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DIRECTORATE FOR SCIENCE, TECHNOLOGY AND INDUSTRY
STEEL COMMITTEE

INDIA

RAW MATERIALS OUTLOOK FOR INDIA

Joint India/OECD/IISI Workshop, New Delhi (India), 16-17 May 2006.

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Raw materials outlook for India

- A Review

A D Baijal

VP (Raw Materials)

Tata Steel

IISI-OECD CONFERENCE
Date: 17th May, 2006

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Presentation Outline

Steel Industry

- Global

- Indian

Raw materials for Steel

Policy / Legislation

Infrastructure

Conclusion

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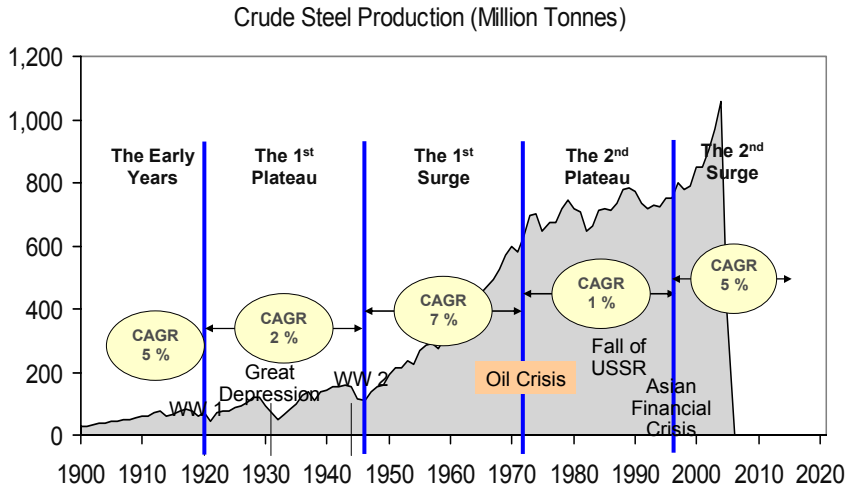
Global steel demand poised for robust growth



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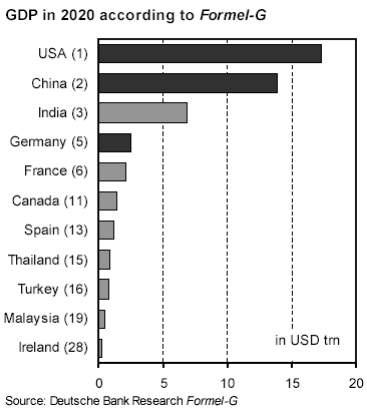
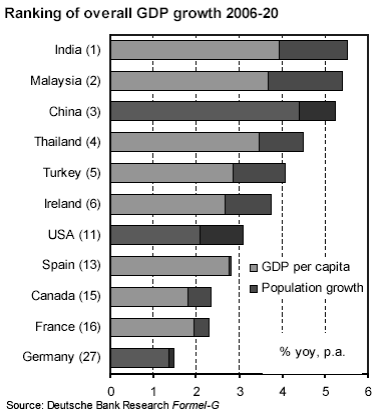
The Global Economic Forecast: Asia poised to be the emerging power house of growth





- In 2020, the US and China will still be the two largest economies in the world (in PPP)
- India leaves Japan behind and moves up to 3rd place
- India, Malaysia and China will post the highest GDP growth rates (above 5%) over 2006-20
- Ireland, the US and Spain are the rich countries expected to grow the most

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Indian Economy

- GDP per capita to increase from USD 2500 and USD 5000 in 2020.
- Poverty ratio dropped from 50% of population in 1950 to 26% in 2005.
- Economic growth rate ~ 8%
- Population growth rate of 1.3 - 1.5%
- 33% population below 15 years and 5% above 65 years
- House hold savings rate go up from current 23% to 30%
- 100,000 MW new capacity (90% of present) in next 7 years.
- The Fiscal Responsibility and Budget Management Act
- Literacy standards increase from 18% in 1951 to 65% in 2002.

