CHAPTER - III

PROFILE OF THE VISAKHAPATNAM STEEL PLANT

In this chapter, a brief about the selected organization for the study i.e. Rashtriya Ispat Nigam Limited (RINL), Visakhapatnam Steel Plant (VSP), the scenario of the Indian Steel Industry and that of the global Steel Industry are presented.

Profile of Visakhapatnam Steel Plant:

With a view to give impetus to Industrial growth and to meet the inspirations of the people from South India, Government of India decided to establish integrated steel plant in Public Sector Undertaking at Visakhapatnam (Andhra Pradesh). The announcement was made by the then Prime Minister of India late Smt. Indira Gandhi in the parliament on 17th April' 1970 for setting up a 5th integrated steel plant in Visakhapatnam, Andhra Pradesh. The foundation stone for the plant was laid by Smt. Gandhi on 20.01.1971.

The selection committee chose the site near Balacheruvu creek and the then prime minister did the formal inauguration on 20th January. The consultants, M/s M.N.Dastur & Company (P).ltd. submitted a techno-economic feasibility report in February 1972, and a detailed project report for the plant, with an annual capacity of about 3 million tons of liquid steel in OCTOBER 1977.

The Soviets examined the DPR prepared by M.N.Dastur Co and offered technical and economic co-operation for the same. The Government of India and USSR signed an agreement on 12th June 1979, for cooperation in setting up the 3.4 million tons integrated steel plant at Visakhapatnam. In term of this agreement the earlier DPR of Dastur co was revised jointly by Soviet and Indian design
organizations, and a comprehensive revised DPR (CRDPR) for VSP was submitted in November 1980.

The project was estimated to cost Rs.3897.28 crores, based on prices as on 4th quarter of 1981. But during the implementation of VSP, it has been observed that the project cost has increased substantially over the sanctioned cost, mainly due to price escalations and under provisions in DPR estimates. In view of this and the critical fund situation, alternatives for implementation of VSP with rationalization of approval concept were studied in 1986. The rationalization has been basically from the point of obtaining the maximum output from the equipment already installed, planned for procurement, achieving higher levels of operational efficiency and labour productivity over what was envisaged earlier. Under the rationalized concept 3.0MT of liquid steel will be produced in a year, and the project is estimated to cost Rs.6281 crores, based on prices as on first quarter of 1986.

The plant is designed to produce three million tons of liquid steel per annum to be converted to 2.656 million tons per annum of saleable steel. In addition, Visakhapatnam steel plant will produce annually about 5.56 lakh tons of pig iron and various by-products and benzol products for sale.

**Location:**

The plant is located in Visakhapatnam city, which is on the coast of Bay of Bengal. Visakhapatnam city is an important commercial center of Andhra Pradesh. It has the deepest port and is one of the principal outlets for country’s exporting Iron ore. The city has many large industries such as The Hindustan petroleum refinery, Bharat heavy Plates and Vessels ltd., Coromandal Fertilizers, Hindustan zinc, Hindustan Shipyard etc. The city is situated on the main broad gauge railway line between Calcutta and Madras and is well connected with other major cities and state
capitals by rail, road and air. The Visakhapatnam steel plant is located southwest of Visakhapatnam Harbour and is about 26 Km from Visakhapatnam city. The township and the plant have been built on an area of 27,000 acres, between the national highway no.5 and the Bay of Bengal.

**Climate:**

Visakhapatnam has worm and humid climate, April to June is the warmest months of the year and December to February are the coldest months of the year. The city benefits from the Southeast monsoon (June to September) & northeast monsoon (October to December). The average rainfall is 973.6mm and highest mean monthly maximum temperature is 37.8 degree centigrade.

**Modern Technology:**

In Visakhapatnam steel plant modern technology has been adopted in many areas of production, some of them for the first time in the country.

- selective crushing of coal
- 7 meter tall coke ovens
- dry quenching of coke
- on ground blending of sinter base mix
- conveyor charging and bell less top for blast furnace
- cast house slag granulation for blast furnace
- 100% continuous casting of liquid steel
- Gas expansion turbine for power generation, utilizing blast furnace top gas pressure.
- Hot metal desulphurization
- Extensive treatment facilities of effluents for ensuring proper environmental protection
➤ Computerization for process control

➤ Sophisticated high speed and high production rolling mills.

**Major Plant Facilities:**

The production facilities in the Visakhapatnam steel plant are most modern amongst the steel industry in the country. The know-how and the technology have been acquired from different parts of the world from the reputed and established sources. Some of the novelties of the Visakhapatnam steel plant are:

- 7meter height coke ovens of VSP are the tallest so far built in the country. Dry quenching of coke has been adopted which will not only improve the quality of coke and economics of coke production, but also contribute significantly to the reduction of environmental pollution.

- Base mix yard for sinter plant introduced for the first time in the country helps in excellent blending of the feed material to the sinter machine and production of consistent good quality sinter.

- 3200 cubic meters two blast furnaces with bell less top charging equipment and 100% cast house slag granulation. The granulation of the entire molten slag arising at the furnace cast house avoids the need to transport molten slag and optimizes utilization of slag.

- 100% continuous casting of liquid steel into blooms result in less and better quality of blooms.

- The VSP have three sophisticated and large rolling mills with the latest features of automation and optimization.

- The operations of blast furnace, steel melting shop and rolling mills have been entirely computerized to ensure consistent quality and efficient performance.
The major production departments of Visakhapatnam steel plant are the raw materials handling system, coke ovens, sinter plant, blast furnace, and steel melting shop and rolling mills.

Extensive facilities have been provided for repair maintenance as well as manufacturing of spare parts. There is a Central machine shop, Structural shop, forge shop, foundry, wood working shop and loco repair shop. Visakhapatnam steel plant has got its own Air separation plant for production of oxygen and acetylene plant for production of acetylene gas. A captive power plant has also been provided for power generation with 4 Units, each of 60MW generation capacity.

**Raw Material Linkages:**

The steel plant is getting its supply of iron ore-lumps and fines from the Bailadilla deposits in Madhya Pradesh (MP), blast furnace grade lime stone from Jaggayyapeta in Andhra Pradesh, SMS grade lime stone from Badnapur in MP, blast furnace grade lime stone from the Kotni-sonor deposits in MP. 20% of cocking coal requirements will be met by imports through the Visakhapatnam harbor while the balance will come from the Bengal-Bihar area. Coal for power generation will come from Talcher in Orissa.

**Power Supply:**

A peak construction power requirement was about 12MVA. This was arranged from the Gajuwaka substation of APSEB at 33KV.

The plant have captive power generation unit consists of 3nos turbo generators, each having 60MW capacity. An additional requirement of operational power around 150MVA is being met from the APSEB grid. Operational power supply is initially at 220KV, which are subsequently stepped down to 400KV.
**Water Supply:**

Requirement of water during the peak of construction was of the order of 4.5 Mgd. This was met from the Meghadrigedda, and Raiwada schemes of Andhra Pradesh state government.

Operational water requirements 70Mgd of the steel plant are being met from the Yeleru water supply scheme provided by the AP government. This involved construction of a storage reservoir at Yeleswaram and a 153 KM long linked canal to the plant site apart from Kanithi Balancing Reservoir (KBR).

**Employment Opportunities:**

At full operation stage, VSP will generate direct employment for about 17,000 persons. The indirect employment due to various auxiliary units development and other services will be much more.

Many of the management strategies now being talked about were anticipated by the Visakhapatnam steel plant management much earlier and adopted straight away in the initial years. The plant decided to operate with around 17,250 workers at work and avoid surplus manpower. The ban of Indian steel industry has set to achieve quantum gains in labor productivity. As part of a deliberate recruitment philosophy, VSP selected young, highly skilled manpower from the region and decided to induct them through carefully chalked out training programs. Visakhapatnam steel plant has achieved excellence in various fields of management by introducing innovative schemes like zero over time working, overlapping shifts, cluster based promotions, task based performance appraisal and productivity oriented training and management development. A unique and comprehensive motivational package with unbolts mechanism for promoting safety and reducing fire accidents has been worked out and successfully implemented.
Social Responsibilities:

Peripheral development and special concern for the displaced persons underling the Visakhapatnam steel plant’s commitment and concern for the social and regional development around it. As a special gesture for the welfare of the displaced persons, Visakhapatnam steel plant provided them with over 5,900 jobs, which constitute more than 1/3 of its total non-executive manpower. In the recruitment policies of VSP displaced persons have been given several concessions in the areas of educational qualifications, age and skill levels.

As a part of social responsibility VSP took a massive afforestation program has been launched in and around the plant. Out of the total 9,200 hectares of area 3,600 hectares has been ear marked for afforestation. Along the land boundary of VSP a green belt of half a kilometer has been delineated for afforestation. 1.4 lakh trees have been planted in 100 hectares during 94-95 and 1.22 lakhs of trees has been planted in 207 hectares during 95-96. 3 million trees for 3MT of steel was the slogan of VSP. That target also achieved. VSP has been complying with statutory standards of both Andhra Pradesh pollution control board and central pollution control board. It has been closely maintaining 31 major stack emissions and 8 ambient air monitoring areas out side steel plant.

