INDIA

STEEL-MAKING RAW MATERIALS
Issues, Policy and Outlook

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

Presentation by Mr. Prafull Sharma, Head of Research, Parijat Consulting (India).

Contact: Mr. Wolfgang Hübner, Head of Structural Policy Division and Steel Unit
Tel: +33 1 45 24 91 32; Fax: +33 1 44 30 62 63; E-mail: wolfgang.hubner@oecd.org
STEELE-MAKING
RAW MATERIALS

Issues, Policy and
Outlook

IRON ORE

Raw Materials
Of
Steel

COAL

SCRAP

PARIJAT CONSULTING

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IRON ORE

Global scenario in 2005

- Reserve base: 370 million tonnes
- Iron ore reserves: 160 billion tones
- Production: 1250 million tonnes
- Major producers - Brazil, China and Australia

World largest iron ore producers, 2005

<table>
<thead>
<tr>
<th>Company</th>
<th>Base</th>
<th>Capacity (mt/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVRD</td>
<td>Brazil</td>
<td>299.3</td>
</tr>
<tr>
<td>Rio Tinto</td>
<td>UK</td>
<td>173</td>
</tr>
<tr>
<td>BHP Billiton</td>
<td>Australia</td>
<td>144.1</td>
</tr>
<tr>
<td>Privat Intertrading</td>
<td>Ukraine</td>
<td>45.8</td>
</tr>
<tr>
<td>IUD – Donbass</td>
<td>Ukraine</td>
<td>38.4</td>
</tr>
<tr>
<td>Anshan I&amp;S works</td>
<td>China</td>
<td>36.8</td>
</tr>
<tr>
<td>Anglo American</td>
<td>South Africa</td>
<td>32.4</td>
</tr>
<tr>
<td>LKAB</td>
<td>Sweden</td>
<td>28.9</td>
</tr>
<tr>
<td>Mittal steel</td>
<td>Various</td>
<td>27.9</td>
</tr>
<tr>
<td>CVG</td>
<td>Venezuela</td>
<td>26.9</td>
</tr>
</tbody>
</table>
Global iron ore resources

<table>
<thead>
<tr>
<th>Countries</th>
<th>Reserve</th>
<th>Reserve base</th>
</tr>
</thead>
<tbody>
<tr>
<td>United states</td>
<td>6900</td>
<td>15000</td>
</tr>
<tr>
<td>Australia</td>
<td>18000</td>
<td>40000</td>
</tr>
<tr>
<td>Brazil</td>
<td>21000</td>
<td>6200</td>
</tr>
<tr>
<td>China</td>
<td>21000</td>
<td>46000</td>
</tr>
<tr>
<td>India</td>
<td>6600</td>
<td>9800</td>
</tr>
<tr>
<td>Russia</td>
<td>25000</td>
<td>56000</td>
</tr>
<tr>
<td>Ukraine</td>
<td>30000</td>
<td>68000</td>
</tr>
<tr>
<td>South Africa</td>
<td>1000</td>
<td>2300</td>
</tr>
<tr>
<td>Sweden</td>
<td>35000</td>
<td>7800</td>
</tr>
<tr>
<td>Sub-total</td>
<td>133000</td>
<td>306900</td>
</tr>
<tr>
<td>% of total</td>
<td>83</td>
<td>83</td>
</tr>
<tr>
<td>Other countries</td>
<td>30500</td>
<td>70900</td>
</tr>
<tr>
<td>Total</td>
<td>160000</td>
<td>370000</td>
</tr>
</tbody>
</table>

Indian scenario

- Production - 142 mt
- Consumption - 46 mt
- Iron ore reserves – 17 billion tonne
- Reserves location
### India mining capacity

- Iron ore reserves – 18 billion tonnes
- Total capacity of mines - 110 million tonnes

![Pie chart showing mining companies' shares](chart.png)

### State & distribution iron ore mines

<table>
<thead>
<tr>
<th>State</th>
<th>No of mines</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>215</td>
</tr>
<tr>
<td>Public</td>
<td>37</td>
</tr>
<tr>
<td>Private</td>
<td>178</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>3</td>
</tr>
<tr>
<td>Chattisgarh</td>
<td>9</td>
</tr>
<tr>
<td>Goa</td>
<td>47</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>15</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>6</td>
</tr>
<tr>
<td>Karnataka</td>
<td>57</td>
</tr>
</tbody>
</table>

[Source: PARIJAT CONSULTING]
Exports – exportable surplus

- China - a major driver
- Exports of 79 million tonnes in 04-05

Country-wise iron ore exports

- China: 61%
- Japan: 22%
- Europe: 5%
- S. Korea: 5%
- Taiwan: 5%
- Others: 6%

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Indian exports - Regional breakdown

- Bellary Hospet: 23%
- Bailadila: 11%
- Goa: 17%
- Jharkhand/Orrisa: 49%

Existing barriers

**Sub-scale mining**
- 255 mines with 10 producing more than 2 mt annually
- High grading of reserves
- Environmental degradation

**Lack of logistics infrastructure**
- Railways network shared
- High rail freight tariffs
- Lack of availability of rakes
- Ports have insufficient capacity
Contd..