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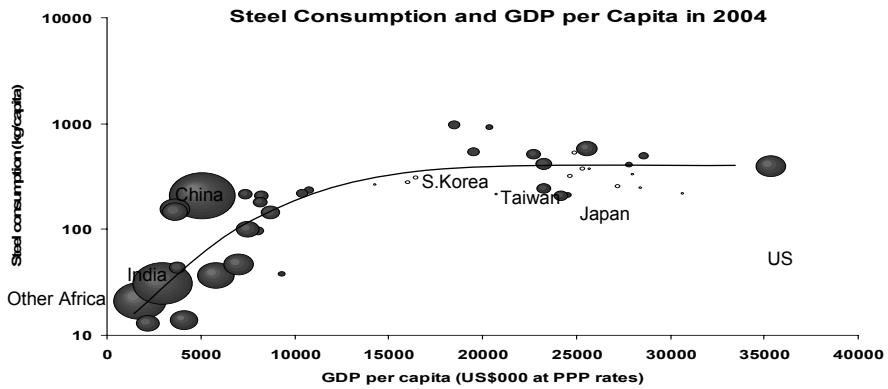
Steel Consumption Vs. GDP



Bubble size represents the population

The growth in BRIC will double the steel demand by 2050

Source: internal analysis

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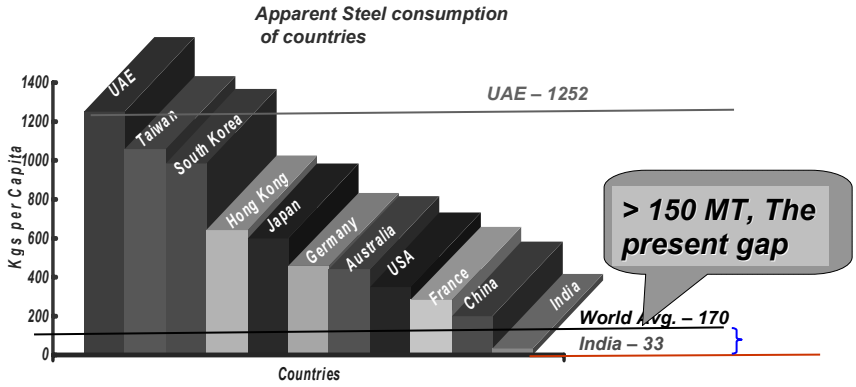
Growth in key sectors will drive the steel demand



We feel the growth trigger has been fired……..

(*Last 3 years GDP growth of + 7.5%)*

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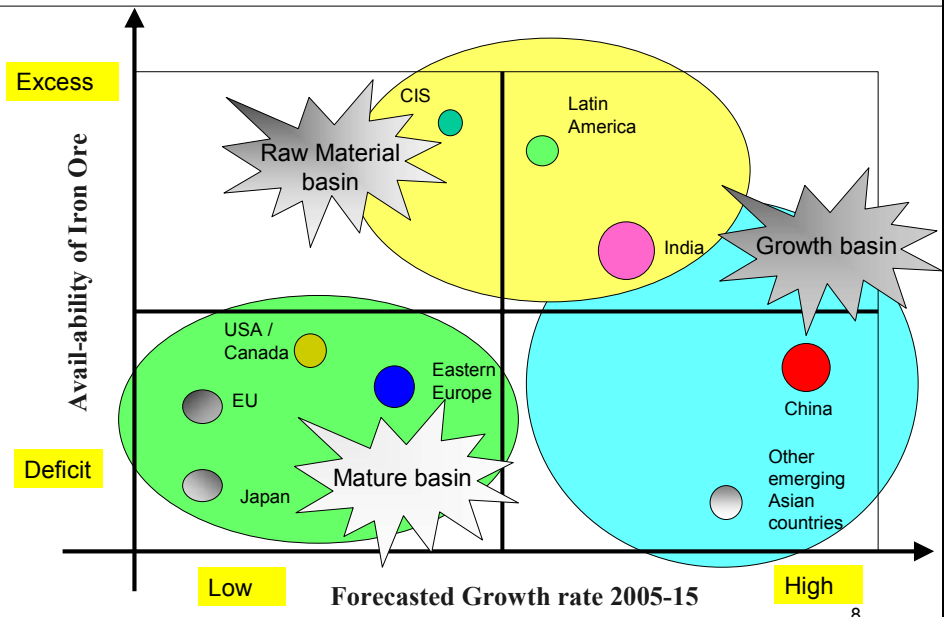
Production sites will move to regions with both RM source and demand.



