$$\text{Price (USD/mmbtu)} = 2.5 + (\text{Crude Price} - 25)^{0.15}$$
- The formula imposes a ceiling on gas price at USD 4.2/mmbtu at USD 60/bbl crude oil price and a floor price of USD 2.5/mmbtu at USD 25/bbl; crude oil

Pre NELP PSC

- The price of natural gas is determined by the provisions of PSC signed by the consortium with GOI

CBM

- The prices are determined on arm's length basis.

LNG Contracted

- From January 2009, LNG prices are linked to JCC

LNG Spot

- Spot LNG prices depend on international LNG prices and vary widely from contract to contract

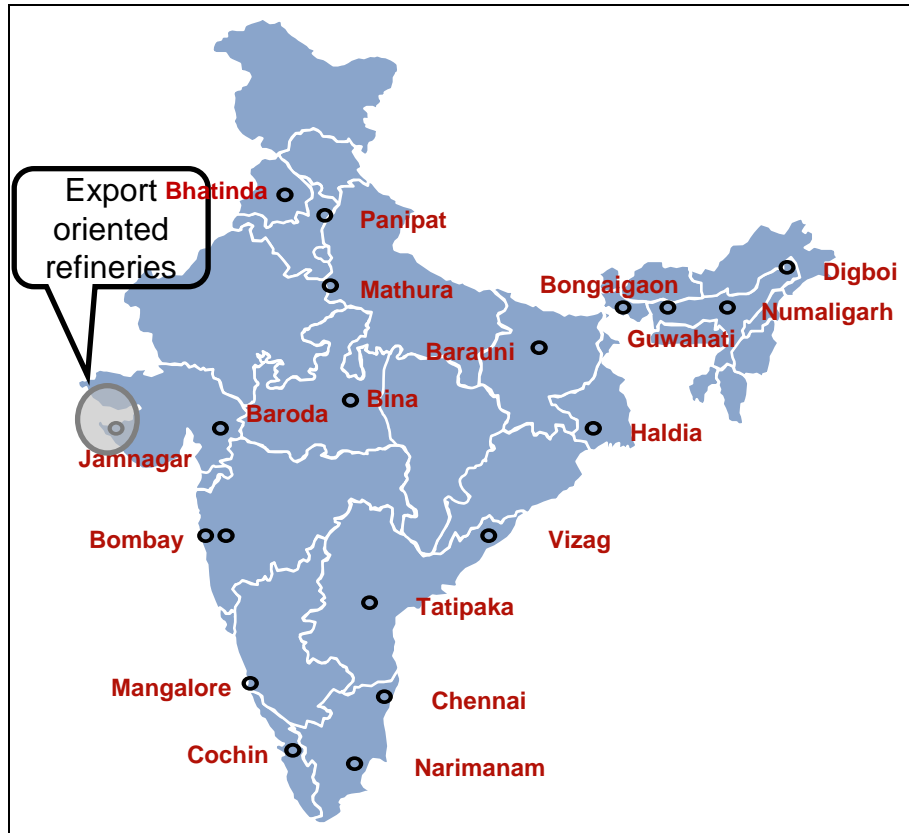
Summary of Midstream regulations

	LNG re-gasification	Gas Marketing	CGD	Transmission Pipeline
Authorisation	Yes	Yes	Yes	Yes
Increase in Capacity	?	NA	Yes	Yes
Marketing Service Obligation	No	Yes	NA	Yes
Common/Contract Carrier	No	NA	Yes	Yes
Price Regulation	Monitor and take corrective action to prevent restricted trade practices			NA
Tariff	No	NA	Yes	Yes

