Organisation de Coopération et de Développement Economiques
Organisation for Economic Co-operation and Development

23-Mar-2006

English - Or. English

DIRECTORATE FOR SCIENCE, TECHNOLOGY AND INDUSTRY
STEEL COMMITTEE

DSTI/SU/SC(2006)8
Unclassified

INDIA

STEEL-MAKING RAW MATERIALS, INDUSTRY ISSUES AND REGULATORY POLICY

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

This document by Parijat Consulting (India) is submitted for information and discussion to participants to the joint India/OECD/IISI Workshop.

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JT03206290

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STEEL-MAKING RAW MATERIALS, INDUSTRY ISSUES AND REGULATORY POLICY

1. This report seeks to articulate a broad framework for the primary inputs industry to the steel industry with regards consumption, supply and production with specific emphasis on the Indian scenario. We have also briefly examined the impact of global trends to contextualize the changing paradigm of the Indian Industry. Finally we have detailed the contribution of primary steel inputs to domestic industry as well as global exports.

1. INDUSTRY STRUCTURE

2. India is nation well endowed with high-quality iron ore reserves. The country's coking coal reserves, however, although abundant, are very high in ash content, which tempers the country's iron ore advantage. Consequently, Indian producers need to blend domestic coking coal with imported coking coal.

3. Whilst we do not expect iron ore requirements to be a constraint on production, we believe incremental steel production will have to be increasingly reliant on imported coking coal. India has three blast furnace producers, which produce close to 42% of the total steel produced in India. The balance is produced by the electric arc furnace, induction furnace and the Corex (5%) routes.

4. Among the blast furnaces, Tata Steel is the only producer with captive access to both iron ore and coking coal. Steel Authority of India (SAIL) has captive access to iron ore but does not have sufficient coal reserves, which means it has to rely on the government-owned Coal India Ltd (whose reserves are inferior to Tata Steel's) and imports. The third producer, Rashtriya Ispat Nigam Ltd (RINL), also a government company, has captive access to neither coking coal nor iron ore. Jindal Vijaynagar (JVSL) is India's only Corex steel producer and India's second lowest cost steel producer after Tisco.

2. IRON ORE

2.1 Introduction

5. **India is also one of the largest exporters of iron-ore in the world**. Iron ore in India is currently serving the dual purpose of feeding the domestic steel industry as well as meeting the demands of the export market. It is therefore functioning both as a resource industry and a feeder industry where the captive mines of the steel plants operate as the feeder sources.

6. The region consisting of Jharkhand, Orissa and Chattigarh states produces about 56% of the country's iron ore. Consequently all major domestic steel plants are located in this region. The region consisting of Karnataka and Goa produces 42% of total iron ore production which is basically exported. This is essentially because except the Jindal steel plant in Karnataka, there are no major steel plants in this region. Historically, these two states and the Bailadilla mines in Chattisgarh have built up the export market for Indian iron ore.

7. The steel industry has not grown as much as was expected in India, because the supporting sectors like construction, infrastructure, manufacturing etc. have not grown as robustly as in needed. It will not be out of context to mention here that steel production growth in many countries like USA, Japan and now China was fuelled by an increase in domestic demand and not in the export market.

8. A healthy domestic demand is always a vital requirement for the success of any indigenous steel industry. That is precisely why the major iron-ore producing countries like Australia, Brazil and South Africa who are mainly exporters of major raw materials of steel are not into steel production in a big way.

9. It follows then that the iron ore industry in India is at present in a very fragile stage. There is an established export market and a steel industry, which is till waiting to be counted amongst the ranks of major steel producers in the world.

2.2 Global scenario

10. As far as global steel production is concerned, China has become the dominant source in the world at present. From a production of 89.538 million tonnes in the year 1993, China's crude steel production has gone up substantially to hit 261.5 million in 2004, a high Compound Annual Growth Rate (CAGR) of 8.6%.

11. As compared to this phenomenal growth in China's steel production, the growth in the overall world crude steel production has been modest with a CAGR of a 2.9%. In 1992 China produced 76 million tonnes of pig iron, surpassing Japan, the world wide leader in the industry. In 2003, China produced more than 200 million tonnes of pig iron; Production figures show an average growth rate of more than 9% per year from 1992 through 2003.

12. This unprecedented growth in China's steel production has fuelled a high iron ore demand growth. China's astonishing growth meant that large conglomerates located in Brazil and Australia, continued to invest large sums of money to increase production to meet Chinese demands.

World's Largest Iron Ore Producers, 2005

Company	Base	Capacity mt/yr
CVRD	Brazil	299.3
Rio Tinto	UK	173.0
BHP Billiton	Australia	144.1
Privat Intertrading	Ukraine	45.8
IUD - Donbass	Ukraine	38.4
Anshan I&S Works	China	36.8
Anglo American	South Africa	32.4
LKAB	Sweden	28.9
Mittal Steel	Various	27.9
CVG	Venezuela	26.9
Cleveland-Cliffs	USA	26.5
Total capacity		**1 403.7**

Source: Parijat Consulting.

- **Global iron ore resources**

13. Iron ore reserves in the world are about 160 billion tonnes at present. The reserve base is still higher at 370 billion tonnes. In fact, world resources are estimated to exceed 800 billion tonnes of iron ore. Over 80% of the world reserves are located in ten countries: Ukraine, Russia, and China, Brazil, Australia, India, Canada, South Africa, USA and Sweden.

Countries	Reserve	Reserve base
United states	6900	15000
Australia	18000	40000
Brazil	21000	6200
China	21000	46000
India	6600	9800
Russia	25000	56000
Ukraine	30000	68000
South Africa	1000	2300
Sweden	3500	7800
Sub-total	133000	306900
% of total	83	83
Other countries	30500	70900
Total	**160000**	**370000**

Source: Parijat Consulting

- **Global ore production**

14. Of the total world iron ore production of about 1 250 million tonnes, the above mentioned ten countries together with a production of 1 138 million tonnes have had a high share of 91%. Brazil, China and Australia continue to be the leading iron ore producers in the world.

15. However, the Chinese ore is of a low grade and hence, even though it produced about 280 million tonnes in the year 2004, China has to import high quantities of iron ore for blending with its low grade ore.

Country	2002	2003	2004
Australia	181 553	182 704	187 219
Brazil	210 000	212 000	212 000
China	220 000	231 000	261 000
Canada	26 981	30 969	31 000
India	79 200	94 300	105 500
Russia	82 500	84 236	91 760
South Africa	34 757	36 484	38 086
Sweden	19 486	20 300	21 500
Ukraine	54 650	58 900	62 498
United states	46 192	51 570	46 447
Sub-total	955 319	1 002 463	1 057 010
% of total	91	91	91
Grand total	**1 050 568**	**1 100 089**	**1 163 700**

Source: Parijat consulting

2.3 Indian iron ore outlook

2.3.1 Resources

16. The Indian resources of iron ore have been made compatible with United Nations framework classification (UNFC), which is more scientific and adopted in most countries of the world. Iron ore reserves and resources estimated on the UNFC basis as on 1.4.2000 are about 12 906 million tonnes of hematite ore and about 10 628 million tonnes of magnetite ores.

17. For the first time, IBM has given the lumps and fines break up of the hematite iron ore reserves. There are four types of classification, lumps, fines, and lumps and fines and others. Others include clue dust etc. about 42% of total reserves are lumps-5 403 million tonnes, that fines about 34% - 4 326 million tonnes and lumps and fines together constitutes 10% of the total reserves-1 287 million tonnes, and 11 are the prospective resources. The residual 3% are blue dust etc. 11% of the total reserves are of high grade. Major chunk of the reserves or around 45% are or medium grade qualities (22% lumps + 20% fines + 3% lumps and fines). This grade of the ore, particularly the fines, is the feed for the Indian iron ore export market.

18. Of the total hematite iron ore reserves, 94% are situated in five states – Orissa 3 780 million tonnes, Jharkhand 2 120 million tonnes, Karnataka 1 148 million tonnes and Goa 642 million tonnes.

19. Besides these hematite ore reserves, India also has a substantial magnetite reserve base. Of the total 1 068 million tonnes of magnetite reserves, Karnataka with a reserve of 7 883 million tonnes has a major chunk of about 74% magnetite iron ore reserves of the country.