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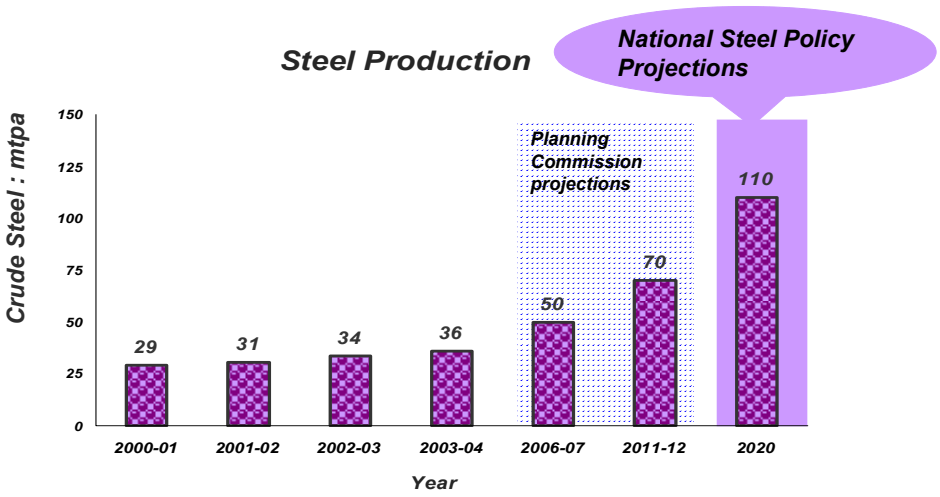
Indian Steel production likely to triple in next 15 years



To realize the above projections, it would be necessary to put in place the right policies as well as alignment of the policies

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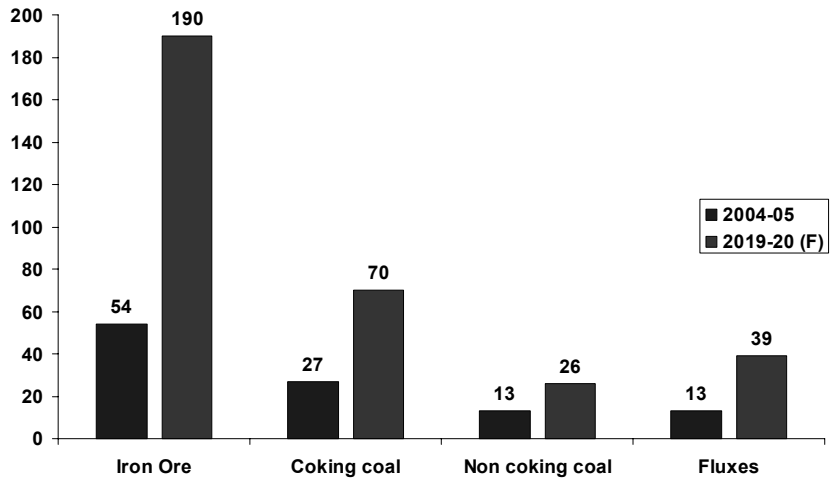
Multifold increase in Raw Material Consumption



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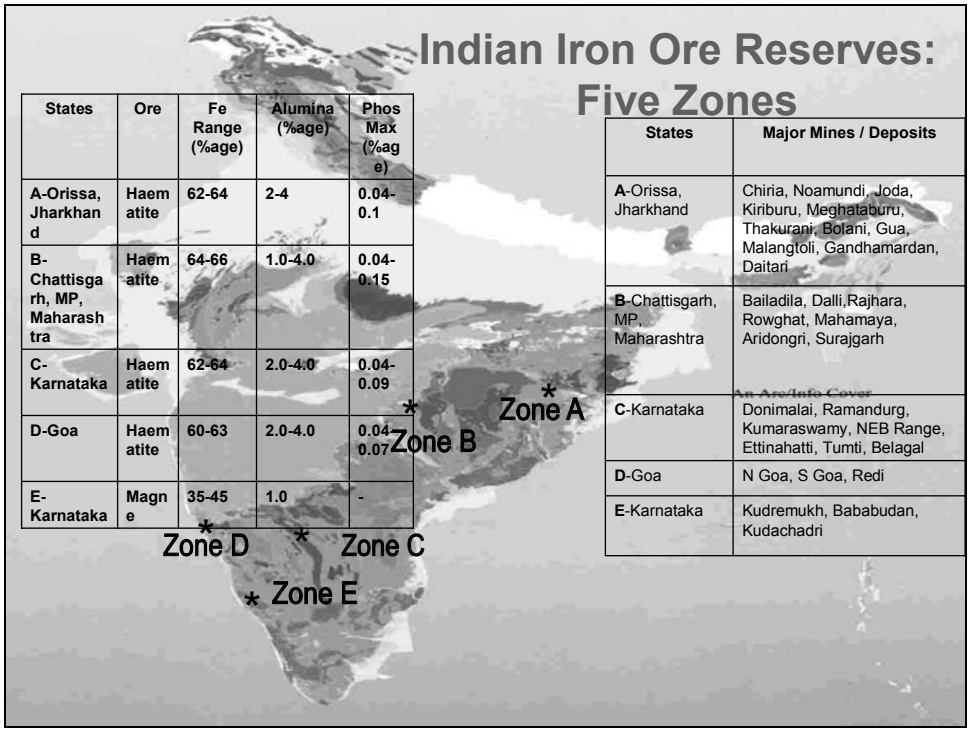
Indian Iron Ore Reserves: Five Zones