Township:

A modern town ship with all amenities and facilities setup adjacent to the steel plant site, to house the plant workers. The township have protected drinking water supply, water borne sanitation, black top facilities, parks etc. 55% housing accommodation is being provided in the township for the manpower of 15,000 required for the plant at 3MT stage.
Technological Highlights of VSP:

The plant uses the most modern technology. The features of the technology are:

– 7m tall Coke Oven Batteries with coke dry quenching.
– Biggest Blast Furnaces in the country.
– Bell less top charging system in Blast Furnace.
– 100% slag granulation at the BF cast house.
– Suppressed combustion-LD gas recovery system.
– 100% Continuous casting of liquid steel.
– ‘Tempcrorre” and “Stelmor” cooling process in LMMM & WRM.
– Extensive waste heat recovery systems.

In its unyielding journey, Visakhapatnam Steel Plant has come a long way and has become the shining star on the industrial horizon and has become a symbol of every changing and endless new possibilities.

Rashtriya Ispat Nigam Limited (RINL) - a Navratna Public Sector Enterprise (PSE) with 100percent ownership of GOI, is the corporate entity of Visakhapatnam Steel Plant (VSP) - India’s first shore based integrated steel plant, located at Visakhapatnam, which is now in the midst of commissioning the 6.3 MT expansion stage, in line with its Mission of expanding to 20 MT. A pioneer in the steel industry in adoption of system standards, VSP is accredited for all three system standards i.e. ISO 9001:2000, ISO 14001:2000 and OHSAS 18001:2007 and is the first Indian steel plant to be certified with “Capability Maturity Model Integrated (CMMI) – Level 3 certification for its implementation of IT systems and the first PSE to be certified for BS EN 16001 for Energy Management system in 2010-11.
Business Scenario of Visakhapatnam Steel Plant:

VSP is the second largest government owned steel company in India (Source: Steel world, June 2011 newsletter), with original liquid steel production capacity of 3.0 MTPA and expanded liquid steel production capacity of 6.3 MTPA, which is in the advanced stages of completion by the Financial Year 2013. The plant at Visakhapatnam, VSP, was originally established in 1971 as part of SAIL, a PSU producing iron and steel products. In 1982, the Company was incorporated and the assets and liabilities of VSP were transferred from SAIL to VSP.

In November 2010, the Company was conferred “Navratna” status by the GOI, which provides it with a considerable degree of operational and financial autonomy from the GOI. As of May 2012, VSP is one of only 16 PSUs in India with Navratna status. The Promoter of the Company is the President of India, acting through the Ministry of Steel, GOI.

VSP has its Registered and Corporate Office in Visakhapatnam, in the state of Andhra Pradesh, India, with regional offices in Visakhapatnam, Delhi, Kolkata, Mumbai and Chennai. VSP conduct its production activities at a single production site in Visakhapatnam. The steel production facilities consist of four coke oven batteries, three blast furnaces, including one commissioned in April 2012, along with the related processing units, three converters, three rolling facilities and a thermal power plant and its ancillary facilities, including waste heat recovery facilities. The expansion of its production capacity to more than double our liquid steel capacity from 3.0 MTPA to 6.3 MTPA is well advanced, with major units, including finishing mills, to be commissioned in phases during the Financial Year 2013. The plant purchase most of its key raw materials, including iron ore and coking coal, but it also has mines which provide limestone, dolomite, manganese ore, quartz and silica sand. VSP owns a
majority stake in EIL, a holding company for mining companies with iron ore, manganese ore, limestone and dolomite reserves.

VSP produces a broad range of steel products, including plain wire rods, rebars, rounds, squares, structural, billets, blooms and pig iron. It sells most of the products domestically, with Indian customers accounting for approximately 97.3 percent of the sales as of June 30, 2012, of which 53.6 percent was in south India. The customers consist mainly of companies in the construction, infrastructure, manufacturing, automobile, general engineering and fabrication sectors.

As of June 30, 2012, VSP employed 18,007 permanent employees. It sells its products through a wide marketing network of five regional offices, 23 branch offices, 18 consignment agents, four handling contractors and five consignment sales agents. VSP sell its steel products to project users, industrial users and retailers.

In the Financial Years 2009, 2010, 2011 and 2012 and the three months ended June 30, 2012, VSP recorded net sales of 91.28 billion, 98.09 billion, 105.79 billion, 131.76 billion and 26.15 billion, respectively, on a restated consolidated basis. During the same periods, it recorded a profit after tax of 13.16 billion, 8.87 billion, 6.02 billion, 8.04 billion and 1.24 billion, respectively. As of June 30, 2012, it had total assets and total net worth of 231.88 billion and 126.63 billion, respectively.

Financial Information of VSP:

The consolidated financial statements for the three months ended June 30, 2012 and the years ended March 31, 2008, 2009, 2010, 2011 and 2012, is given in the Table (3.1) below.
Table 3.1 Financial Statements

<table>
<thead>
<tr>
<th>PARTICULARS</th>
<th>For the year ended March 31st</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INCOME</strong></td>
<td></td>
</tr>
<tr>
<td>Revenue From Operations</td>
<td>146,057.6</td>
</tr>
<tr>
<td>Less: Dividend</td>
<td>13,315.5</td>
</tr>
<tr>
<td>Other Income</td>
<td>3,920.2</td>
</tr>
<tr>
<td>Total Income</td>
<td>136,747.4</td>
</tr>
<tr>
<td><strong>EXPENSES</strong></td>
<td></td>
</tr>
<tr>
<td>Cost of materials consumed</td>
<td>84,717.3</td>
</tr>
<tr>
<td>Consumption of fuel</td>
<td>-</td>
</tr>
<tr>
<td>Changes in inventories of Semi-finished/finished goods</td>
<td>45,489</td>
</tr>
<tr>
<td>Employees' benefits</td>
<td>15,071.1</td>
</tr>
<tr>
<td>Other expenses</td>
<td>26,575.4</td>
</tr>
<tr>
<td>Total Expenses</td>
<td>120,859.7</td>
</tr>
<tr>
<td>Less: prior year adjustments &amp; material mining cost</td>
<td>500.3</td>
</tr>
<tr>
<td>Net Expenses</td>
<td>120,359.4</td>
</tr>
<tr>
<td><strong>Earnings before interest, tax, depreciation &amp; amortisation (EBITDA)</strong></td>
<td>16,938.0</td>
</tr>
<tr>
<td>Finance Costs</td>
<td>1,906.0</td>
</tr>
<tr>
<td>Depreciation and Amortisation</td>
<td>3,414.0</td>
</tr>
<tr>
<td>Prior period items - Net credit</td>
<td>(293.5)</td>
</tr>
<tr>
<td>Profit before Profit and Exceptional Items and Tax</td>
<td>11,136.6</td>
</tr>
<tr>
<td>Exceptional items</td>
<td>29.7</td>
</tr>
<tr>
<td>Profit before Exceptional Items and Tax</td>
<td>11,166.3</td>
</tr>
<tr>
<td>Extraordinary items</td>
<td>-</td>
</tr>
<tr>
<td><strong>Profit before Tax</strong></td>
<td>11,166.3</td>
</tr>
<tr>
<td><strong>Tax Expense</strong></td>
<td></td>
</tr>
<tr>
<td>Current Tax</td>
<td>3,997.3</td>
</tr>
<tr>
<td>Earlier years adjustments</td>
<td>(106.6)</td>
</tr>
<tr>
<td>Fringe Benefit Tax</td>
<td>-</td>
</tr>
<tr>
<td>Deferred Tax</td>
<td>(214.8)</td>
</tr>
<tr>
<td>Profit (loss) for the period from Continuing Operations</td>
<td>7,497.4</td>
</tr>
<tr>
<td>Tax Expense of Discontinuing Operations</td>
<td>-</td>
</tr>
<tr>
<td>Profit (Loss) for the period from Discontinuing Operations (after Tax)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Net Profit (Loss) after tax as per audited accounts</strong></td>
<td>7,497.4</td>
</tr>
</tbody>
</table>

Adjustments on account of:

(a) Changes in accounting policies                           | 124.5 | (2.7) | -    | -    | (1,717.4) |
(b) Other adjustments & Prior period items                   | (1,099.0) | (158.0) | 39.9 | 41.7 | (74.3) |
(c) Derivatives & Wages                                      | -    | 461.1 | 635.7 | 145.8 | 189.6 |
(d) Current Tax impact of Adjustments                        | 884.3 | 842.9 | (184.5) | 18.7 | (106.1) |
(e) Deferred tax impact adjustments                           | (22.6) | (13.0) | 46.2 | (24.5) | 655.4 |
**Total of Adjustments after Tax impact**                    | (546.4) | 655.3 | (906.7) | 191.7 | (1,052.8) |

Profit after tax (as restated)                              | 8,043.8 | 6,015.5 | 6,971.5 | 13,164.8 | 20,466.0 |

80
Principal Units of VSP:

Blast Furnaces:

Two operating blast furnaces which produce hot metal from iron ore, sinter and coke, and their related processing units, including raw material handling facilities, four coke oven batteries to produce coke, a sinter plant and a lump ore crushing plant to produce the sinter and sized iron ore to meet the blast furnace requirement; a third blast furnace was commissioned in April 2012 as part of the Company's expansion;

Converters:

Three LD (Linz-Donawitz) converters of 150 Cu.m. volume each produce 1.5 MT liquid steel p.a. used to convert hot metal into liquid steel, with an installed production capacity of 3.0 MTPA of liquid steel. Six continuous casting machines used to produce crude steel in the form of cast blooms from liquid steel. 3x4 strand bloom casting machines producing 1.4MT of blooms yearly. One converter of 150 Cu.m., producing 1.5 MT liquid steel per annum. 3 x 4 strand bloom casting machines in stage-II to give an additional tonnage of 1.4 MT of blooms per year.