Regulatory hurdles/delay

Delay in obtaining approvals for mining i.e. PLs, MLs, forest and environment clearances

Absence of merchant iron ore market

• Captive mining
• Spot sales where surplus available

COKING COAL

Demand
• Global demand – 680 million tonnes
• Expected global demand in 2006 - 715 million tonnes

Steel-driven demand growth

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Supply
- Australia - largest supplier of coking coal
  - Account 55 per cent of the total supply
- Japan - largest buyer of coking coal

Capacity
- Additional capacity of 30 million in 2 years
- In long term significant capacity will be added
  - BHP Billiton to increase capacity from 58 to 100 mt by 2010
- Therefore 2005-2006 existing capacity will have a bear the burden of increasing demand
**Indian scenario**

- Reserves in India – 16 billion tonnes
- Total demand – 27.5 mt
- Domestic production - 11 mt
- Domestic consumption - 13 mt

*Demand to be met by imports (Australia)*

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**Foreign collaboration**

To meet country growing demand for coal

- Technology upgradation
- Bilateral cooperation
- Bringing financial assistance
Coke

- Key inputs in steel making
- An important source of fuel
- Scarcity of coal in India and abroad
  - Astronomically high coke prices
  - Demand–supply mismatch

China impact

- China - largest manufacturer and exporter
  - Coke supplies restricted
  - Government restriction and trade barriers
  - Global prices to determine coke prices in India
- Production- consumption mismatch
Growing coke consumption and prices

Indian scenario

- Production - 7.6% CAGR since 2000-2001
- 62% production through BF route
- Sources of coking coal in India
  - In house captive source
  - Non-captive source (imports)
- Major users of coke in India
  - Tata steel
  - SAIL
  - RINL
  - SMEs
Scarcity of coke in India

- Highly dependent on coke imports
- 5-6 mt capacity addition by 2008-09.

Coke prices India

- Global prices and Landed cost to determine coke prices
- Average price to remain Rs13000 –15000 per tonne in 05
• Main input – EAF/ IF route
• Global scrap demand: 432-465 million tonnes
• Major sources: junked automobiles, ships

Scrap Prices
• Domestic prices to depend on global prices
  – Landed cost of scrap
• Scrap prices will remain - Rs 13,000-15,500 per tonne

Global scrap consumption

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Indian scenario

- Scare commodity in India
- Lack of quality scrap generated
- Consumption – 8 million tonnes
- Production – 6 million tonnes
- Inherent limitation in scrap generation

Scrap: less preferred route to steel making

- BF a preferred route
  - Abundant reserves of iron ore
  - Shortage and high cost of electricity

Advantages of setting up EAF/IF:
- Less capital investment
- Less processing cost in EAF as compare to BF
Scrap imports

- Imports in 2005: 1.5 – 2.5 million tonnes
- Highly dependent on imports

Ship breaking in India

- India ship breaking – one of the biggest in the world
- Main source of indigenous scrap generation
- Low labour cost – key competitive advantage

Problems
- Losing market share to Bangladesh
- Ship brought in for breaking are shrinking
- High freight rate
National steel policy - 2005

Objective

• Targets a production of 110 mt by 2020
• Adequate infrastructure for mines
• Enhance capacity of existing ports and opening of new ports
• Ensuring availability of rail wagons
• Duty free import of raw material for export – advance licensing scheme

<table>
<thead>
<tr>
<th></th>
<th>Production</th>
<th>Consumption</th>
<th>Imports</th>
<th>Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019-2020</td>
<td>110</td>
<td>6</td>
<td>26</td>
<td>90</td>
</tr>
<tr>
<td>2004-2005</td>
<td>38</td>
<td>2</td>
<td>4</td>
<td>36</td>
</tr>
<tr>
<td>CAGR</td>
<td>7.3%</td>
<td>7.1%</td>
<td>13.3%</td>
<td>6.9%</td>
</tr>
</tbody>
</table>

Government initiatives

Iron ore

• Encourage iron ore trading
• Encourage investing in an additional minings and beneficiation capacity
• Long-term export supply of iron ore would be confined to a maximum of five-year contracts.
• Captive mining leases for private companies
• Recommend renewal of existing leases
• DEPB factor
Coking coal

- Domestic coking coal to be blended with imported coal
- Developing and adapting new technologies
- Encourage investment in washing & beneficiation of coal
- Encourage invest for capacity addition
- Government would encourage joint ventures and equity participation coal companies.

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SWOT

<table>
<thead>
<tr>
<th>Strength</th>
<th>Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Availability of iron ore</td>
<td>• Unscientific mining</td>
</tr>
<tr>
<td>• Mature production base</td>
<td>• Coking coal dependence</td>
</tr>
<tr>
<td>• Abundance of quality manpower</td>
<td>• Low R&amp;D investment</td>
</tr>
<tr>
<td></td>
<td>• Inadequate infrastructure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Unexplored rural market</td>
<td>• Protectionism in the west</td>
</tr>
<tr>
<td>• Consolidation</td>
<td>• Dumping by competitors</td>
</tr>
<tr>
<td>• Exports</td>
<td></td>
</tr>
</tbody>
</table>

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**Barriers for Indian steel**

**Logistics infrastructure**
- High rail freight
- Port/shipping bottlenecks

**Coking coal and coke availability and cost**
- Indian coal has high ash
- Exposure to availability & prices of coking coal in international market
- Competition for seaborne hard coking

Contd..

**Iron ore availability**
- Hugh in country reserves
- Captive resource policy
- Sub-optimal mining
- Insufficient investment & development
Strategy

On demand side
• Promotional efforts
• Creation of awareness
• Strengthening the delivery chain

On supply side
• Capacity addition
• R&D investments
• Creation of infrastructure

Factors for India to reach full potential

• Accelerate infrastructure development

• Continuous expansion and development of domestic steel industry

• Mining improvement - iron ore
Thank you