20. Even after producing 1 126 million tonnes during two-decade period, 1980 to 2000, the iron resource base in the country has increased by 4 898 million tonnes in these two decades because of fresh exploration.

21. Another point that should be noted is that the hematite resource is estimated at 55% Fe cut off. It is, therefore, evident that as and when the mining activity intensifies, concomitantly, exploration will also increase leading to the discovery of more resources. The resource position will increase further if the cut-off is brought down to 45% Fe. With the modern technology it should be possible to utilise iron ore of 45% Fe and above.

Iron ore (hematite) reserves in India

GRADE	Total resources 000 tonnes	% to total hematite
A. Lumps		
High grade	915 276	7
Medium grade	2 822 917	22
Low grade	1 131 915	9
Unspecified grade	533 225	4
Sub total A	5 403 333	42
B Fines		
High grade	139 221	1
Medium grade	2 506 868	20
Low grade	1 325 515	10
Unspecified grade	354 187	3
Sub total B	4 325 791	34
C. Lumps & fines		
High grade	409 095	3
Medium grade	421 225	3
Low grade	331 754	3
Unspecified grade	116 650	1
Sub total C	1 278 724	10
D. Prospective resources	1 480 005	11
E.others	417 940	3
Total Hematite (A+B+C+D)	12 905 793	
Magnetite ore	10 682 207	
Grand total	**23 588 000**	

Source: JPC.

Iron ore production: product-wise Quantity:' 000 tonnes

Grade	2000-2001	2001-2002	2002- 2003	2003-2004	2004-2005
Lumps	33 567	34 572	39 581	48 960	57 590
Fines	41 189	45 224	52 994	67 679	79 976
Concent rates	6 006	6 430	6 497	6 199	5 147
Total	**80 762**	**86 226**	**99 072**	**120 601**	**142 711**
% Growth		7	15	21	18

Source: JPC.

2.3.2 Iron ore production in India

22. Iron ore production in the country has been increasing steadily from 2000/1 onwards and has shown a better growth from 2002/3 onwards. The increase in the production of iron ore was export driven and came from existing mines which were either closed (as Chitradurga – Tumkur region in Karnataka and Reddi area in Maharashtra) or were not operating at their full capacity (as Orissa/Jharkhand and Bellary-Hopset in Karnataka).

23. **It should also be noted in this context that no green field iron ore project has been opened in the previous two decades.** 60% of the production comes in the form of fines (including concent rates) during the course of mining operations itself. A further 10/12% lump becomes fines while handling, loading/unloading and while converting them into calibrated lumps ore (CLO) for sponge/pig iron plants/exports. On an average 2.5% of the tonnes of run of mines are required to get 1 tone of CLO.

24. Production of iron ore in private sector mines increased by 31% whereas in public sector, it decreased by about 1%. Further, in captive mines, the production increased by about 5%, reflecting the slow growth in the steel industry whereas non-captive mines contributed an increase of about 21%. This is clearly demonstrates that increase in iron ore production during these years is basically export driven and where there are no avenues for domestic consumption at present. It also reflects that non-captive mines have latent production capacity.

25. On the other hand, steel plants are not able to utilise production of iron ore in their sinter or pellet plants (in some cases, pellet plants are closed) and sell their surplus production either in domestic markets or export.

26. Hence, about 70/75% of the total production, of the country's iron ore is fines either at the times of mining or handling of ore. In addition, there is already a stockpile of about 40/45 million tonnes of fines in Indian Iron and Steel Company (IISCO) and SAIL mines, which is creating environmental hazards.

27. **Essentially, there are two regions which produce iron ore: *(a)* central and eastern India comprising Chhattisgarh, Jharkhand and Orissa and *(b)* south western India comprising Karnataka and Goa.**

28. **Region (a)** Chhattisgarh, Jharkhand and Orissa together produced 69.33 million tonnes or 56.44% and 79.77 million tonnes or 55.90% of the total production of iron ore in India in 2003/4 and 2004/5 respectively.

29. This is the region where all the integrated steel plants in public or private sectors are situated who draws all their requirements of iron ore from their respective captive mines. The New Delhi Municipal Corporation (NDMC) looks after iron ore requirements of RINL. Gas-based sponge iron plants also draw their maximum requirements from NDMC and source some quality from non-captive mines in eastern and Bellary - hospet (Karnataka) sectors.

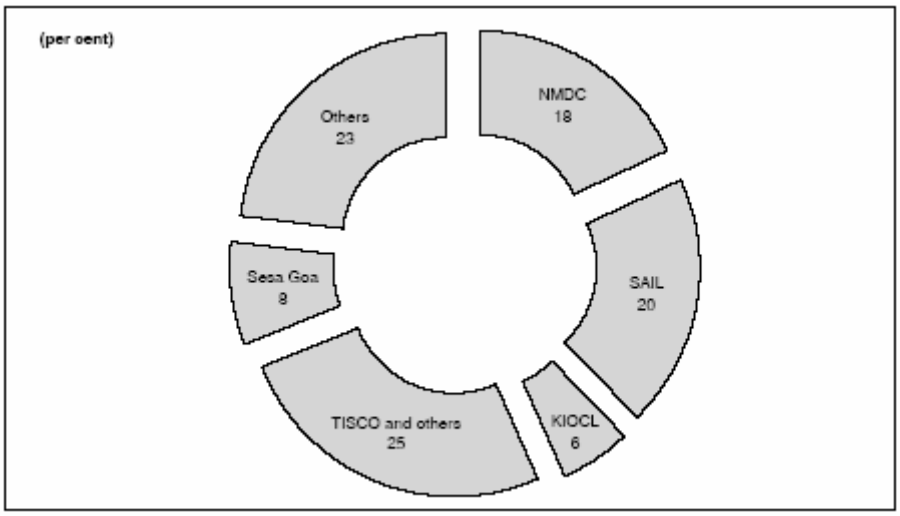
30. **Region (b)** comprising of Karnataka and Goa contributed 51.88 million tonnes or 42.23% of the country's total iron ore production of 122.84 million tonnes in 2003/4. In 2004/5, this was 59.48 million tonnes or 41.68% of the total production 142.71 million tonnes in the country.

State & distribution iron ore mines

	No of mines
India	215
Public sector	3
Private sector	178
Andhra pradesh	3
Chattisgarh	9
Goa	47
Jharkhand	15
Karnataka	57
Madhya pradesh	6
Maharashtra	4
Orissa	77
Rajasthan	1

Source: Parijat Consulting.

Indian iron ore: mining capacity



Source: CRIS INFAC

Production of iron ore

States	2001-2002	2002-2003	2003-2004	2004-2005
Andhra pradesh	390	680	741	860
Chattisgarh	18 412	19 428	22 010	25 520
Goa	13 810	17 455	19 775	22 925
Jarkhand	13 215	13 648	15 485	17 954
Karnataka	22 130	23 980	27 165	31 495
Maharashtra	22	38	48	55
Orissa	16 410	21 460	24 300	28 175
Rajasthan	6	14	15	16
Total	**84 395**	**96 703**	**109 539**	**127 000**

Source: JPC.

2.3.3 Domestic consumption of iron ore

31. Since iron ore is the major input in steel production, the domestic consumption of iron ore naturally depends on the steel industry in the country and its growth. The steel industry has been observing a modest growth in demand and hence production seems to be poised for a high growth in the coming years.

32. There has been a spate of MoUs between the steel producers and Orissa and Jharkhand states. The national steel policy 2005 has indicated the steel production will reach 110 million tonnes by 2019/20 at a CAGR of 6.3%.

33. With this anticipated growth in the steel production and the clamour for assured supply of iron ore in the form of captive mines, the region ore industry is currently at a delicate balance in the country.

34. In 2004/5, India is reported to have produced 34.821 million tonnes of crude steel (both by primary and secondary producers), a marginal increase of 1.63% over 2003/4 production of 34.821 million tonnes.

35. Alloy steel plant however use only sponge iron, scrap and hot-bracketed iron and Ferro alloys for production. Similarly IF units use only scrap. These units, therefore, do not use any iron ore directly.