Rolling Facilities:

Three types of mills are installed for manufacturing of end products like angles, channels, billets, wire rods etc. input to these mills is blooms of Steel Melt Shop. These mills are Light and medium merchant mill, wire rod mill and medium merchant and structural mill in the rationalized concept, an output of about 2.7 million tones per year of finished steel products in envisaged as compared to about 3 million tones. In the approved concept the product mix comprises of bars, rods, and shapes.

The Light and Medium Merchant Mill rolls rebars, rounds, light structural and billets. It has evaporative cooling systems in its furnaces and is equipped with tempcore technology. This technology ensures uniform grain size and the desired
metallurgical and mechanical properties for the bar products. The Light and Medium Merchant Mill has an installed production capacity of 0.7 MTPA;

The Wire Rod Mill rolls rebars and plain wire rods and is equipped with Stelmore technology. The Wire Rod Mill has an installed production capacity of 0.9 MTPA; and

The Medium Merchant and Structural Mill rolls rounds, squares and structural rolls. It contains evaporative cooling systems in its furnaces and has an installed production capacity of 0.9 MTPA.

**Power Plant:**

A thermal power plant equipped with four generators to produce 247.5 megawatts of power to meet our requirements, with an additional capacity of 53.0 megawatts provided by auxiliary units through waste heat utilization. VSP is also in the process of installing waste gas based power capacity of 120.0 megawatts by the Financial Year 2014.

**Expansion and Modernisation of Visakhapatnam Steel Plant:**

The Company is implementing a brown field expansion aimed at increasing the capacity of VSP in phases from 3.0 MTPA to 6.3 MTPA by the Financial Year 2013, which is in its advanced stages of completion, and to 7.3 MTPA by the Financial Year 2015. Apart from capacity expansion, the expansion is also expected to increase energy efficiency, productivity and yield, as well as deploy more environmentally friendly technologies.

**Expansion to 6.3 MTPA:**

VSP is well advanced in the first phase of expansion for increasing its liquid steel capacity to 6.3 MTPA. The first phase has been divided into two stages.
Stage I consists setting up a new blast furnace with advanced technology, a sinter plant and raw material handling systems, a new steel melting shop (Steel Melt Shop) along with enhanced technological facilities to produce clean steel, and a new wire rod mill. The commissioning activities of the Stage I units started in November 2011. The equipment has been supplied by globally reputed contractors from Russia, Luxembourg and the United States. Major units are targeted for commissioning by the end of the Financial Year 2013.

Stage II consists of setting up two new finishing mills, a special bar mill and a structural mill, along with the associated facilities. These facilities will give the Company enhanced capacity to meet market demand for long steel products. Equipment for these facilities is being supplied by contractors from Italy, Austria and the United States.

Products of VSP:

Production at VSP comprises mainly of long steel products, such as plain wire rods, rebars, rounds and structurals, and semi-finished steel products, such as billets and blooms. The products are made with 100 percent virgin steel, and we have adopted modernized technology to help improve product quality.

Blooms:

Blooms are semi-finished products used for the manufacturing of long steel products. VSP produces blooms at the steel melt shop, which are then rolled to produce billets. Blooms not used by VSP are sold to downstream steel producers, who further process them into steel products that are utilized in a wide variety of construction and manufacturing sectors.
**Billets:**

Billets are one of the first steel products produced in the steel manufacturing chain. They are semi-finished products used in the manufacturing of long steel products, such as bar products, rods and wires. Billets can be used as feedstock for rolling mills for the production of long products. Steel billets are also used extensively in forge shops and machine shops for the production of engineering goods.

VSP manufactures billets for further rolling into bars and plain wire rods. It sells its non-rollable billets to downstream steel producers who further process them into steel products that are utilized in a wide variety of construction and manufacturing sectors.

**Plain Wire Rods:**

Plain wire rods are a type of long steel product with a wide variety of functions such as making wires for welded mesh, nails, hangers, screws, chain link fencing, wire nets and barbed wires. Plain wire rods are produced both in the mild steel (a type of carbon steel) and value added steel categories. VSP sells plain wire rods to a broad range of large, medium and small scale users, who in turn use them for wire drawing, bright bar, fastener and construction purposes. Plain wire rods are also used in the manufacturing industry.

**Rebars:**

Rebars are long steel products used for reinforcement in construction and infrastructure projects. They provide tensile strength to concrete sections subject to a bending load, and they normally have ribbed profiles on their surface to improve bonding with concrete. VSP have adopted the quenching and self-tempering technology for making our thermo mechanically treated rebars, which are marketed under the registered trademark of “VIZAG TMT”. We produce rebars in our Wire
Rod Mill and Light and Medium Merchant Mill, depending on the size of the rebar. Rebars are mainly sold to project users.

**Structurals:**

Structurals are long steel products that include angles, channels and beams. Like rebars, structural products are mainly used in the construction and infrastructure sectors.

**Rounds:**

Rounds are a type of long steel bar product used mainly in the engineering and automobile industries. VSP produce rounds in our Light and Medium Merchant Mill and Medium Merchant and Structural Mill, depending on the size of the round. VSP sell rounds to a broad range of large, medium and small scale users, many of whom further reroll the rounds to their desired sizes.

**Squares:**

Squares are a type of long steel product used for rerolling and forging. VSP produce squares in our Medium Merchant and Structural Mill. Our Company sells squares to a broad range of large, medium and small scale users.

**Pig Iron:**

VSP produce hot metal from high grade iron ore and low ash coke. Surplus hot metal produced from blast furnaces is cast into pig iron. Our Company sells pig iron to steel manufacturers as well as foundries. Our installed production capacity for pig iron is 0.6 MTPA.

**By-Products:**

A number of by-products are generated in the process of steelmaking. These products include coke products, benzol products, tar products, ammonium sulphate,
granulated blast furnace slag, lime products and gases. Coke by-products are sold to the steel, cement and brick industries. Benzol by-products are used in the solvent, paint, dye, drugs and detergent industries. Tar by-products are sold to the aluminum and manufacturing industries. Ammonium sulphate is used as fertilizer. Granulated blast furnace slag is used for manufacturing slag cement. Lime by-products are sold to the paper industry. Gases such as liquid oxygen are sold for medical and industrial purposes while liquid nitrogen is used for industrial purposes.

The following Table (3.2) details the various products and the by-products of VSP:

**Table 3.2 Products of VSP**

<table>
<thead>
<tr>
<th>Steel Products</th>
<th>By-products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angles</td>
<td>Nuts Coke</td>
</tr>
<tr>
<td></td>
<td>Granulated Slag</td>
</tr>
<tr>
<td>Billets</td>
<td>Coke Dust</td>
</tr>
<tr>
<td></td>
<td>Lime Fines</td>
</tr>
<tr>
<td>Channels</td>
<td>Coal Tar</td>
</tr>
<tr>
<td></td>
<td>Ammonium Sulphate</td>
</tr>
<tr>
<td>Beams</td>
<td>Anthracene Oil</td>
</tr>
<tr>
<td>Squares</td>
<td>HP Naphthalene</td>
</tr>
<tr>
<td>Flats</td>
<td>Benzene</td>
</tr>
<tr>
<td>Rounds</td>
<td>Toulene</td>
</tr>
<tr>
<td>Re-bars</td>
<td>Zylene</td>
</tr>
<tr>
<td>Wire Rods</td>
<td>Wash Oil</td>
</tr>
</tbody>
</table>

**Production Process:**

VSP's production facilities process iron ore and other raw materials into steel products. Our production processes can be broadly broken down into three categories: iron making, steel making and product rolling.
Iron Making:

Coking coal is heated in the coke ovens to produce coke, while iron ore fines, limestone, dolomite and coke are heated in the sinter plant to produce sinter, which is the major input for the blast furnaces. Afterwards, the coke, sinter and sized iron ore are charged in the blast furnace, with the coke acting as a main fuel and reducing agent for the smelting of the iron. The process converts the iron ore into liquid iron form, and it is then transported to the LD converters to make steel.