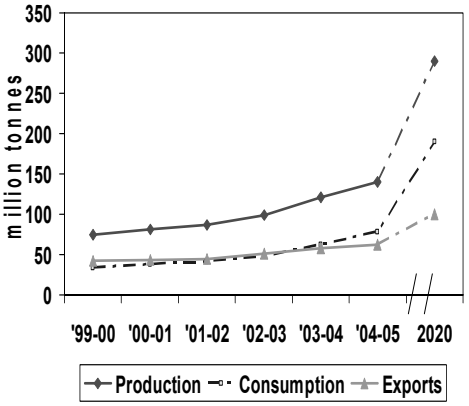
States	Ore	Fe Range (%age)	Alumina (%age)	Phos Max (%age)
A-Orissa, Jharkhand	Haematite	62-64	2-4	0.04-0.1
B-Chattisgarh, MP, Maharashtra	Haematite	64-66	1.0-4.0	0.04-0.15
C-Karnataka	Haematite	62-64	2.0-4.0	0.04-0.09
D-Goa	Haematite	60-63	2.0-4.0	0.04-0.07
E-Karnataka	Magne	35-45	1.0	-

States	Major Mines / Deposits
A-Orissa, Jharkhand	Chiria, Noamundi, Joda, Kiriburu, Meghataburu, Thakurani, Bolani, Gua, Malangtoli, Gandhamardan, Daitari
B-Chattisgarh, MP, Maharashtra	Bailadila, Dalli,Rajhara, Rowghat, Mahamaya, Aridongri, Surajgarh
C-Karnataka	Donimalai, Ramandurg, Kumaraswamy, NEB Range, Ettinahatti, Tumti, Belagal
D-Goa	N Goa, S Goa, Redi
E-Karnataka	Kudremukh, Bababudan, Kudachadri

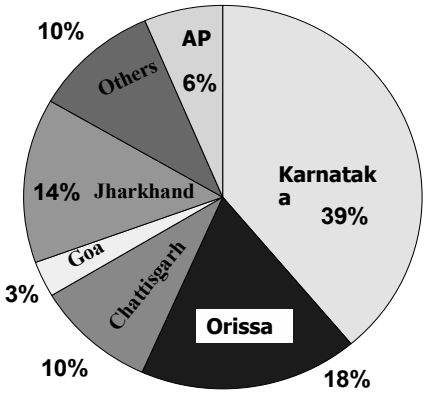


Iron Ore

Production Trend



Indian Resources: 23 bt



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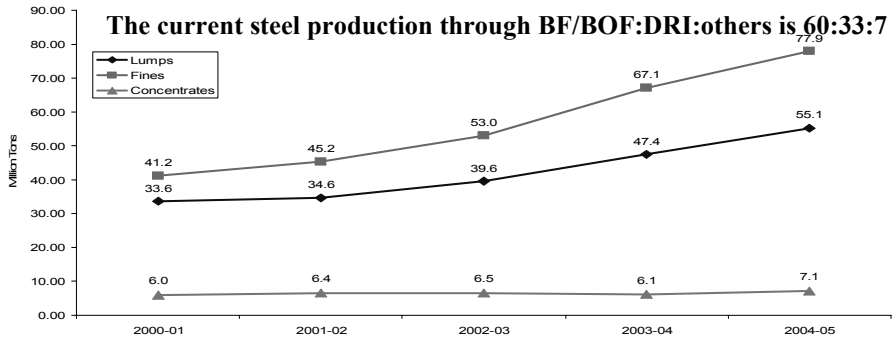
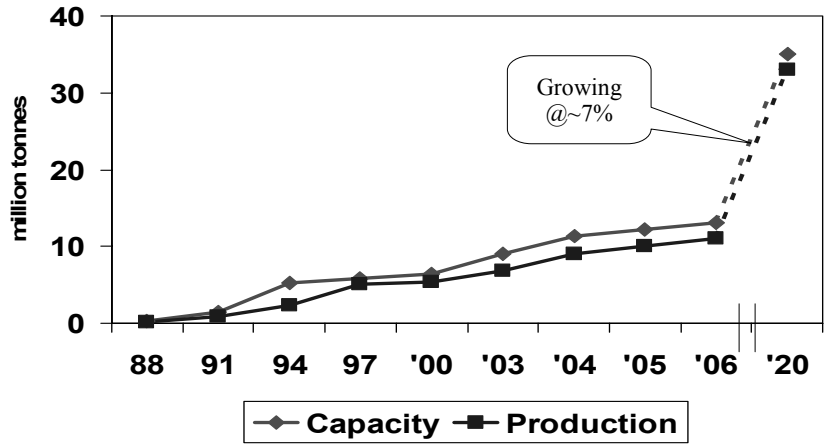
Natural iron ore resources can support lump: fines ratio of 20:40 as against current adverse trend of 40:60