36. For the balance, using thumb-rule 1.6 tonnes of iron ore consumed per tone of crude steel. Iron ore consumption by the steel industry was 44.97 million tonnes of iron ore against a total ore production of 122.4 million tonnes in 2003/4, 3% and 45.49 million tone against production of 142.71 million tonnes of iron ore in 2004/5 or about 31%.

37. One interesting factor emerges that the contribution of captive mines to the domestic consumption has in fact reduced marginally in 2004/5.

Steel	**2000-2001**		**2001-2002**		**2002-2003**	
Producers	Steel production	Iron ore consumption	Steel production	Iron ore consumption	Steel production	Iron ore consumption
A. Units with captive units	14319	22911	14677	23483	15617	24988
B. With non-captive units	2935	4514	3085	4784	3365	5210
C. secondary						
EAF Producers	5372	8595	5904	9446	6711	10738
D. If units (only scrap users)	4331		4298		4750	
Total	**26957**		**27964**		**30443**	
Iron ore						
A. Captive source		22911		23483		24988
Captive-captive source		13109		14230		15948
Total		**36020**		**37713**		**40936**

Steel	**2003-2004**		**2004-2005**	
Producers	Steel production	Iron ore consumption	Steel production	Iron ore consumption
A. Units with captive units	16468	26349	16413	26261
B. With non-captive units	3544	5445	3602	5523
C. Secondary				
EAF Producers	8238	13181	8568	13709
D. If units (only scrap users)	5998		6238	
Total	**34248**		**34821**	
Iron ore				
A Captive source		26349		26261
B. Non-captive source		18626		19232
Total		**44975**		**45493**

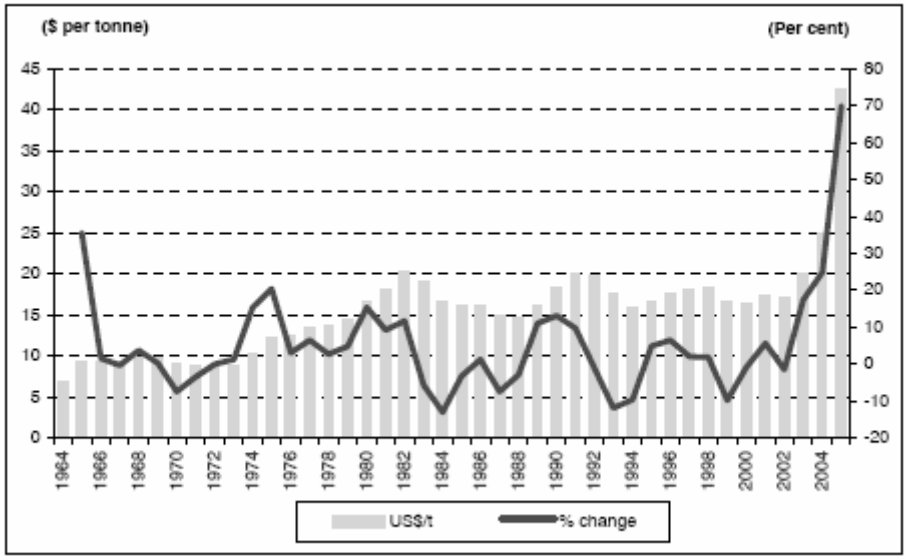
Source: JPC.

2.3.4 Iron ore prices

Iron ore price peaked in 2004/5

38. Whilst India is self-sufficient in iron ore, international prices do influence domestic prices. The international contracted prices for 2005 witnessed a 71% jump, driven by increased demand for iron ore and firm steel prices. The contracted prices of iron jumped to USD 43 per tonne from USD 25 prevailing in 2004.

Unprecedented price rise Figure 20



Source: CRIS INFAC & Industry

39. In the domestic market, the government-owned NMDC determines the contract prices. NMDC was late in reacting to the firm international prices and for the most part of 2004/05, the contracted price stood at Rs 865 per tonne. In April 2005, NMDC increased the domestic contracted price to Rs 1 450 per tonne to align with international markets. Player like Tata and SAIL are insulated from these price hikes as they have their own captive mines.

40. Some players, such as Jindal Steel and Power Ltd. (JSPL) exported iron ore from their captive mines to China to take advantage of high iron ore spot prices and purchased the shortfall for their own consumption from the domestic market.

2.3.5 Exports – exportable surplus

41. Exports play a major balancing act between the regional availability of ore and regional domestic requirement. The increase in exports of iron ore has not affected the Indian steel industry. In fact, India exports iron ore fines essentially from the states where there is no local demand.

42. The current international trade in iron ore appears completely China driven. Chinese demand for iron has substantially increased as a consequence of an unprecedented increase in its steel demand and hence it's steel production.

43. While the overall iron ore imports have registered an increase of 15% in 2004 over the 2003 import level (575-660 million tonnes) Chinese imports have registered a high of 40% (from 14 to 208 million tonnes). This high demand for iron ore in China has benefited the Indian iron ore industry as well. During the year 2004/5, India has exported 78.24 million tonnes and increase of about 25% over 62.57 million tonnes exported in 2003/2004.

India iron ore export - lumps/ fines

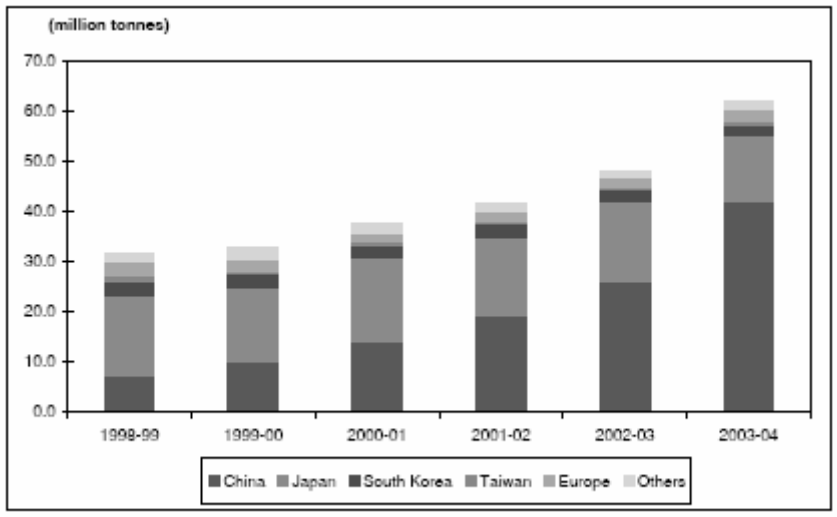
	2002-2003			2003-2004			2004-2005		
	Fines	Lumps	Total	Fines	Lumps	Total	Fines	Lumps	Total
Quantity (in million tonnes)	35.72	12.3	48.02	49.12	13.45	62.57	60	13.54	78.14
Percentage to the total exports	74.39	25.61	100	78.5	21.5	100	82.67	17.33	100

Source: JPC.

44. Present demand for iron ore fines comes from small Chinese steel mills and is on spot basis and hence cyclical. All the big steel plants in China, Japan and South Korea have long-term contracts with Australia, Brazil, India and South Africa for iron ore supplies. They negotiate prices each year.

45. It is the spot demand where prices are fixed based on spot demand and supply gap at a particular point of time. The spot prices, which are highly volatile, cannot be taken as standard prices.

India's iron ore exports Figure 22

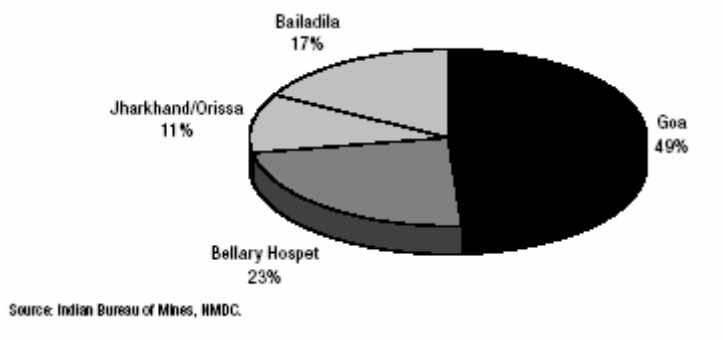


Source: CRIS INFAC & Industry

Exports dominated by ores from Goa and Bellary Hospet

46. Given the existence of an inland river network (which is more economical) connected to the port, Goa has emerged as a dominant iron ore exporter in India. Last year Goa exported almost its entire production; exports from Goa constituted 49% of India's total exports. The Bellary Hospet region is the other large exporter of Indian iron ore, accounting for 23% of total exports.