Steel Making:

Steel is made in our steel melting shop in LD converters by blowing oxygen into the converter until the desired carbon content is achieved and impurities are reduced to acceptable levels. Alloying elements including manganese, chromium, silicon and nickel are also added to achieve the required grade of liquid steel. Liquid steel is tapped from the LD converter and transported to a continuous casting machine, where it is cooled gradually, and then cast into blooms. We believe that we were one of the first integrated steel plants to adopt 100 percent continuous casting on a large scale in India. When the oxygen reacts with the carbon in the LD converters, the reaction releases large quantities of gas rich in carbon monoxide. The gases released from the converter are collected, cooled, cleaned and recycled for use as fuel in our steel plant.

Product Rolling:

Blooms which are cast are delivered to their respective rolling mills for the production of finished or semi-finished steel products in a multitude of sizes and shapes. The Wire Rod Mill rolls rebars and plain wire rods, the Light and Medium Merchant Mill rolls rebars, rounds, light structural bars and billets, and the Medium Merchant and Structural Mill rolls rounds, structural bars and billets. Finished steel
products are then packed in the required bundles and transported to customers by rail, road and sea.

For the previous ten consecutive years, production in all major units of VSP has exceeded 100 percent of rated capacity. The following Table (3.3) sets forth our capacity utilisation rates for hot metal, liquid steel and saleable steel for the periods indicated:

**Table 3.3 Capacity Utilisation Rates for Hot Metal, Liquid Steel and Saleable Steel**

<table>
<thead>
<tr>
<th>Financial Year</th>
<th>Hot Metal</th>
<th>Liquid Steel</th>
<th>Saleable Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>115.1</td>
<td>110.7</td>
<td>115.8</td>
</tr>
<tr>
<td>2009</td>
<td>104.3</td>
<td>104.8</td>
<td>101.7</td>
</tr>
<tr>
<td>2010</td>
<td>114.7</td>
<td>113.3</td>
<td>119.2</td>
</tr>
<tr>
<td>2011</td>
<td>112.7</td>
<td>114.1</td>
<td>115.9</td>
</tr>
<tr>
<td>2012</td>
<td>111.1</td>
<td>110.3</td>
<td>112.6</td>
</tr>
</tbody>
</table>

**Sales:**

VSP sell the majority of our products to domestic customers. In the Financial Years 2010, 2011 and 2012 sales to domestic customers accounted for approximately 96.7 percent, 96.3 percent and 97.1 percent respectively, of our turnover. The following Table (3.4) sets forth VSP sales by region for the periods indicated:

**Table 3.4 VSP Sales by Region**

<table>
<thead>
<tr>
<th>Market/Region</th>
<th>Financial Year 2010</th>
<th>% of Total 2010</th>
<th>Financial Year 2011</th>
<th>% of Total 2011</th>
<th>Financial Year 2012</th>
<th>% of Total 2012</th>
<th>Three Months Ended June 30, 2012</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>102,840</td>
<td>96.7%</td>
<td>110,945</td>
<td>96.3%</td>
<td>140,467</td>
<td>97.1%</td>
<td>28,428</td>
<td>97.3%</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>40,906</td>
<td>38.5%</td>
<td>40,200</td>
<td>34.8%</td>
<td>49,484</td>
<td>34.2%</td>
<td>9,844</td>
<td>33.69%</td>
</tr>
<tr>
<td>North</td>
<td>23,562</td>
<td>22.2%</td>
<td>24,290</td>
<td>21.1%</td>
<td>32,074</td>
<td>22.2%</td>
<td>2,968</td>
<td>10.16%</td>
</tr>
<tr>
<td>South</td>
<td>17,785</td>
<td>16.7%</td>
<td>21,876</td>
<td>19.0%</td>
<td>26,437</td>
<td>18.3%</td>
<td>5,816</td>
<td>19.91%</td>
</tr>
<tr>
<td>West</td>
<td>14,652</td>
<td>13.8%</td>
<td>16,197</td>
<td>14.1%</td>
<td>20,491</td>
<td>14.2%</td>
<td>5,200</td>
<td>17.8%</td>
</tr>
<tr>
<td>East</td>
<td>5,935</td>
<td>5.6%</td>
<td>8,382</td>
<td>7.3%</td>
<td>11,971</td>
<td>8.3%</td>
<td>4,600</td>
<td>15.74%</td>
</tr>
<tr>
<td>Export</td>
<td>3,510</td>
<td>3.3%</td>
<td>4,225</td>
<td>3.7%</td>
<td>4,151</td>
<td>2.9%</td>
<td>788</td>
<td>2.7%</td>
</tr>
<tr>
<td>Total</td>
<td>106,350</td>
<td></td>
<td>115,170</td>
<td></td>
<td>144,618</td>
<td></td>
<td>29,216</td>
<td></td>
</tr>
</tbody>
</table>

*Excluding the state of Andhra Pradesh*
VSP's customers are divided into three segments: project users, industrial users and retailers.

- Project users consist of infrastructure and construction companies. VSP provide mainly rebars and structural products to project users;
- Industrial users, which includes actual users of our Company's products across various industry segments, consist of a wide range of large, medium and small scale industries, who mainly purchase plain wire rods, rounds and squares; and
- Retailers are parties who mainly procure products to sell to end users.

Marketing and Distribution:

VSP sell our steel products either directly to customers or through stockyards located across the country. The Company has a wide marketing distribution network spread across the country. VSP have five regional offices located at Visakhapatnam, Chennai, Mumbai, Delhi and Kolkata. Furthermore, we have 23 branch offices and 22 stockyards. Four stockyards, located at Bombay, Chennai, Visakhapatnam and Hyderabad, are owned by VSP, and the remaining 18 are operated by consignment agents. The consignment agents are chosen through an open national tender, a process by which prospective agents are selected by our Company, and sign seven year contracts with us. VSP have also signed seven year contracts with six consignment sales agents, where VSP do not have branch offices. There are also more than 128 retailers spread across the country. The Figure (3.1) below illustrates VSP marketing network.
VSP rely on a variety of marketing methods, such as sales through MOUs, direct sales to projects through participation in tenders, sales to state small industries corporations and national small industries corporations as per government allocation, e-auctions and spot sales.

VSP also use our brand name to market our products. For example, rebars are branded as “VIZAG TMT,” and structural products are branded as “Vizag UKKU,” (“ukku” means steel in the Telugu language).

**Raw Materials:**

Steel production requires a substantial amount of raw materials and energy, including iron ore, coking coal, limestone and dolomite. Raw materials comprise the single most significant percentage of our Company's manufacturing costs and in the
Financial Years 2009, 2010, 2011 and 2012 raw materials accounted for 75.7 percent, 61.4 percent, 73.4 percent and 70.1 percent respectively, of VSP expenditure in the production of steel excluding certain adjustments for raw material mining costs, depreciation, and interest and finance charges. Iron ore and coking coal are the primary materials used in steel production and the prices of these commodities are subject to significant volatility.

VSP purchase iron ore and coking coal at market prices under supply contracts typically lasting up to five years. Under the long-term arrangements, the price is fixed on a quarterly or monthly basis. VSP have formed a joint procurement committee with SAIL for our and SAIL’s coking coal supplies and we believe the combined purchasing requirements of VSP’s two entities benefits us in commercial negotiations with coking coal suppliers. For other raw materials, we make agreements chosen through a tendering system, in which we float a tender and choose suppliers according to the lowest bidder who satisfies VSP’s terms and conditions.

VSP uses various third parties for transportation of our raw materials. Most of our iron ore is transported from NMDC’s mining complexes through rail. Coking coal is mostly imported on capesize and panamax vessels from Australia, New Zealand and the United States. Other raw material resources are also transported by road. The following Table (3.5) gives the details of major sources of raw materials:
Table 3.5 Major Sources of Raw Materials

<table>
<thead>
<tr>
<th>Name of Raw Material</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron Ore Lumps &amp; Fines</td>
<td>Bailadilla, MP</td>
</tr>
<tr>
<td>BF Lime Stone</td>
<td>Jaggayyapeta, AP</td>
</tr>
<tr>
<td>SMS Lime Stone</td>
<td>UAE</td>
</tr>
<tr>
<td>BF Dolomite</td>
<td>Madharam, AP</td>
</tr>
<tr>
<td>SMS Dolomite</td>
<td>Madharam, AP</td>
</tr>
<tr>
<td>Manganese Ore</td>
<td>Chipurupalli, AP</td>
</tr>
<tr>
<td>Boiler Coal</td>
<td>Talcher, Orissa</td>
</tr>
<tr>
<td>Coking Coal</td>
<td>Australia</td>
</tr>
<tr>
<td>Medium Coking Coal (MCC)</td>
<td>Gidi / Swang / Rajarappa / Kargali</td>
</tr>
</tbody>
</table>

Iron Ore:

VSP obtain most of VSP’s iron ore requirement (comprising iron ore fines, lumps and calibrated lump ore) from NMDC's mining complexes at Kirandul and Bacheli in the state of Chhattisgarh. In the Financial Years 2009, 2010, 2011 and 2012, the cost of such purchases accounted for 27.4 percent, 34.3 percent, 38.6 percent, and 33.7 percent of VSP’s raw material purchases, respectively.