The current steel production through BF/BOF:DRI:others is 60:33:7



- ***Fines are mostly being exported***
- ***DRI route uses 100% lumps, detrimental to mineral conservation***
- ***Economies of scale not available with large number of small players to set up sintering / pelletization facilities***
- ***Increasing use of fines in agglomerates in bigger size blast furnaces can increase its productivity and bring down cost/tss***

Domestic DRI production : Trend and Forecast



Increasing DRI production may lead to faster depletion of high quality lumpy ore reserves

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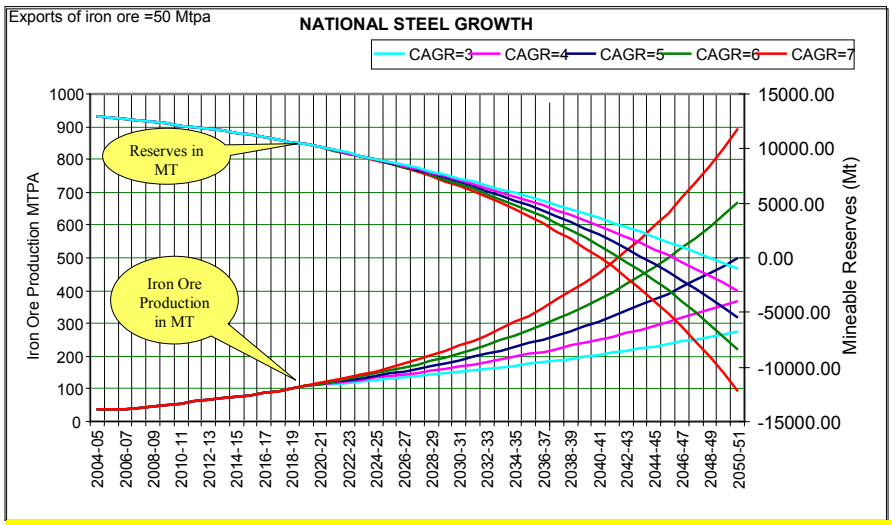
Source: Tata Steel analysis

With expected CAGR of ~7% and exports at 50 mtpa, India will become an importer of iron ore in next 40 years.



Most of the iron ore reserves are in reserve forest and environment sensitive areas making the actual availability of reserves much less

Imperative – Need for conservation and resource enhancement

Challenges

- Selective mining of high grade lumpy ores (DRI).
- Many low volume producers
- Mismatch in agglomeration capacity and fines generation.
- Lower production (33%) routed through beneficiation.
- Increasing exports.

Conservation ….for future

- o Scientific Mining
- o Agglomeration capacity
- o Use of pellets for DRI
- o Beneficiation.
- o Technology for using Slimes
- o Restricting exports.

Enhancement …

- o Detailed / Scientific Exploration

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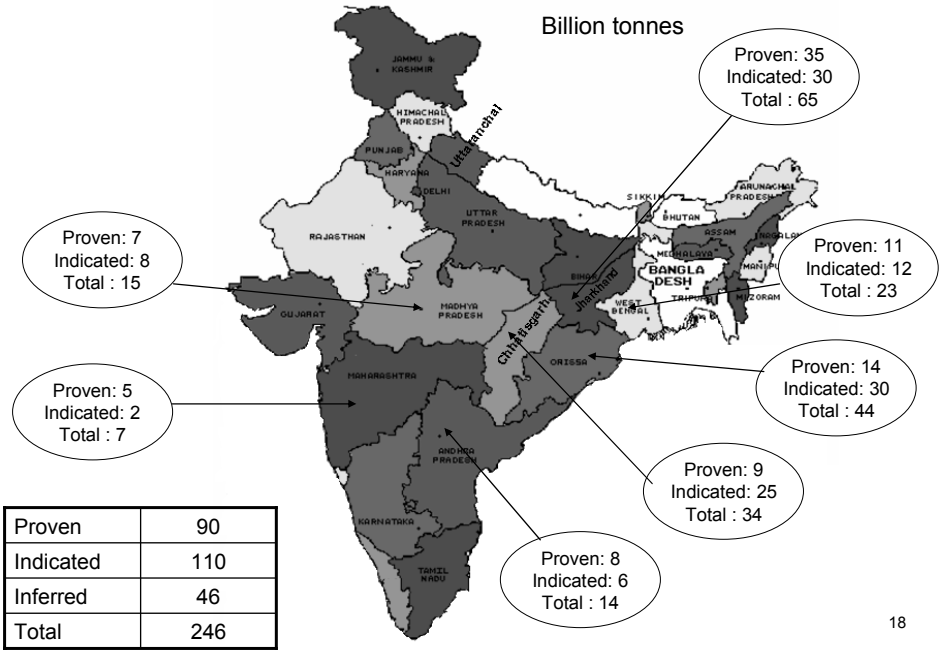
Indian Coal Reserves