India Iron Ore Exports — Regional Breakdown



47. While Eastern India is the largest producer and has access to some of the world's best reserves (Fe content 68%), this region has been serving the requirements of the domestic steel industry — almost 66% of India's steel is produced in Eastern India. Ore exports from Eastern India (Jharkhand and Orissa) constituted about 17% of total exports. With Goa's ore depleting, Eastern India is likely to emerge as a major exporter. Infrastructure could prove a major impediment.

Iron ore exports in India

	Exports (Tonnes Mils.)	% of Exports from Region
Goa	23	49
Bellary Hospet	11	23
Jharkhand/Orissa	5	11
Bailadila	8	17

Source: Indian Bureau of Mines, NMDC.

Future outlook - Exports

48. **The country's existing iron ore mining capacity is about 140 mt per year**. Following discussions with some of the leading producers of iron and steel (and assessing their plans), we estimate that over the next five years there is a possibility of an additional 80-150 mt of additional mining capacity being developed.

International majors keen to explore iron ore opportunities in India

49. India's attractive iron ore deposits have always attracted the attention of global miners and, now, steel producers. The current environment of tight markets and the increasing compulsion to tie up raw material sources has enhanced the attractiveness of India's reserves.

50. Steel companies such as Posco and Arcelor have expressed an interest in sourcing ore from India. However, the state government of Orissa has stipulated that it will grant mining leases only to steel producers (hence no leases granted for iron ore production for sale) and that leases will be transferred only after 50% of a project has been completed. We understand foreign majors have been lobbying hard for a modification to this clause.

Iron ore production, consumption, exports and surpluses

Quantity in million tonnes

Year	Production	Domestic consumption	Exports	Total	Surplus	Cumulative total
2000-2001	80.76	36.02	37.27	73.29	7.47	7.47
2001-2002	86.23	37.71	41.64	79.35	6.88	14.35
2002-2003	99.07	40.94	48.02	88.96	10.11	24.46
2003-2004	122.84	44.97	62.57	107.54	15.3	39.76
2004-2005	142.71	45.49	78.14	123.33	19.08	58.84

Source: Parijat Consulting.

Conclusion

51. As evident, the Domestic ore industry is driven by the Economic realisation aspect as a principle Decision variable for output rather than exhibit a preference for either the local or overseas market.

52. If the industry can get similar realisations domestically, as it would get in export market, then it will sell in domestic market rather than export. This is in keeping with current trends in global trade.

53. It should be mentioned in this context that the domestic prices of steel and other major non-ferrous metals in India are presently governed by the international prices. Hence, if a finished product's price can be based on international price levels, the output price can also be regulated by the same basis.

3. COKING COAL

54. Coal has been recognised as the most important source of energy for electricity generation in India. About 70% coal output in the country is consumed by power sector. In addition, other industries like steel, cement, fertilizer, chemical, paper and thousands of medium and small-scale industries are also dependent on coal for their process and energy requirements.

55. Coke being one of the main inputs in steel making through the blast furnace method (as a reluctant) it is also a source of fuel. India does not have enough coke making capacities and consequently depends on imports.

3.1 Reserves

56. The proven reserves of prime coking coal are only 4.6 billion tonnes. The quality of Indian coking coal is also not suitable for steel. The production of coal during 2001/2 was 328 mt, out of which coking coal amounted to only 29 mt. The low ash coking coal required by steel makers was around 10 mt in 2001/2. Coking coal production has declined at an annual rate of 4.7 percent during the decade ending 2001/2.

57. Poor quality domestic prime coking coal has to be blended with imported coal. Currently the steel industry imports around 19 mt of coking coal annually, and procures 7.5 mt from indigenous sources including captive mines. By 2019/20, about 70 mt of coking coal will be required, of which 85% will have to be imported.

58. It is Imperative therefore to secure coking coal supply by tapping new sources. Accordingly, the Government should encourage the coal sector to become market-driven. While in the meantime continuing to allocate captive coking coal blocks to steel plants and establishing mechanisms to share their surplus resource with other steel plants.

59. The Government should encourage joint ventures and equity participation abroad by steel and coal companies. Simultaneously, efforts should be made to develop and adapt technologies, which have a synergy with the natural resource base (non-coking coal) of the country. The steel industry should be encouraged to make investments in washing and beneficiation of coal.

60. Non-*Coking Coal:* With proven reserves of 74 billion tonnes, non-coking coal constitutes around 82% of the total coal reserves in India. Production of non-coking coal at 294 mt during 2001/2 was 91% of the total coal production of 328 mt. In 2004/5, the steel sector consumed about 8 mt of non-coking coal, excluding thermal coal for captive power plants.

61. *Sponge iron grade non-coking coal:* The sponge iron industry using non-coking coal, as input material will play an important role in the future as a substitute input for coke. The capacity of sponge iron industry would increase from the current 13 mt to 20 mt by the end of 2010/11, at a growth rate of 6.5% per annum and thereafter till 2020, grow to 38 mt.

62. The current trend indicates that a large number of sponge iron based steel units may come up in the states of Orissa and Jharkhand. By 2019/20 the steel industry will demand around 26 mt of non-coking coal of a higher grade.

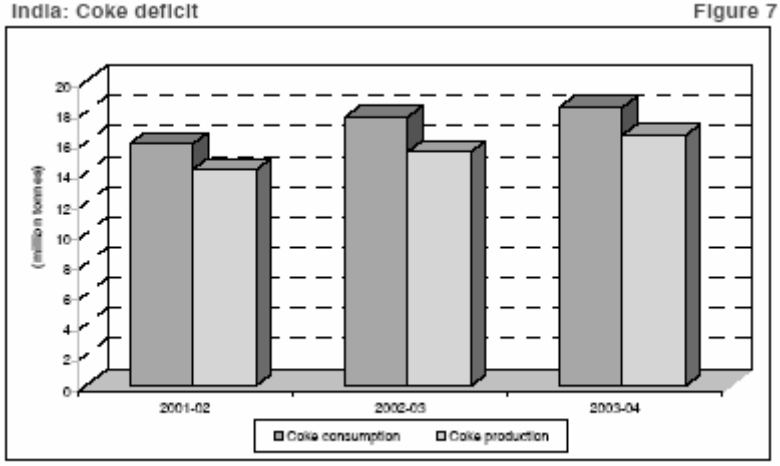
63. Available data shows a declining growth rate for the production of non-coking coal in India. In the decade of 1980s, the growth rate was 6.5%, which fell to 3.9% in the 1990s. In the last five years the growth rate has been 4.7%. The power plants are, therefore, planning to import large quantities of thermal coal. Further, Indian coal is high in ash content, which will force non-coking coal based steel production to also consider imports.

64. While market forces should allocate resources to their most efficient uses, which would require the coal sector to be deregulated, a strategy for the transitional period would be needed. Accordingly, the sponge iron and steel industry should get first priority in the allocation of higher grades of non-coking coal of below 12% ash content, being essential feedstock. Greater flexibilities should be introduced in the form of sale of surplus coal, re-allocation of existing unused linkages with Coal India Limited, and allocation to consortia of small users. Joint ventures of public sector companies with the private sector would be explored in order to finance the required investments.

3.2 Coke deficit in India

65. India's total coke production has grown at a CAGR of around 7.6%, but the Indian industry is still plagued by scarcity of coke.