Coal:

In the Financial Years 2009, 2010, 2011, and 2012, the cost of VSP’s coking coal purchases accounted for 55.7 percent, 57.0 percent, 55.8 percent, and 61.2 percent of our raw material purchases, respectively. We use both imported and domestic coking coal in VSP’s steel production process. VSP import approximately 90.0 percent
of our coking coal from Australia, New Zealand and the United States. In the Financial Years 2009, 2010, 2011, and 2012, we imported a total of 2.7, 3.3, 3.5 and 3.5 MT of coking coal valuing 29.85 billion, 27.31 billion, 38.15 billion and 48.85 billion, respectively. We procure approximately 10.0 percent of our coking coal from CCL, a subsidiary of CIL. In the Financial Years 2009, 2010, 2011, and 2012, we obtained a total of 0.5, 0.3, 0.4, and 0.5 MT valuing 2.14 billion, 1.82 billion, 2.19 billion and 3.03 billion, respectively, from CCL. Our Company also procures non-coking coal used in the power generation process from MCL, a subsidiary of CIL. In the Financial Years 2009, 2010, 2011 and 2012, VSP obtained a total of 1.3, 1.5, 1.3 and 1.3 MT valuing 1.67 billion, 2.14 billion, 1.91 billion, and 2.33 billion, respectively, from MCL.

**Limestone:**

Two types of limestone are used in the steel production process: BF grade limestone to convert iron ore to iron, and high grade low silica limestone to convert iron to steel. We import high grade limestone from the Ras Al Khaimah Rock Company in the United Arab Emirates. In the Financial Years 2009, 2010, 2011 and 2012, the cost of such purchases accounted for 1.3 percent, 1.3 percent, 0.8 percent, and 0.7 percent of our raw material purchases, respectively. In the Financial Years 2009, 2010, 2011 and 2012, we imported 0.5, 0.5, 0.4, and 0.5 MT at a cost of 753.29 million, 655.61 million, 583.59 million, and 602.43 million, respectively. We source most of our BF grade limestone from our mine in Jaggayapeta, Krishna district, in the state of Andhra Pradesh. In the Financial Years 2009, 2010, 2011 and 2012, our Company obtained a total of 0.4, 0.4, 0.4, and 0.4 MT, respectively, from our limestone mine.
Dolomite:

As with limestone, two types of dolomite are required in the production of steel; BF grade dolomite is combined with limestone, iron ore and coal in blast furnaces to convert iron ore into liquid iron, and SMS dolomite is used to convert hot metal to steel in LD converters. VSP currently source most of its dolomite requirement from our mine in Madharam, Khammam district in the state of Andhra Pradesh. In the Financial Years 2009, 2010, 2011 and 2012, we obtained a total of 0.6, 0.6, 0.5, and 0.5 MT, respectively, from our dolomite mine.

Energy:

VSP’s energy consumption accounted for approximately 5.5 percent, 6.9 percent, 5.7 percent, and 5.2 percent of VSP’s total raw materials and energy costs during the Financial Years 2009, 2010, 2011 and 2012, respectively. These costs consisted primarily of power and fuel. The cost per megawatt hour VSP purchased was 2,988.01, 4,861.57, 5,719.09, and 5,224.69, respectively, for the Financial Years 2009, 2010, 2011 and 2012. VSP currently has four generators, three of which each have a capacity of 60.0 megawatts and one which has a capacity of 67.5 megawatts. VSP also have facilities to generate 53.0 megawatts of power through waste heat utilisation of our back pressure turbine station and gas expansion turbine station. During the Financial Years 2008, 2009, 2010, 2011 and 2012, we generated 94 percent, 89 percent, 86 percent, 84 percent, and 86 percent, respectively, of our power in-house, and VSP purchased the balance necessary for our operations from public utilities.¹
Major Production Units:

- Raw Material Handling Plant (RMHP).
- Coke Oven & Coal Chemical Department (C & CCD).
- Sinter Plant (SP).
- Calcining & Refractory Material Plant (CRMP).
- Blast Furnace (BF).
- Steel Melting Shop (SMS).
- Light and Medium Merchant Mill (LMMM).
- Medium Merchant and Structural Mill (MMSM).
- Wire Rod Mill (WRM).
- Roll Shop and Repair Shop (RS & RS).

Service Units (works):

- Air Conditioning Systems (ACS).
- Central Maintenance – Electrical (CME).
- Central Maintenance – Mechanical (CMM).
- Civil Engineering Department (CED).
- Electrical Repair Shop (ERS).
- Electro Technical Laboratory (ETL).
- Energy Management Department (EMD).
- Engineering Shops & Foundry (ES & F).
- Environment Management Department (En MD).
- Field Machinery Department (FMD).
- Instrumentation Department (INSTM).
- Information Technology Department (ITD).
- Maintenance Management System (MMS).
- Plant Design (PD).
- Power Engineering Maintenance (PEM).
- Production Planning & Monitoring Department (PPM).
- Quality Assurance & Technology Development (QATD).
- Raw Materials Department (RMD).
- Refractory Engineering Department (RED).
- Safety Engineering Department (SED).
- Scrap & Salvage Department (SSD).
- Spare Parts Cell (SPC).
- Technical Services Department (TSD).
- Telecommunications Department (TELE).
- Terminal Power Plant (TPP).
- Traffic Department.
- Utilities Department.
- Water Management Department (WMD).

**Non – Works Departments:**

- Company Affairs Department (CA).
- Corporate Strategic Management (CSM).
- Finance & Accounts Department (F & A).
- Management Services Department (MS).
- Marketing Department (MKTG).
- Materials Management Department (MM).
- Medical Department.
- Personnel Department.
- Town Administration Department (TA).
- Training and HRD.
Other Departments:
- Mines Department.
- Projects Division.

Water Supply:
Operational water requirement of 36 MGD is being met from the Yeleru Water Supply Scheme.

Vision of RINL:
To be a continuously growing world Class Company, VSP shall:
- Harness our growth potential and sustain profitable growth.
- Deliver high quality and cost competitive products and be the first choice of customers.
- Create an inspiring work environment to unleash the creative energy of People.
- Achieve excellence in enterprise management.
- Be respected corporate citizens, ensure clean and green environment and develop vibrant communities around us.

Mission of RINL:
To attain 16 million tonne (Mt) liquid steel capacity through technological upgradation, operational efficiency and expansion; augmentation of assured supply of raw materials; to produce steel at international Standards of Cost and Quality; and to meet the aspirations of the stakeholders.

Objectives of RINL:
- Expand plant capacity to 6.3 million tonnes by 2011-12, with the mission to expand further in subsequent phases as per the Corporate plan.
• Revamp existing blast furnaces to make them energy efficient to contemporary levels, and in the process increase their capacity by 1.0 million tonnes, thus total hot metal capacity to 7.5 million tonnes.
• Be amongst top five lowest cost liquid steel producers in the world.
• Achieve higher levels of customer satisfaction.
• Vibrant Work Culture in the organization.
• Be proactive in conserving environment, maintaining high levels of safety and addressing social concerns.

Core values of RINL:

• Commitment.
• Customer Satisfaction.
• Continuous Improvement.
• Concern for environment.
• Creativity and Innovation.

VSP People:

People, the “RINL collective,” are the key to our success, and the Company has evolved suitable HR initiatives for multi-skilled training and constant learning. Many awards and merit certificates were earned by the employees for the company. Conferring of Prime Minister’s Trophy for the second time for Best Integrated Steel Plant in 2005-06 is a testimony to the Company’s commitment to excellence in steel making.

Employees:

The industrial relations situation at RINL during the year 2008 – 09 was by and large peaceful. The peaceful industrial relations climate was maintained in the
organization to sustain the production and productivity levels. Despite hectic union activities and the agitations of unions on issues including contract workers, a conducive environment prevailed. The proactive approach and measures taken enabled harmonious industrial relations. The organization structure of the plant is as shown in the Figure (3.2).

**Figure 3.2 Organisation Chart**
**Employee Training and Development:**

Facilitating employees to excel in their professional, personal and social life is a key element of the company’s HR objective. Emphasis of HR development during 2008-09 was on fulfilling position related training needs, emerging from the business needs of the company.