India Oil & Gas Regulatory Framework - Downstream

Downstream Refining Capacity - Existing

India Existing Refinery Locations



Source: PPAC

India Existing Refinery Capacity

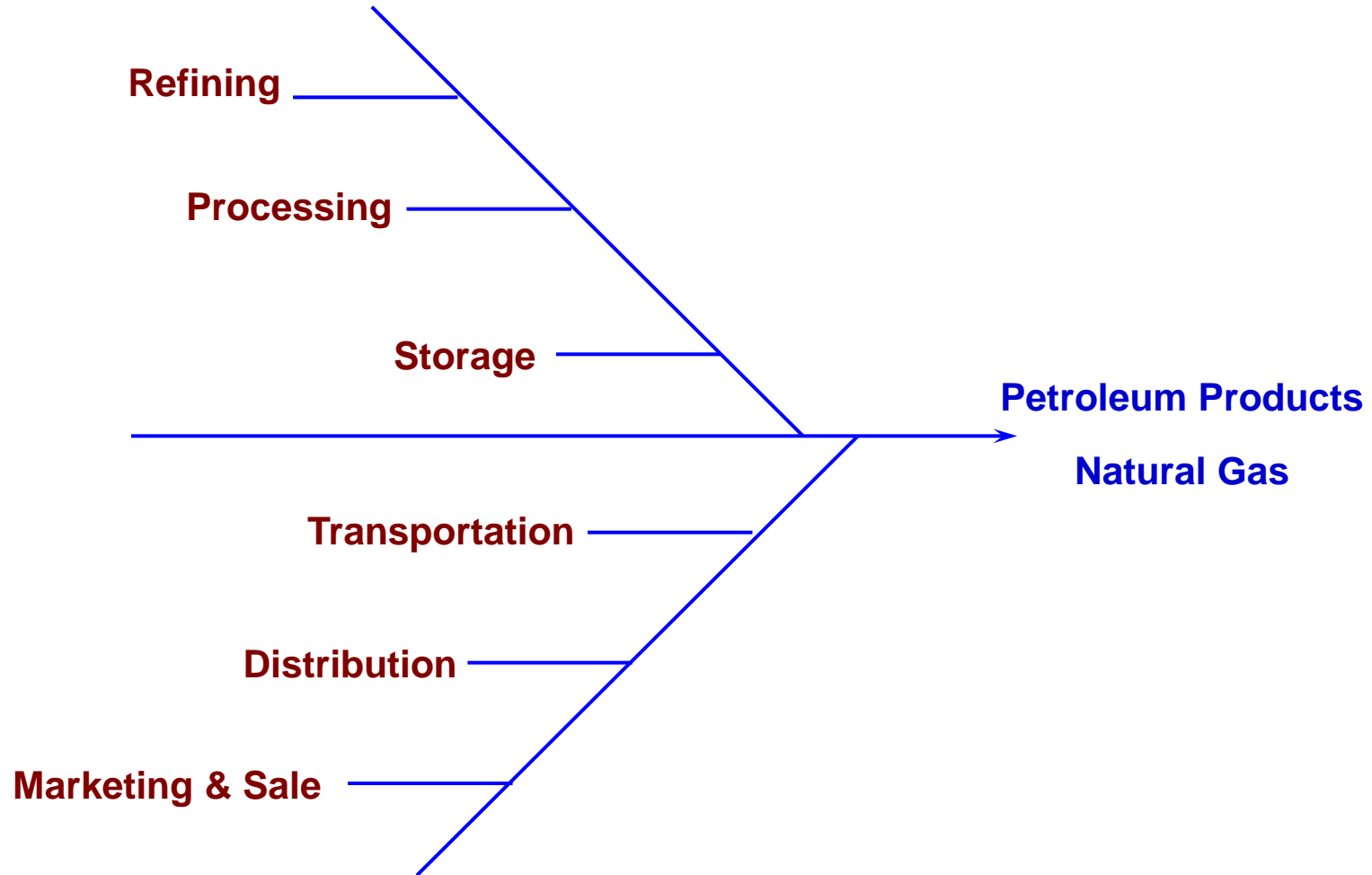
Company	Location	Capacity (mtpa)
IOC	Digboi	0.7
	Guwahati	1.0
	Barauni	6.0
	Koyali	13.7
	Haldia	7.5
	Mathura	8.0
CPCL	Panipat	15.0
	Manali	10.5
BRPL	Narimanam	1.0
	Bongaigaon	2.4
Total - IOC		65.7
BPCL	Mumbai	12.0
KRL	Cochin	9.5
NRL	Numaligarh	3.0
Total - BPCL		24.5
HPCL	Mumbai	6.5
	Vizag	8.3
Total - HPCL		14.8
MRPL	Mangalore	11.8
BORL	Bina	6.0
RIL	Jamnagar	33.0
RIL (SEZ)	Jamnagar	27.0
ONGC	Tatipaka	0.1
Essar Oil	Vadinar	10.5
Total		193.4

Note: Capacity as on April, 2011

Source: PPAC

Gujarat and Maharashtra have about 53% of total refining capacity. IOC and RIL have about 65% of total refining capacity

Areas under purview of Regulatory Board



Summary of downstream regulations

	Refining	Storage	Marketing	Pipeline
Authorization	No	Yes - Above certain capacity	Yes	Yes
Price Regulation	?	NA	Monitoring	NA
Common/Contract Carrier	No	No	No	Yes
Increase in Capacity	?	?	NA	Yes
Marketing Service Obligations	NA	NA	Yes	NA
Tariff	NA	NA	NA	Yes

Market oriented policies are key to sector development

Market oriented policy framework has been introduced to support private sector involvement in downstream petroleum and natural gas sector

Midstream & Downstream

- **APM Dismantled: 1998 - 2002**
- **Guidelines for laying petroleum products pipelines: 2002**
- **Bio Diesel purchase policy: 2005**
- **PNGRB Act: 2006**
- **Policy on development of natural gas and city gas distribution network: 2006**
- **Gas Utilisation Policy: 2008**
- **Pricing of Petrol and Diesel both at the refinery gate and the retail level market-determined: June 2010**
- **Gas Pooling Price: 2012?**
- **Gas Swapping guidelines: 2013**

Thank You

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Living in the Oil & Gas industry

1. Global
2. Volatile
3. High Risk, High Investments
4. Age of Dinosaurs, Size of Elephant
5. Oil - Well to Wheels
6. Gas - Well head to Wall socket
7. Regulations, Regulations, Regulations.....