India: Coke deficit Figure 7

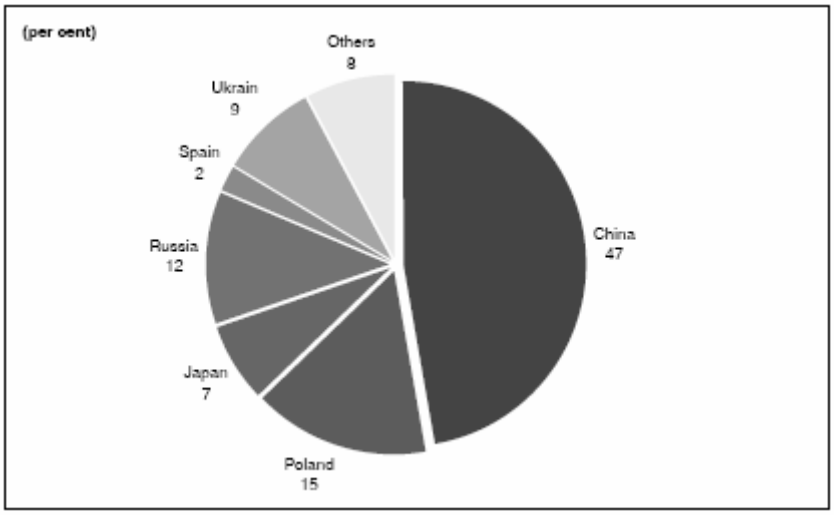


Source: CRIS INFAC

China: maximum share of Indian imports

66. China is the world largest manufacturer and exporter of coke; almost 50% of global coke production takes place there. India imports around 47% of its coke requirements from China.

Coke imports in 2005



67. However, as a result of increasing domestic consumption in China, India's imports from China have been reducing in the last 3 years, with incremental imports from Russia.

68. The shortage of coke was more pronounced in Asia (around 68% of crude steel is produced through the blast furnace route) because of the controlled supply from China (most of the incremental production was consumed domestically).

69. Due to high power costs and easier access to iron ore, the blast furnace route of steel making had reported the highest growth in steel production. Thus, steel production through BF/BOF (blast furnace and basic oxygen) route is increasing at a fast pace, resulting in greater demand for coke.

3.3 Global scenario

China dominates the scene

70. Coke prices surged to unprecedented levels in 2004/5 due to the threat of a global shortage. The consistently high growth of steel production in China has not only created waves in the global steel industry, it has also resulted in scarcity of steel inputs.

71. Here again, Global Coke prices largely depend on the Chinese steel industry, as China is the largest manufacturer and exporter of coke with more than half of global coke supply. The other major exporters of coke are Poland, Japan and Russia.

Prices skyrocketed with growing demand and restricted supply

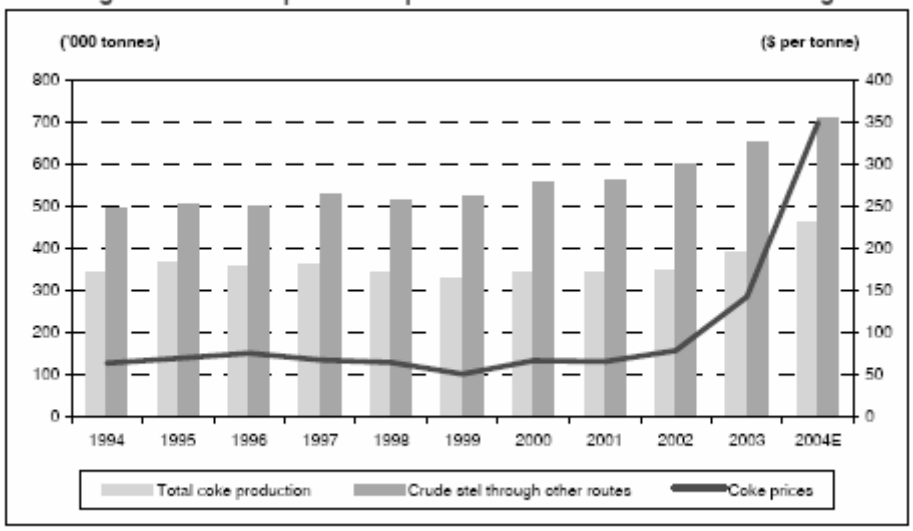
72. As a result of the shortage of coke in Asia and the increasing dependence on the BF/BOF route prices for coke grew at an unprecedented rate.

73. Furthermore, coke supplies remain restricted. The Chinese government has adopted a very conservative approach towards coke exports. It issued export licenses and fixed quotas releasing them for the year on a periodic basis, fuelling speculation in coke markets. China has also reportedly been discouraging the use of "Beehive" Coke ovens, as they are very polluting. Such policies restrict the regional coke production on a small-scale basis. This phenomenon was particularly visible in the Shanxy province of China.

74. A similar approach is being taken in other coke manufacturing countries as well. Thus, the increase in coke production could not keep pace with the increase in crude steel production through the BF/BOF route.

75. As a result, with increased steel production, coke prices experienced an unprecedented rise in 2004.

Growing coke consumption and prices **Figure 10**



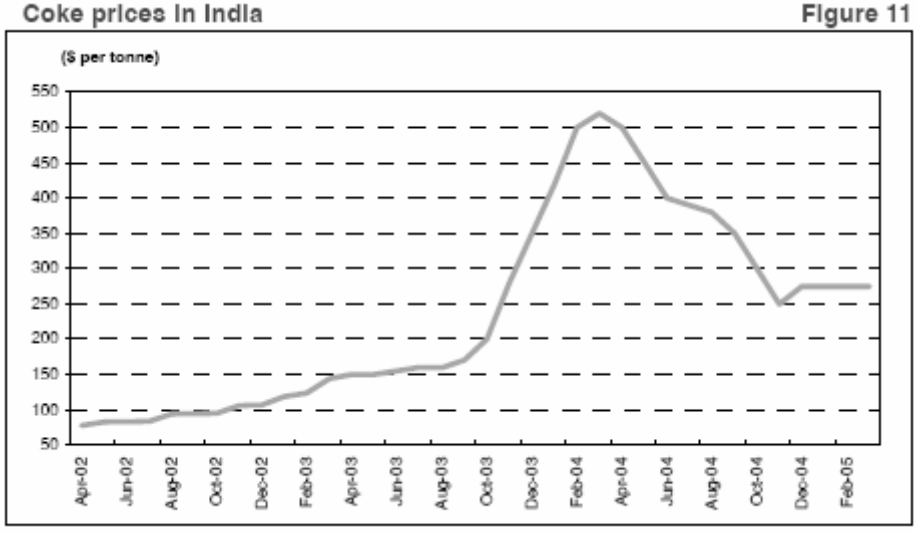
Source: IISI, Re-Net

3.4 Coke prices

76. Coke constitutes a major raw material for pig iron production. Coke prices had touched unprecedented heights of USD 520 during April/May 2004 as compared with UDS 120 per tonne prevailing in March 2003. This rally was driven by an acute shortage of coke, coupled with speculations over China's export quota. China's controlled coke supply led to acute shortage in the Asian region. About 65% of the crude steel production in the Asian region is through the blast furnace route.

77. Consequently, Coke prices in India also shot up, in line with global prices. Although the government reduced the import duty on coke to zero percent, the measure proved to be futile due to rising global prices.

Coke prices in India — Figure 11



Source: CRIS INFAC

78. However, since then coke prices have descended from their peaks, dropping to USD 150-USD 170 per tonne in September 2005. This decline in prices can be attributed to increased supply of coke from China, the biggest exporter, and a slowdown in the demand for steel in the major steel consuming countries and also due to corrections of speculative forces.

Indian dependence on imports continues

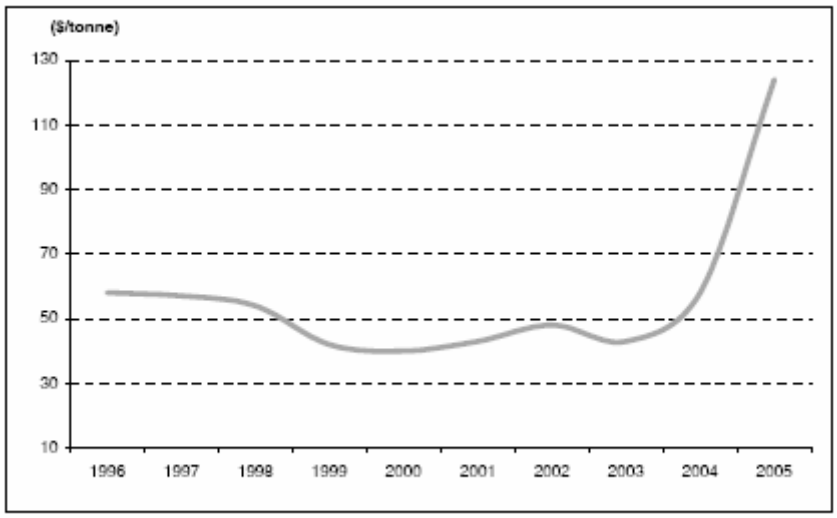
79. India's coke consumption for pig iron players was estimated at 2.50 –2.75 mt in 2004/5, of which India imported about 1.75-2.00 mt. Thus, Indian pig iron players had to import about 70/75% of their requirements, mainly from China.