Proven	90
Indicated	110
Inferred	46
Total	246

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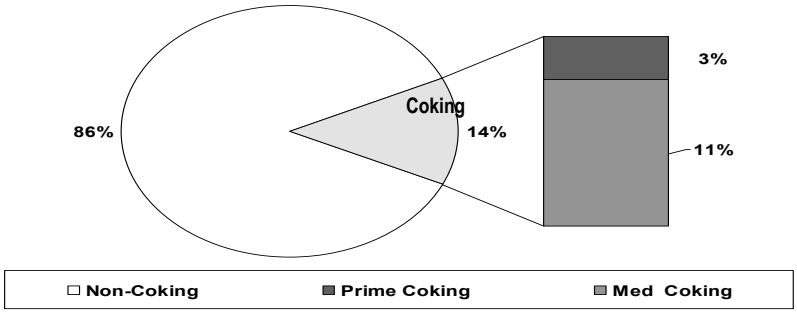
Domestic Coking Coal

Coal Reserves, BT	
Semi-Coking	28
Prime Coking	6
Non Coking	212
Total	246

Coking Coal Producers	
CIL	5.8
Tata Steel	3.3
Others	0.5

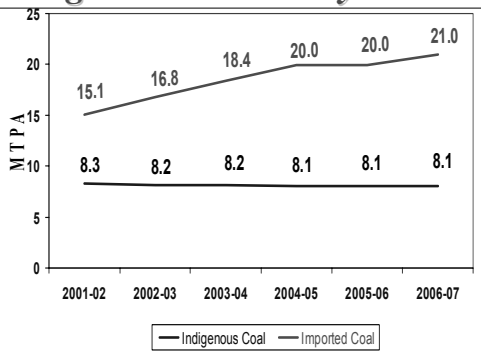
Washed Coal Ash	
BCCL	18%
CCL	18%
Tata Steel	13%

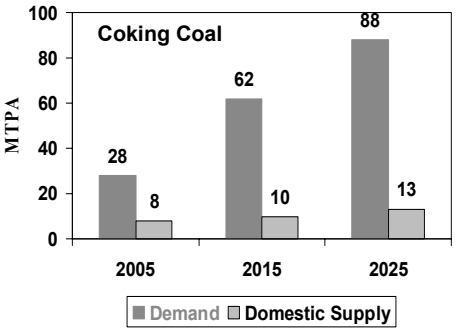


The Indian Coal, both coking and non coking is characterized by high ash and low washability index.

Geological Survey of India : As of 1.1.2001

Imports of Coking Coal to increase due to low Indigenous availability





- The additional demand for coking coal will be 70 mt by 2020 for 110 mt steel demand as per national steel policy

- For coking coal, dependence on imports to continue

Source: 10th Plan report

Need to conserve the scarce coking coal resources

Challenges

- High ash
- Poor washability
- Over 40% coking coal used for thermal use.
- 70% demand met through imports
- Low domestic availability*

Conservation of resources for future use

- o Beneficiating
- o Improving washing capacity / efficiency
- o Technology using medium coking coal for coke making
- o Steel making technology using non-coking coal

Enhancement of capacity

- o Developing new sources
- o Detailed exploration

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*Coal Strategy: Reducing coking coal requirements

Mining:

- Beneficiation technology
- Improving mining / washing process efficiency

Coke & Sinter Making

- Quality Coke from semi coking indigenous coal.
- Using low ash imported coal for blending
- Reducing Alumina level in iron ore for improving sinter & BF productivity and reducing coke requirement

Iron Making:

- Pulverized Coal Injection using semi/non coking coal
- Tar Injection
- Using more pellets
- Using sponge iron for feed

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Limestone

	Limestone Reserves	BF grade	SMS grade
World	Abundant		
India	160 bt	15 bt	7 bt

	Current Requirement	Requirement in 2020
BF grade	3.1 mt	9.5 mt
SMS grade	7 mt	22 mt

- SMS Grade available in Rajasthan and Himalayan regions.
- While Environment and logistics constrains Himalyan exploitation, high freight from Rajasthan is adverse.
- Stringent quality requirement further restricts availability

Therefore, Dependence on imports for steel grade limestone to continue…

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Chrome Ore

Figures in million tonnes

	Cr Ore Reserves	Production Ore	Production Fe Cr
World	11068	18	6
India	115	3.2	0.6

- Ferro-Chrome industry in India is highly fragmented
- >98% Chrome ore reserves in Orissa.
- Chrome ore tons expected to ~ 10 mt by 2020.
- High conversion cost to Ferro Chrome due to high power cost

Globally competitive power tariffs to avoid shift to countries where power is cheaper.