The company has evolved and implemented 1022 employee development training programmes covering 20489 participants and nearly 330 Management Development programmes organized over 8142 officers. Human capital development index achieved was 12.8. Fresher’s training covering 200 management trainees, 106 trainee khalasis, 591 junior trainees etc, was imparted during the year.

In addition, special need based training programmes, foreign training (covering 59 executives and 8 non executives), junior officers training (for 186 employees),apprentice training (226 no’s) etc were imparted.

**Corporate Social Responsibility:**

CSR initiatives in terms of giving training to ITI principals in Andhra Pradesh, training to school children on MS office package, vocational training covering 4489 students of engineering colleges and project work facilities / project based training were also imparted to students of various institutes and colleges. Library services covering fresh procurement of 1393 books and 3790 journals were organized and as many as 13204 employees utilized the library.

**Advent of “Centre for Business Systems” (CBS) & “Corporate Strategic Management” (CSM):**

The CBS was formulated to cater to the strategic needs of Vizag Steel. The focus of CBS is to study world-class initiatives and develop suitable framework for their adoption and implementation on an organization-wide basis at VSP.
CBS was inaugurated on 18th December 2003. On this occasion, a booklet on “Strategies to achieve the Vision Mission & Objectives of Vizag Steel” was released. VSP’s Knowledge Management Portal “Gnana” was launched on 26th July 2004, basically to capture and share unique experience in day to day operations.

CBS has four teams to assist other departments in implementation of the initiatives identified and thus guide VSP to achieve its cherished vision of becoming a world-class integrated steel plant. The four teams are:

- Corporate Management
- Technology & Automation
- Marketing Research
- Intellectual Capital Development

The above teams initiate activities pertaining to implementation of various aspects of the Business Excellence Model, alignment and integration of organizational goals along with management hierarchy through key performance indicator (KPI) charts, research on the latest technological developments in the steel industry for suitable adoption and benchmarking, initiatives leading to identification of new markets and niche markets, knowledge sharing initiatives like Knowledge.

Management etc., Groups of self organized employees from different areas of common interest called communities of practices (CoP’s) have been initiated which promote collaboration, information exchange and sharing of best practices among them.

The CBS has been merged with Corporate Planning Development and renamed as “Corporate Strategic Management” in order to suit the changing needs.
Achievements & Awards:

The efforts of VSP have been recognized at various forums. Some of the major awards received by VSP are in the area of energy conservation, environment protection, safety, quality, Circles, Rajyabhasha, MOU, sports and a number of awards at the individual level.

Some of the important awards received by VSP are:

- ISO 9001: 2000 Certificate for
1. Production of comprehensive range of Iron and Steel products, Coke & Coal chemicals, other saleable products like liquid nitrogen, liquid oxygen, liquid argon, ammonium sulphate and generation of power along with supporting & service departments.
2. Marketing of Iron and Steel products in export and domestic markets through a network of regional offices and branch offices.
3. Sale of power to state grid and sale of coke & coal chemicals, other saleable products like liquid nitrogen, liquid oxygen, liquid argon, ammonium sulphate in domestic markets.
   - Indira Priyadarshini Vriksha Mitra Award - 1992-93
   - Nehru Memorial National Award for pollution control 1992-93 & 1993-94
   - EEPC Export Excellence Award – 1994-95
   - CII (Southern Region) Energy Conservation Award – 1995-96
   - Golden Peacock (1st Prize) “National Quality Award – 96”
   - Steel Minister’s Trophy for “Best Safety Performance” – 1996
   - Selected for “World Quality Commitment Award – 1997”
• Gold Star Award for Excellent Performance in Productivity Udyog Excellence
  Gold Medal Award for Excellence in Steel Industry. Excellence Award for outstanding performance in productivity Management, Quality & Innovation.
• Ispat Suraksha Puraskar (1st Prize) for longest Accident Free Period 1991- 94
• Best Labor Management Award from the Govt. of AP
• SCOPE Award for Best Turnaround – 2001
• Environment Excellence Award from Greentech Foundation for Energy conservation – 2002
• Best Enterprise Award from SCOPE, WIPS – 2001- 02
• Best Enterprise Award from SCOPE for surpassing MOU targets – 2003- 04
• ISTD Award for “Best HR Practices” – 2002
• Prime Ministers Trophy for “Best Integrated Steel Plant – 2002-03
• “World Quality Commitment International Star Award” in the Gold category conferred by Business Initiative Directions, Paris
• “Organizational Excellence Award” for 2003-04 conferred by INSSAN
• National Energy Conservation Award, 2004 and Special Prize from Ministry of Power, Govt. of India.

The above awards are besides a number of awards at the local, regional & national level competitions in the area of Quality Circles, Suggestion Scheme etc.

**The Indian Steel Industry:**

India is the second largest country in the world, with a population of 1.2 billion people in 2011, according to the IMF, World Economic Outlook 2012. The Indian economy is also one of the fastest growing economies in the world, with a GDP growth of 10.5 percent in 2010, according to the IMF. Its GDP at current prices is estimated at US$1.8 trillion (96.9 trillion) for 2012, according to the IMF. The Indian
economy is better insulated from the global economy than several other Asian countries due to the fact that it does not rely heavily on exports to developed markets. This is compounded by strong economic fundamentals, which include high savings and investment rates and a rapidly growing middle class, helping to ensure a relatively stable economic performance for the country. India’s economy has grown significantly in recent years with a GDP growth rate estimated at 7.1 percent in 2011, 6.1 percent in 2012 and 6.5 percent in 2013 according to the IMF.

**Indian Steel Production:**

India is currently the fourth largest crude steel producer in the world, according to the Ministry of Steel, Government of India, and is forecasted to be the second largest steel producer by 2016, according to E&Y 2010. Unlike China, where there is significant excess steelmaking capacity, (Chinese crude steel capacity is expected to be 840.0 MT in 2012, which would be 22 percent in excess of the expected 688.0 MT of consumption), India remains a net importer of steel, which should allow for more growth in steelmaking capacity for domestic Indian steel companies. Indian crude steel production increased by a CAGR of 10.5 percent from 27.3 MT in 2001 to 66.8 MT in 2010, according to the WSA. In 2011, production increased by 5.7 percent. Production is expected to further increase by 15.3 percent in 2012 and by 13.4 percent in 2013, according to the Ernst and Young Global Steel - 2011 Trends, 2012 Outlook Report (“E&Y 2011”). In addition, steel producers have signed a total of 222 MoUs with the State Governments for a planned capacity addition of about 275.7 MT by 2020.

The Indian steel industry is classified into main producers (SAIL, Tata Steel Limited and RINL), major producers (plants with crude steel making capacity above 0.5 MTPA including Jindal Steel Power Limited (“JSPL”), JSW Steel Limited, Essar
Steel Limited and JSW Ispat Steel Limited) and other producers, according to the Joint Plant Committee. The other producers consist of a number of steel-making plants producing crude steel, semi-finished steel, non-flat steel and other downstream segments of flat steel. The following Table (3.6) sets for crude steel production from 2005 to 2012 by public and private sector.

**Table 3.6 crude steel production by public and private sector**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Sector</td>
<td>17.0</td>
<td>17.0</td>
<td>17.1</td>
<td>16.4</td>
<td>16.7</td>
<td>17.0</td>
<td>16.5</td>
</tr>
<tr>
<td>Private Sector</td>
<td>29.5</td>
<td>33.8</td>
<td>36.8</td>
<td>42.1</td>
<td>48.2</td>
<td>52.6</td>
<td>55.3</td>
</tr>
<tr>
<td>Total Production</td>
<td>46.5</td>
<td>50.8</td>
<td>53.9</td>
<td>58.4</td>
<td>64.9</td>
<td>69.6</td>
<td>71.7</td>
</tr>
<tr>
<td>% Share of Public Sector</td>
<td>36.5</td>
<td>33.5</td>
<td>32.0</td>
<td>28.0</td>
<td>26.0</td>
<td>24.4</td>
<td>23.0</td>
</tr>
</tbody>
</table>

Source: Joint Plant Committee (JPC)

**Indian Steel Consumption:**

Demand in India has been driven by the expanding oil and gas and power sectors and spending on infrastructural facilities, coupled with growth in the housing, consumer durables and automobile sectors. Apparent steel consumption in India is projected to grow 6.9percent in 2012 and 9.4percent in 2013 after recording a growth of 4.3percent in 2011, according to the WSA. The following chart Figure (3.3) sets out the domestic steel consumption for the periods indicated:

**Figure 3.3 Domestic Steel Consumption**
Among end-user sectors, the infrastructure and industrial construction sectors accounted for 40 percent of total steel consumption in India in the Financial Year 2012, followed by the pipes and tubes industry, which accounted for 10 percent of total steel consumption and the automobile sector, which accounted for 11 percent of total steel consumption in the same period, according to CRISIL Research. (Source: CRISIL Research, Steel Products - Outlook, September 2012).