80. The high prices of coke have woken up Indian manufacturers to the importance of backward integration, and they are now setting up captive coke ovens. This has reduced India's dependence on imported coal to some extent. However, the demand-supply gap will ensure that India would continue to import coke at least in the near future

Coking coal prices move in tandem with coke prices

81. Coking coal is the feedstock for coke. With the increase in the prices of coke, the prices of coking coal too have gone up. The Indian steel industry is heavily dependent upon imports of coking coal, as it is not available in sufficient quantities in India.

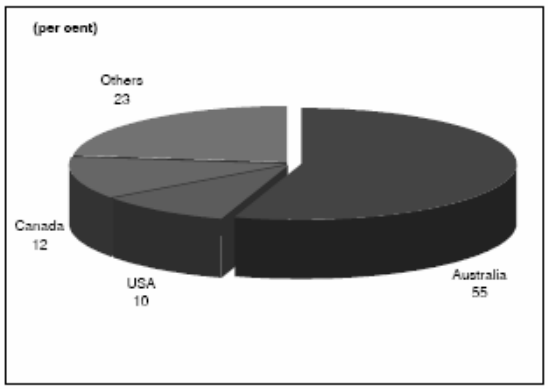
Coking coal prices Figure 27



Source: Industry and CRIS INFAC

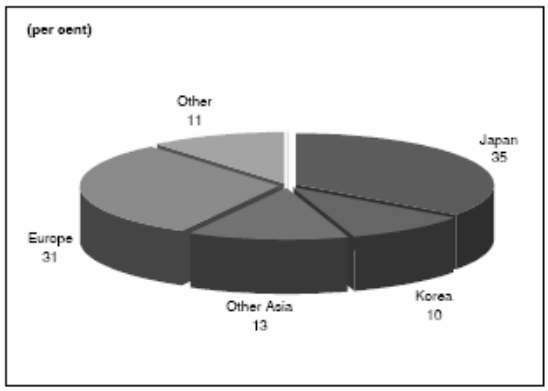
82. Australia is the largest supplier of coking coal, accounting for 55% of the supply, and Japan is the biggest buyer. The sources and destinations of coking coal vary significantly.

Sources of coking coal Figure 28



Source: Industry

Destination Figure 29



Source: Industry

83. **Many Indian pig iron producers import coking coal from Australia**. The government-owned CIL controls the domestic supply of coking coal. Although CIL is planning an expansion of capacity, the expansion is meagre and not likely to meet the incremental domestic demand. Indian coke manufacturers have long-term contracts with Australian mines.

3.5 Foreign collaboration

84. To meet country's growing demand for coal, foreign collaboration with advanced coal producing countries are considered for:

- Bringing in new technologies for both underground and opencast mines. As well for efficient skill management and training in the coal industry.
- Seeking bilateral finds for import of equipment which is not manufactured in the country.
- Seeking foreign financial assistance to meet investment requirement.

85. The latest policy pursed by coal India Ltd. is to encourage technology upgradation through global tenders. Bilateral co-operation, although limited, continues to play an important role for March towards improvement. The global tender's approach has been used to introduce higher productivity in Indian mines.

4. SCRAP

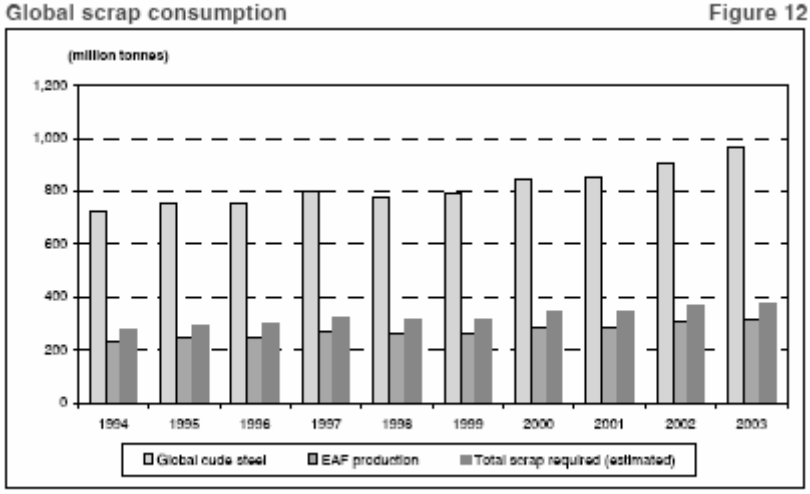
86. With the continued surge in global steel production, global scrap prices will remain steady at high levels. However, scrap availability will be a key concern, as a large chunk of the capacities coming up in the world are through the BF route. Thus, no significant surge is expected in prices due to increased demand. Also, scrap is one of those unique commodities, where supply also increases with the increase in demand.

87. According to industry sources, as scrap prices increase, a lot of scrap lying idle outside the system starts moving, leading to the creation of additional supplies.

88. Scrap is the main input while producing steel through the electric arc furnace (EAF) or induction furnace (IF) route. The EAF route is an efficient route for manufacturing steel in moderate size plants and in regions where scrap supply is abundant and power is cheaply available.

89. Large-scale steel plants generally opt for blast furnace route. Thus, out of the global crude steel production, only 32/33% is manufactured through the EAF route.

Global scrap consumption Figure 12



Source: IISI and CRIS INFAC

Scrap: Less preferred route to steel making in India

90. **In India, the blast furnace route has traditionally been preferred in steel making, since the country has abundant reserves of iron ore and coal.** Shortage and higher cost of electricity has resulted in the share of EAF/IF capacities being lower than BF capacities.

91. The main advantages of setting up an EAF or IF are:

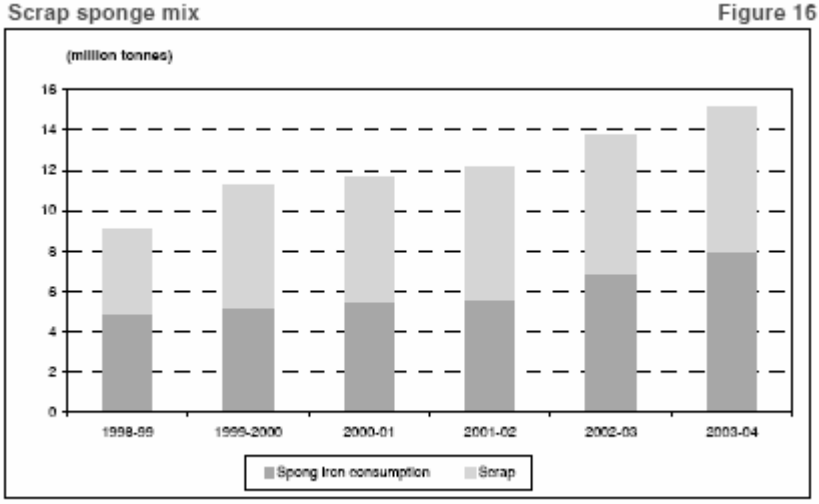
- Lesser capital investment as the minimum economic size of such steel plants is low. According to the Joint Plant Committee (JPC), in India around 11 460 EAF and IF units were operating in 2002/03, contributing only 37.6% of total steel produced.

- Process loss can be minimized to 6/7% of the charge feed as against 8/10% in the blast furnace. However, in the Indian context, this benefit is wiped but because sponge iron substitutes scrap in EAF/Ifs, resulting in a larger process loss of around 12%.

Substitution by sponge iron

92. **Scrap is a scarce commodity as far as the Indian steel industry is concerned**. India does not generate enough high quality scrap, and has to import it primarily from western countries. As a result, Indian steel makers substitute sponge iron (DRI) for scrap (generally in the ratio of 1:1).