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Manganese

Figures in million tonnes

	Mn Ore/Reserves	Production Ore	Production FeMn, SiMn
World	5000	29	10.5
India	406	1.4	0.71

- International market for Mn alloys have dipped in recent years
- Manganese ore tons expected to grow to 4.5 mt by 2020
- The usage of Mn alloys for steel making is limited by
  - Low Mn content and high phos in Mn Ores
  - High power cost for conversion

Therefore ….

- ***Need to explore and develop more high grade Mn resources***
- ***Beneficiation to improve the lower grade coupled with sintering***

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Source: Mineral Commodities Summary: 2002, IBM

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Evolution of India's Regulatory Environment

1950 ~ 1991 – Tightly regulated industry

- Iron ore reserved for Public Sector Companies
- Growth subjected to "Industries (Development & Regulation) Act 1951"
- Pricing regulated by "JPC Price Mechanism"
- Distribution subjected to controls such as "Freight Equalization Scheme"
- Foreign Investment discouraged
- Foreign trade regulated by Canalization policy

An Industry insulated from Market forces

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Evolution of India's Regulatory Environment…

1991 onwards : Economic Liberalisation

- Steel Sector opened to private participation
- Included in list of "High Priority" industries
- Up to 100% FDI allowed in prospecting & mining Iron ore
- No separate approval for prospecting and mining necessary
- Decanalisation of low grade Iron Ore (Fe<64%) trade.
- Decanalisation of high grade Iron Ore (Fe>64%) - Export License given for limited quantity and time .

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Challenges & Policies for meeting growth demand

Challenges

- Fragmented capacities
- Unscientific operations
- Inadequate power & transport infrastructure
- Delay in grant / renewal of mineral leases

Policy Reforms under consideration

- o Minimum production levels for lease grant
- o Scientific Mining and Mineral Beneficiation
- o Lease grant solely on the basis of technical & financial capability
- o FDI & private sector participation for infrastructure development
- o Time bound grant/renewal process

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Challenges & Policies for meeting the growth demand

Challenges

- Long drawn process for land/forest/ environmental clearance
- Socio/political pressures
- Limited iron ore / coking coal reserves

Policies reforms under consideration

- o Creation of land bank / private sector participation in afforestation
- o Social / Environment cost to be seen in Long Term perspective
- o Transparent implementation of the laws
- o Technology / private participation for detailed exploration
- o Large area prospecting license
- o Linking iron ore resources to integrated and other steel plants
- o De-nationalization of coal mines
- o De-reserving areas for private sector for a level playing field

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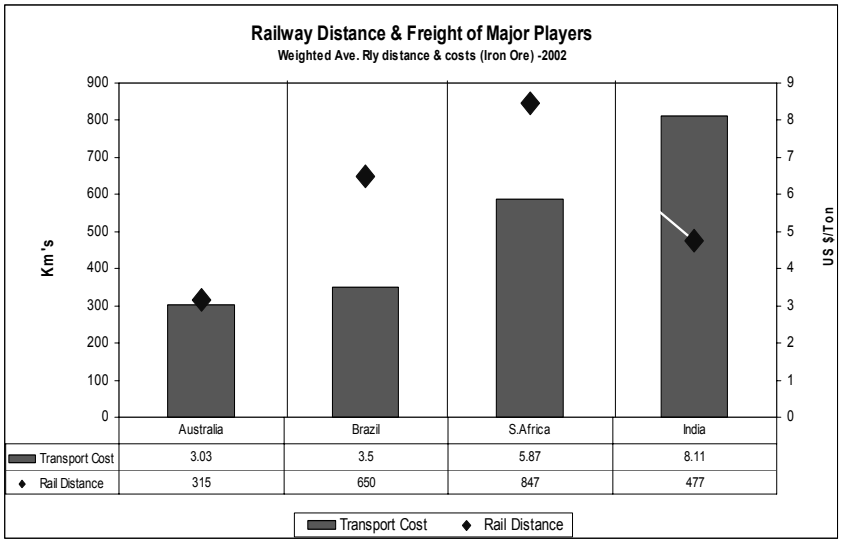
Rail Freight in India are high