The following chart Figure (3.4) sets out the percentage of steel consumption each sector accounted for during the Financial Year 2012:

**Figure 3.4 Percentage of Steel Consumption**

![Figure 3.4 Percentage of Steel Consumption](source: CRISIL Research, Steel Products – Outlook, September 2012)

Furthermore, according to E&Y 2010, an additional US$1 trillion of investment is expected to be made in the construction and infrastructure sectors during the 2012-17 period. Most infrastructure projects consume large amounts of long steel products, so there should be a corresponding increase in long steel demand. The following chart Figure (3.5) sets out the long steel consumption pattern in India during the Financial Year 2012:
The automobile and automobile components industries are also expected to drive the growth of steel consumption in India. According to the Society of Indian Automotive Manufacturers, the Indian automobile sector has grown rapidly in recent years, with total production growing at a CAGR of 13.3 percent from the Financial Year 2006 to the Financial Year 2011, driven by growth in production of all of its major segments such as passenger vehicles, commercial vehicles and utility vehicles. As the automobile industry consumes large amount of flat steel products, flat steel products also saw an increase of around 12.8 percent from the 2005-06 period to the 2010-11 period.

While there is currently a strong demand for steel, according to the WSA, India’s per capita consumption of finished steel is still relatively low at 56.3 kg as compared to China at 445.2 kg, Japan at 538.6 kg, the United States at 291.6 kg and a world average at 220.8 kg in 2010. Consequently, the Indian steel industry still has room to grow substantially, and the Indian steel sector has been targeted as a key sector for support by the Indian Government, which has encouraged further growth with its increased approval rate of Greenfield projects. In its Eleventh Five Year Plan, the Indian Government also established targets for increased total investment in domestic infrastructure from approximately 5 percent of GDP in Financial Year 2007.
to 9 percent by the Financial Year 2012. The Eleventh Five Year Plan included plans for an addition of 78,577 megawatts of power capacity and 511.8 MT of new capacity in ports, the expansion of India’s four-lane and six-lane highway systems and an expansion of its railway system’s freight capacity. This growth in infrastructure will be necessarily accompanied by a growth in steel demand.

**Indian Steel Prices:**

Similar to global steel prices, steel prices in India are volatile and fluctuate in response to changes in global supply and demand, raw material costs and general economic conditions. The Indian steel industry is linked to global steel prices and fluctuates in response to a combination of factors, including the availability and cost of raw materials, global production capacity, the existence of, and changes in, steel imports, exchange rates, transportation and labor costs and protective trade measures. The following Table (3.7) sets out the prices of steel and the key raw materials involved in the production of steel, iron ore and coking coal, for the periods indicated:

<table>
<thead>
<tr>
<th>Table 3.7 Prices of Steel and the Key Raw Materials</th>
</tr>
</thead>
</table>

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel prices</td>
<td>$/tonne</td>
<td>469</td>
<td>614</td>
<td>695</td>
</tr>
<tr>
<td>Iron ore contract price</td>
<td>$/tonne</td>
<td>61</td>
<td>108</td>
<td>148</td>
</tr>
<tr>
<td>Coking coal contract price</td>
<td>$/tonne</td>
<td>130</td>
<td>191</td>
<td>289</td>
</tr>
</tbody>
</table>

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel prices</td>
<td>Rs/tonne</td>
<td>32,792</td>
<td>36,812</td>
<td>39,575</td>
</tr>
<tr>
<td>Iron ore contract price</td>
<td>$/tonne</td>
<td>61</td>
<td>126</td>
<td>150</td>
</tr>
<tr>
<td>Coking coal contract price</td>
<td>$/tonne</td>
<td>130</td>
<td>215</td>
<td>290</td>
</tr>
</tbody>
</table>

(Source: CRISIL Research, Steel Products, Dec. 2011)
Public Sector Steel Plants in India:

The companies under the Ministry of Steel have performed well in the last three years. The contribution of Public Sector Enterprises to the public exchequer has gone up significantly. The contribution to Central and State Government exchequer by way of excise duty, customs duty, dividend, corporate tax, sale tax, royalty etc., has gone up by 84 percent from ` 8,978 crore in 2004 – 05 to ` 16,475 crore in 2006–07, and the trends up to the third quarter of 2007 – 08 indicate a figure of `12,596 crore.

The picture of public sector steel industry in India is given below:

1. **Steel Authority of India Limited (SAIL):**

Steel Authority of India Limited (SAIL) is a company registered under the Indian Companies Act, 1956 and is an enterprise of the Government of India. It has five integrated steel plant at Bhilai (Chattisgarh), Rourkela (Orissa), Durgapur (West Bengal), Bokaro (Jharkhand) and Burnpur (West Bengal). SAIL has three special and alloy steel plants viz., Alloy Steel Plant at Durgapur (West Bengal), Salem Steel Plant at Salem (Tamilnadu) and Visvesvaraya Iron and Steel Plant at Bhadravati (Karnataka). In addition, a Ferro Alloy producing plant Maharashtra Elektrosmelt Ltd at Chandrapur, is a subsidiary of SAIL. SAIL has Research & Development Centre for Iron & Steel (RDCIS), Centre for Engineering & Technology (CET), SAIL Safety Organisation (SSO) and Management Training Institute (MTI) all located at Ranchi; Central Coal Supply Organisation (CCSO) at Dhanbad; Raw Materials Division (RMD), Environment Management Division (EMD) and Growth Division (GD) at Kolkata. The Central Marketing Organisation (CMO), with its head quarters at Kolkata, coordinates the country-wide marketing and distribution network. SAIL Consultancy Division (SAILCON) functions from New Delhi.
2. **Maharashtra Elektrosmelt Ltd, (A Subsidiary of SAIL):**

Maharashtra Elektrosmelt Ltd. is situated in Chandrapur, Maharashtra and is a major producer of ferro manganese and silico manganese for captive use of SAIL Plants. The authorized and paid-up share capital of the company as on 31st March, 2007 were `30 crore and `24 crore respectively. SAIL’s holding is approximately 99.12 percent of the paid-up capital.

3. **Rashtriya Ispat Nigam Limited (RINL):**

RINL, the corporate entity of Visakhapatnam Steel Plant (VSP), is the first shore based integrated steel plant located at Visakhapatnam in Andhra Pradesh. The plant was commissioned in August 1992 with a capacity to produce three million tonnes per annum of liquid steel. The plant has been built to match international standards in design and engineering with state-of-the-art technology, incorporating extensive energy saving and pollution control measures.

Right from the year of its integrated operation, VSP established its presence both in the domestic and international markets with its superior quality of products. The company has been awarded all the three international standards certificates, namely, ISO 9001: 2000, ISO 14001: 1996 and OHSAS 18001: 1999.

RINL was accorded the prestigious ‘Mini Ratna’ status by the Ministry of Steel, Government of India in the year 2006, and the company is gearing up to complete the ambitious expansion works to increase its capacity to 6.3 MTPA by 2009. RINL has prepared a road map to expand the plant’s capacity upto 16 MTPA in phases by 2020.

The other public sector plants are: NMDC Ltd, Manganese Ore (India) Ltd (MOIL), MSTC Ltd, Ferro Scrap Nigam Ltd (FSNL), Hindustan Steel Works Construction Ltd (HSCL), MECON Ltd, Bharat Refractories Ltd (BRL), Sponge Iron
India Ltd (SIIL), Kudremukh Iron Ore Company Ltd (KIOCL), Bird Group of Companies (BGC), The Bisra Stone Lime Company Ltd (BSLC), The Karanpura Development Company Ltd (KDCL), Scott & Saxby Ltd (SSL) and Neelachal Ispat Nigam Ltd (NINL)\(^8\).

**Private Sector Steel Industry in India:**

The private sector of the Steel Industry is currently playing an important and dominant role in production and growth of steel industry in the country. The private sector units consist of both major steel producers on one hand and relatively smaller and medium units such as Sponge iron plants, Mini Blast Furnace units, Electric Arc Furnaces, Induction Furnaces, Re-rolling Mills, Cold-rolling Mills and Coating units on the other. They not only play an important role in production of primary and secondary steel, but also contribute substantial value addition in terms of quality, innovation and cost effectiveness\(^9\).

1. **TATA Steel Ltd:**

Tata Steel has an integrated steel plant, with an annual crude steel making capacity of five million tonnes located at Jamshedpur, Jharkhand. Tata Steel has completed the first six months of fiscal 2007-08 with impressive increase in its hot metal production. The Company has planned to take the capacity to 10 MT by the fiscal year 2010.