Scrap sponge mix Figure 16



Source: SIMA and CRIS INFAC

Global scrap prices to remain around $250 per tonne

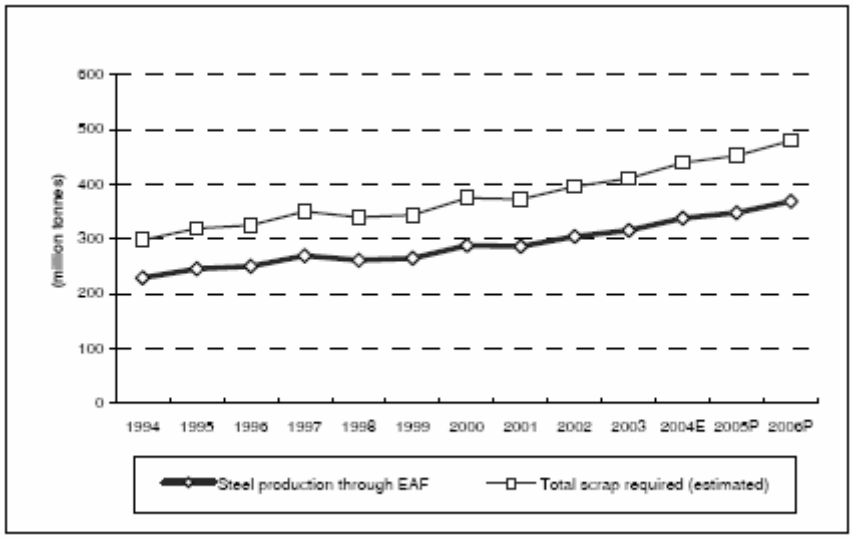
93. The average price of scrap will we believe remain around USD 250 per tonne in 2005/06, at the same level as in 2004/05. As most of the upcoming steel capacities are through the BOF route, the incremental demand for scrap is not likely to be very high. Thus, we expect the scrap demand-supply situation to remain at the current levels.

94. In the Indian context, the domestic price of scrap depends upon its import price *i.e.*, the landed cost of scrap. India's dependence on scrap imports is not likely to change. Thus, for domestic players, scrap prices will remain in the range of Rs 13 000-15 500 per tonne.

Global scrap fundamentals seen steady

95. Almost all of the new upcoming steel flat capacities are through the BOF route. The share of the EAF (scrap-based) route will decline in 2005 and 2006. Thus, the consumption of scrap is not likely to grow significantly. In 2004, global scrap demand was estimated to be 420-450 million tonnes. Incremental demand for scrap in 2005 is likely to be 12-15 million tonnes.

Global scrap consumption Figure 1



Source: CRIS INFAC

96. We expect that there will be sufficient scrap supply to cater to the growing demand. Scrap as mentioned before is one of those unique commodities, where supply increases with increase in demand. Furthermore idle scrap is also likely to enter the system with an increase in demand.

97. Additional shipping capacities are likely to come in stream in the later part of 2005. When that happens, the number of scrapped ships will also return to the usual levels. (Number of ships scrapped was the lowest in 2004 due to boom in shipping industry). This will also result in higher scrap supply.

98. As a result, scrap prices will remain in the same range in 2005 as in 2004.

Domestic prices to hinge upon global prices

99. Domestic scrap prices to hinge on global prices, as India's dependence on imported scrap are not likely to come down. Across the globe, the main source of scrap is junked automobiles. Due to various socio-economic reasons, such practices are not prevalent in India.

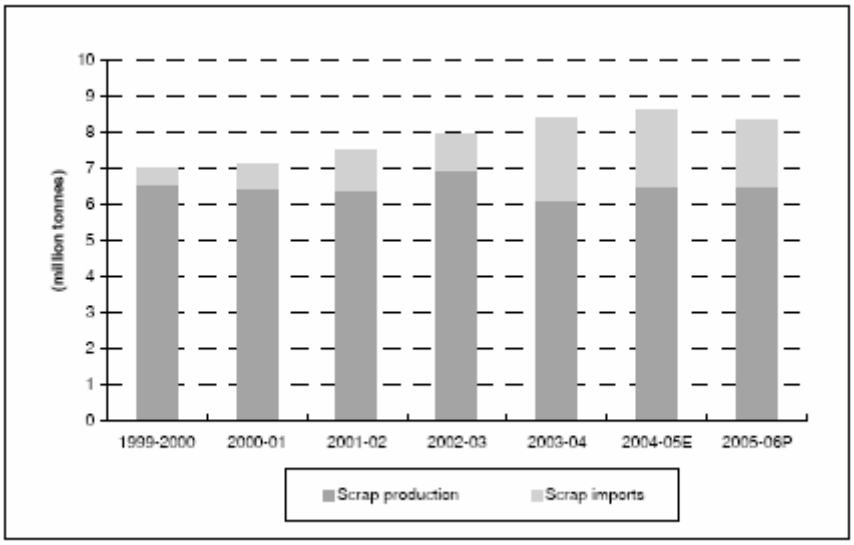
100. As a result, India has an inherent limitation in scrap generation. Out of the 8 million tonnes of scrap required, only 6 million tonnes are generated in India (35% of which comes from ship-breaking). Thus, for Indian scrap consumers, scrap prices are driven by the landed cost, which is likely to remain at Rs 13 000-15 000 per tonne.

101. In India, the share of steel generated through the EAF route is close to 37.5%. Applying the same rate in 2005/06, the steel produced through the EAF route is estimated to be 15 million tonnes, resulting in metallic consumption of 19-20 million tonnes (assuming an input-output norm of 1.3 times).

102. Out of this amount, sponge iron consumption is expected to be 11/12 million tonnes in 2005/6; thus, the balancing metallic requirement of 8-9 million tonnes will be met through scrap. The share of sponge iron in the total metallic feed of EAF is expected to increase.

103. India's scrap generation per year is in the range of 6-6.5 million tonnes. Assuming that the level of scrap generated remains the same in 2005/6, India will have to import 1.5-2.5 million tonnes of scrap. Thus, India's dependence on scrap remains at the current levels.

Increasing scrap imports Figure 2



Source: CRIS INFAC

4.1 Ship breaking in India

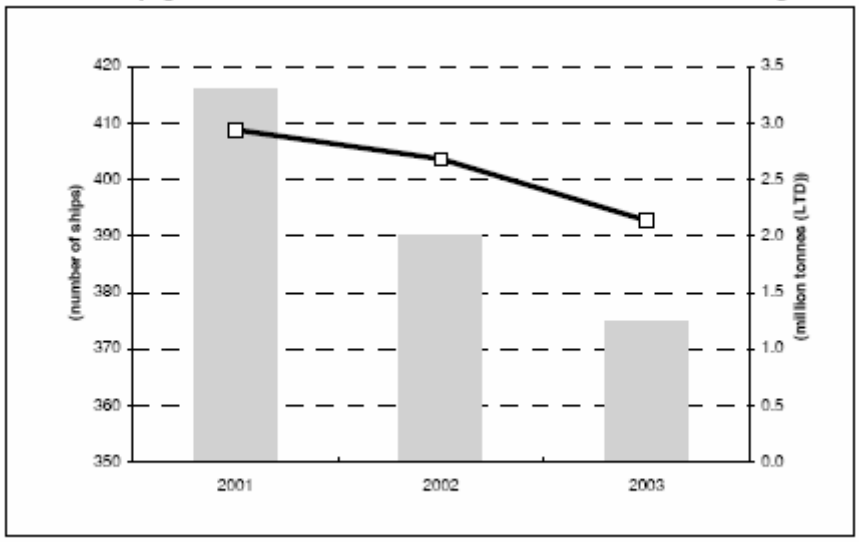
104. **The ship-breaking industry is one of the main sources of indigenous scrap generation. India's ship-breaking industry is one of the biggest in the world. Low labour cost is India's key competitive advantage in ship breaking, as it is an intensive-intensive industry.**

105. The ship-breaking yard at 'Alang' on the Gujarat coast is the biggest such yard in the world. In recent years, India has been losing its share in the industry to countries such as Bangladesh, where labour is even cheaper.

106. Over the years, the number of ships brought in for breaking has been shrinking. With the tightness in the global logistics market and very high freight rates, many ship operators are postponing scrapping their ships.