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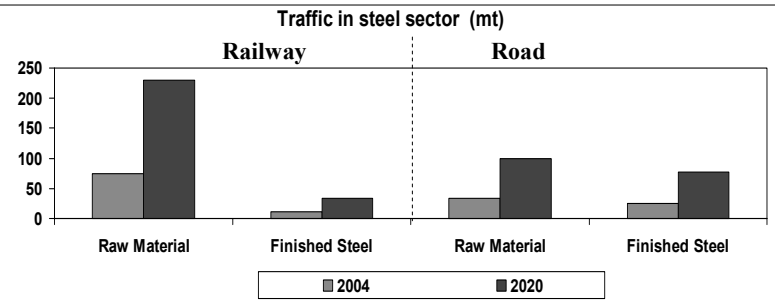
Inland Transportation of Raw Material



Inland transportation:

– Infrastructure being beefed up for the incremental volumes

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Source: Economic Survey, 2003-04.

Railways – The challenges

Challenges

- Tariff & Capacity out of sync with a high growth environment
- Operational efficiencies.
- Costlier longer hauls
- Lower bulk movement per haul

Initiatives …

- Expansion of facilities
- Development of raw material corridor for faster movement of raw materials to ports and consumption points
- Improving services
- Reinforcing existing tracks
- Improvement in freight structure
- Participation of private sector through SPV / own your wagon

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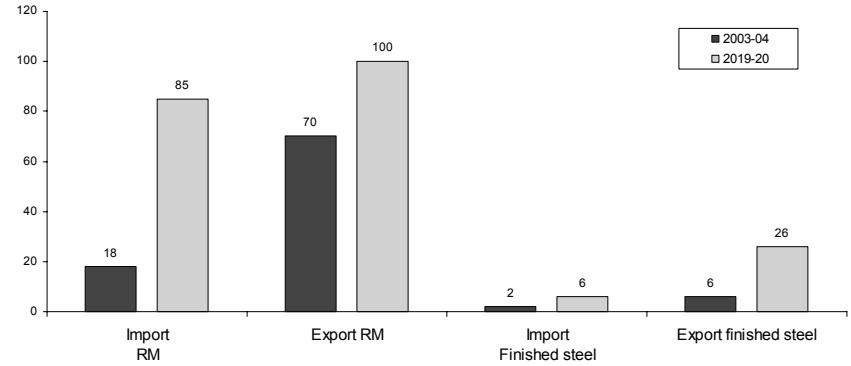
Ports



- The port facilities would also have to be expanded substantially.
- Improving productivity, turn around time, capacity to handle larger vessels and other operational parameters of efficiency are critical.
- Private sector participation in ports increasing
- Feeder balance (mainly railways) is a key issue

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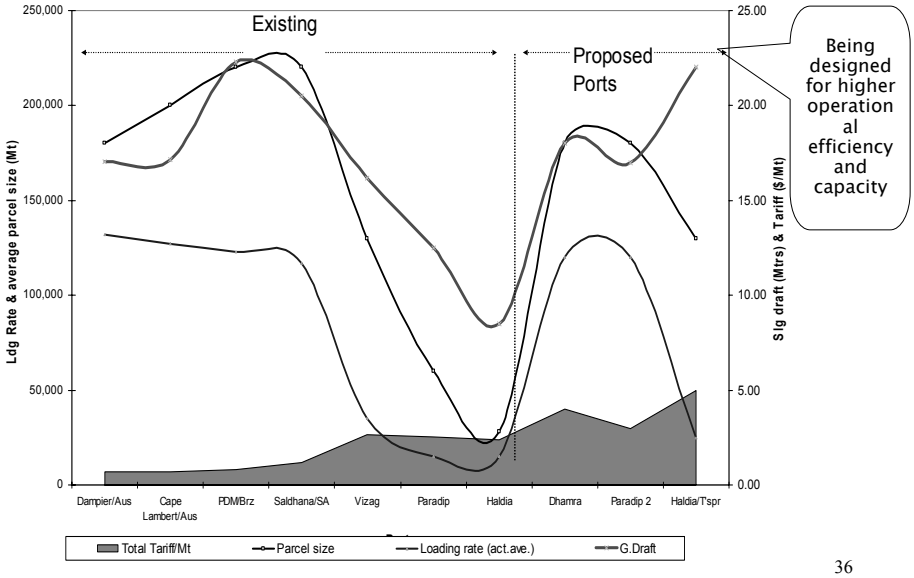
Port facilities comparison



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India – A Land Of Opportunities

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