107. The government of India has reduced the import duty on ships brought in for breaking to nil from 5%. However, we do not expect this to have any significant impact on the industry.

Lower scrap generation Figure 3



Source: Iron Steel Scrap and Ship Breakers Association of India.

5. NATIONAL STEEL POLICY – 2005

5.1 Background

108. **The steel sector was deregulated in 1991/2, when controls on capacity and prices were abolished along with quantitative trade restrictions. Import tariffs were also brought down substantially. Currently customs and excise duties are the primary areas where Government intervenes.**

109. The present government policy is, therefore, to facilitate removal of bottlenecks in supply of inputs such as iron ore and coal, and to encourage self-reliance to meet the demand for steel in the country. The 30th Report of the Standing Committee on Industry while examining the demand for grants for 1999/2000 of the Department of Steel recommended that a national steel policy be formulated. In the 34th Report, this Committee reiterated this recommendation.

110. The first draft of the policy was prepared in April 2001 by the Ministry in consultation with the Industry. The consultation was then enlarged to other ministries and industry associations. While this was in progress, the steel industry was suffering from a 5 year recession and other countries had adopted protectionist measures.

111. In 2002, the industry began to show signs of revival. In July 2003, a new group comprising economists and professionals was, therefore, tasked to redraft the policy. This draft was sent, in March 2004, to the concerned ministries for consultation. Eventually the draft policy was submitted to the Cabinet Committee on Economic Affairs (CCEA) in September 2004. In its meeting of 13 October 2004, CCEA has directed to bring up the draft before the Committee of Secretaries in the first instance.

5.2 Objective

112. Strategic Goal: The long-term goal of the national steel policy is that India should have a modern and efficient steel industry of world standards, catering to diversifying steel demand.

113. The focus of the policy would therefore be to achieve global competitiveness not only in terms of cost, quality and product-mix but also in terms of global benchmarks of efficiency and productivity.

114. This will require indigenous production of over 100 million tonnes (mt) per annum by 2019/20 from the 2004/5 level of 38 mt. This implies a compounded annual growth of 7.3% per annum.

115. The above strategic goal is justified on the ground that steel consumption in the world, around 1 000 mt in 2004, is expected to grow at 3.0% per annum to reach 1,395 mt in 2015, compared to 2% per annum in the past fifteen years. China will continue to have a dominant share of the world steel demand.

116. At home, the Indian growth rate of steel production over the past fifteen years was 7.0% per annum. The projected growth rate of 7.3% per annum in India compares well with the projected national income growth rate of 7-% per annum, given an income elasticity of steel consumption of around 1.

117. In terms of consumption of steel, defined as production plus imports minus exports, the present equation is 38+2-4 = 36 mt in 2004/5. Table 1 gives the equation for 2019/20 and the projected compounded annual growth rates for production, imports, exports and consumption.

Table 1: Production, Imports, Exports and Consumption of Steel

(in million tonnes)

	Production	Imports	Exports	Consumption
2019-20	110	6	26	90
2004-05	38	2	4	36
CAGR*	7.3%	7.1%	13.3 %	6.9 %

Notes: * Compounded Annual Growth Rate

5.3 SWOT

118. The strengths, weaknesses, opportunities and threats for the Indian steel industry have been tabulated below. The national steel policy lays down the broad roadmap to deal with all of them.

Strengths	**Weaknesses**
1. Availability of iron ore and coal 2. Low labour wage rates 3. Abundance of quality manpower 4. Mature production base	1. Unscientific mining 2. Low productivity 3. Coking coal import dependence 4. Low R&D investments 5. High cost of debt 6. Inadequate infrastructure
Opportunities	**Threats**
1. Unexplored rural market 2. Growing domestic demand 3. Exports 4. Consolidation	1. China becoming net exporter 2. Protectionism in the West 3. Dumping by competitors

5.4 Strategy

119. A multi-pronged strategy would be adopted to move towards the long-term policy goal. On the demand side, the strategy would be to create incremental demand through promotional efforts, creation of awareness and strengthening the delivery chain, particularly in rural areas.

120. On the supply side, the strategy would be to facilitate creation of additional capacity, remove procedural and policy bottlenecks in the availability of inputs such as iron ore and coal, make higher investments in R&D and HRD and encourage the creation of infrastructure such as roads, railways, and ports.

Key issues

i) Technologies, research and development

121. India's expenditure on research and development has been negligible not only in absolute terms but also as a percentage of GNP at 0.86%. This can be compared to the developed world with an average ratio of 2.5% in the case of steel industry, the ratio of expenditure on R&D, as a percentage of turnovers are only 0.26%.

122. The low priority to indigenous R&D has given rise to adoption of technologies that are more suited to conditions prevailing in the developed world. For example, resource position of raw materials requires development of technologies, which can use indigenous coking coals and non-coking coals as also for an improvement in quality of high alumina Indian iron ore.

123. However lack of innovation and adaptation to Indian conditions is resulting in large-scale import of coking coal and low performance in iron making.

124. Aggressive R&D efforts should therefore, be mounted to create manufacturing capabilities for special types of steel, substituting coking coal, enrichment and agglomeration of iron ore fines, developing new products suited to rural needs, enhancing material and energy efficiency, utilizing waste, and arresting environmental degradation.

125. Public sector steel companies should enhance R&D expenditure in the coming years to finance internal R&D efforts and sponsor outside research, which may provide a framework for inter-disciplinary cooperation with the private sector across national boundaries. The government's contribution to fostering basic and applied R&D should therefore be enhanced.

ii) Environmental concerns

126. With a view to making various operations in steel industry environmentally friendly, environmental audit and life cycle assessment of existing steel plants (including sponge iron units) are being encouraged. This is to ensure the implementation of the relevant processes to reduce emissions and effluents, to encourage better management of solid waste as well as improving resource conservation such as energy and water.

127. There are some fine examples of high-level environmental friendly performances in the steel sector already. However, the steel sector should join the efforts of other industries to improve environmental performance even more.

128. The secondary steel producers particularly should be proactively assisted in shifting to processes that are more environment-protective. A similar policy would be followed in assisting natural resource industries, such as iron ore and coal mining, where scientific mining and mineral processing should be encouraged.

iii) Secondary and small-scale sector

129. The secondary sector primarily consists of non-integrated and comparatively small steel producers. However there are large variations amongst various units in terms of scale of operations, product-mix and technology. The secondary sector plays an important role in providing employment, meeting local demand of steel in rural and semi-urban areas, and meeting the country's demand of some special products required in small volumes.

130. The government will in the coming years we believe strive to provide the necessary feedstock to these units at reasonable prices from major plants through the existing mechanism of state small industries corporations.

5.5 Trade policy

131. Exports: it is estimated that the country will achieve an export ratio of around 25% of the total production in 2019/20 from 11% in 2004/5. This is comparable with a 30% share of exports in global production.

132. The government will therefore support all efforts to make available export credit, provide trade information, and cut transaction costs in general. In view of the slow progress of multi-lateral negotiations, the government will likely focus on regional trade agreements to broaden the export base. Exports of value-added steel and steel products, including indirect export of steel through project exports, would be encouraged.

133. Imports: import duty rates have been brought down progressively in the post-deregulation period. The Indian steel industry has been able to successfully withstand the competitive pressures of overseas producers.

134. However, integration with the global economy requires that the industry should be protected from unfair trade practices, which become common especially during the periods of downturn. The government would, therefore, institute mechanisms for import surveillance, and monitor export subsidies in other countries.

Investment promotions and policy implementation

135. The very nature of steel production, especially through the integrated route, requires a number of clearances of the central and state governments for investment in the steel sector. Delays at various levels not only add to project costs but also discourage fresh investments.

136. Consequently, an adequate executing mechanism will need to be evolved to discharge the following functions:

- Provide a single-window clearance for large projects, to be followed by statutory clearances by the concerned ministries.
- Prepare and implement an action plan for achieving the strategic goal of 110 mt of steel production by 2019-20, with separate plans for the growth of flats and long products.
- Preparation and implementation of road maps for technological and productivity improvements benchmarking them to global standards.
- Monitoring the implementation of the national steel policy.
- Conducting reviews to remove infrastructure, procedural and institutional bottlenecks and achieving a policy coordination mechanism among central Ministries and State Governments.