Tata Steel’s Greenfield projects in Orissa and Chattisgarh are progressing on schedule with placement of equipment order for Kalinganagar Project in Orissa and commencement of the land acquisition process. Jharkhand Project is awaiting announcement of Relief & Rehabilitation policy of the State Government.
2. **Essar Steel Ltd (ESL):**

   Essar Steel Holdings Ltd. (ESHL) is a global producer of steel with a footprint covering India, Canada, USA, the Middle East and Asia. It is a fully integrated flat carbon steel manufacturer, from iron ore to ready-to-market products. ESHL has a current global capacity of eight million tonnes per annum (MTPA). With its aggressive expansion plans in India and other parts of Asia and North America, its capacity is likely to go up to 25 MTPA by 2012. Its products find wide acceptance in highly discerning consumer sectors such as automotive, white goods, construction, engineering and shipbuilding.

3. **JSW Steel Ltd:**

   The organization has four plants namely: JSW Steel, Vijayanagar Works; JSW Steel, Tarapur & Vasind Works; JSW Jharkhand Steel Ltd and JSW Bengal Steel Ltd.

4. **Jindal Steel & Power Ltd. (JSPL):**

   Jindal Steel & Power Limited is one of the fast growing major steel units in the country. The Raigarh plant of JSPL has a present capacity of 1.37 MT per annum sponge iron plant, 2.40 MTPA Steel Melting Shop, 1.0 MTPA Mill, 2.30 mtpa Sinter Plant, 0.80 MTPA coke oven and a 330 Mega Watt captive power plant.

5. **Ispat Industries Ltd. (IIL):**

   IIL has set up one of the largest integrated steel plants in the private sector in India at Dolvi in Raigad District, Maharashtra, with a capacity to manufacture 3.00 MTPA of hot rolled steel coils (HRC). The Dolvi complex also boasts of an ultra modern blast furnace (setup by a group company Ispat Metallic Indian Ltd.) capable of producing 2.0 MTPA of Hot Metal/Pig Iron, a 2.0 MT capacity Sinter Plant (newly commissioned) and a DRI plant with a capacity of 1.60 MTPA. The integrated steel
plant is using the converter-cum-electric arc furnace route for producing steel. In this project, IIL have uniquely combined the usage of hot metal and DRI (sponge iron) in the electric arc furnace for production of liquid steel for the first time in India. For casting and rolling of liquid steel, IIL the state-of-the art technology called compact strip production (CSP) process, which was installed for the first time in India and produces high quality and specifically very thin gauges of Hot Rolled Coils.

6. **Bhushan Power & Steel Ltd. (BPSL):**

   Bhushan Power & Steel Ltd., although a new entrant in integrated steel making, has over 35 years of experience in the steel sector, being a part of the erstwhile Bhushan steel group. The company at present has five finished product plants in Chandigarh and Derabassi and one plant in Kolkata.

7. **Monnet Ispat & Energy Ltd (MIEL):**

   MIEL started its manufacturing activities in the year 1994, with one lakh tonnes per annum coal based sponge iron plant based on indigenous technology. Today it has emerged as one of the largest coal based sponge iron and manganese alloys manufacturers in the country. Apart from this, MIEL’s Raipur Sponge Iron Kiln has achieved a world record campaign of 525 days and is still in operation. The company has its own captive coal mines, and is the only Indian private company to operate underground coal mines. The company has created various benchmarks in the mining industry in terms of production (the highest producing underground coal mines), safety (awarded with DGMS safety awards for two consecutive years) and OMS. The company in a very short span of time has made a distinct mark in the steel sector, and has a mission to add 5.00 mtpa of high end steel products by 2012.
In addition to the above, some other industries like Sponge Iron Industry, Pig Iron Industry, Electric Arc Furnace Industry and Induction Furnace Industry are also contributing to enhance the production of iron and steel.

According to a report of South East Asia Iron and Steel Institute published in April’ 09, India’s economy is largely domestic consumption led and accordingly it has been less affected by the deceleration in global economic growth when compared to other countries. Exports account for 14 percent of GDP, while much of its growth is based on services, 54 percent of GDP.

The economic slowdown which hit the industry in the second half of 2008-09 had limited the GDP growth to 6.7 percent for the year 2008-09 against a growth of 9.0 percent for the year 2007-08. Industry wise comparative growth rates achieved in 2008–09 and 2007–08 make it clear that major steel consuming sectors like construction and manufacturing were hit badly during the year. Manufacturing sector registered a growth of 2.4 percent during 2008–09, against growth of 8.2 percent in 2007–08, and construction sector grew at 7.1 percent against a growth of 10.1 percent in 2007–08. However, initial signs of recovery have boom sighted from the trend of IIP growth rates, which turned negative during December 2008 and have been positive in the first two months of 2009–10. The following Table (3.8) shows the major iron and steel plants expansion capacity by 2020:
Table 3.8 Major Iron And Steel Plants Expansion Capacity By 2020

<table>
<thead>
<tr>
<th>Name of the Company</th>
<th>Existing Capacity</th>
<th>Expansion Capacity</th>
<th>Total capacity by 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAIL</td>
<td>16.00</td>
<td>24.00</td>
<td>40.00</td>
</tr>
<tr>
<td>TATA</td>
<td>4.00</td>
<td>29.70</td>
<td>33.70</td>
</tr>
<tr>
<td>JSW</td>
<td>3.80</td>
<td>27.20</td>
<td>31.00</td>
</tr>
<tr>
<td>Essar</td>
<td>4.60</td>
<td>19.10</td>
<td>23.70</td>
</tr>
<tr>
<td>JSPL</td>
<td>2.40</td>
<td>19.10</td>
<td>21.50</td>
</tr>
<tr>
<td>Ispat</td>
<td>3.00</td>
<td>16.00</td>
<td>19.00</td>
</tr>
<tr>
<td>RINL</td>
<td>3.00</td>
<td>13.00</td>
<td>16.00</td>
</tr>
<tr>
<td>Total</td>
<td>37.20</td>
<td>147.70</td>
<td>184.90</td>
</tr>
</tbody>
</table>

Source: Business India, March 9, 2008, P.52

The Global Steel Industry:

Evidence indicates that iron and steel items have been in use by mankind for almost 6000 years. But the modern form of iron and steel industry producing cheaper steel by mass production came into being only during the 19th century, after industrial revolution took roots in Great Britain and other European countries. However, the growth and development of world iron and steel industry was comparatively slow, and picked up at a significant rate after the Second World War. There is an emerging need to discuss the global iron and steel perspectives in this context.

Iron and steel comprises one of the most important inputs in various sectors of economy of a country. Steel industry is both basic and a core industry. History reveals that a country having strong potential for iron and steel industry played a prominent role in the advancement of civilization in the world.
Steel is such a versatile commodity that every object we see in our day to day life has used steel either directly or indirectly in its production. To mention a few it is used for items like nails, pins, needles etc., agricultural machinery, boilers, ships, fabrication tools, railways, automobile besides heavy machinery industry. The level of steel consumption has long been regarded as an index of industrialization and economic maturity attained by a country.

According to the World Steel Association (WSA) Crude Steel Production 2011, global crude steel production (of the 64 countries reported) in 2011 was approximately 1,490.1 MT, while global apparent steel consumption (which reflects the deliveries of steel to the marketplace from domestic steel producers and imported steel) of finished steel was 1,373.3 MT (Source: WSA Short Range Outlook, April 2012).

The global steel industry is cyclical in nature and the growth or decline of the steel industry is linked to the economic cycle of a country and, in particular, to industrial production and infrastructure development. Global production capacity, trade policies of countries and the regional demand-supply scenario also strongly influence the industry. Steel producers may attempt to reduce the impact of cyclicality through various measures, such as diversification of manufacturing operations to various geographies (preferably emerging markets with low-cost operations), vertical integration into raw material production, diversification of customer base and focus on value-added products.

**Global Steel Production:**

Growth in steel production has been volatile. According to the WSA, global steel production declined on average by 0.5percent per year from 1990 to 1995 and grew on average by 2.4percent per year from 1995 to 2000 and 6.1percent per year
from 2000 to 2005. Over the period from 2005 to 2011, global steel production increased by approximately 8.0 percent per year. Individual rates for these years ranged from a 14.9 percent growth in 2010 to a 7.9 percent reduction in 2009.

Overall global crude steel production (based on the 64 countries reporting) in 2011 was 1490.1 MT, a 5.1 percent increase in production over the previous year. In 2011, according to the WSA, crude steel production increased by 5.6 percent in Asia (9.0 percent increase in China, 5.7 percent increase in India, 14.7 percent increase in Taiwan and 1.8 percent decrease in Japan); increased by 6.8 percent in North America (7.1 percent increase in the United States); increased by 2.8 percent in the EU of 27 countries (“EU27”) (1.0 percent increase in Germany and 11.3 percent increase in Italy); increased by 10.7 percent in Other Europe (17.0 percent increase in Turkey); and increased by 3.9 percent in CIS Countries (2.7 percent increase in Russia and 5.7 percent increase in Ukraine).

Over the past decade, steel production has continued to shift from its traditional base in heavily industrialized countries to fast-growing emerging markets such as China and India. In 2000, the United States and EU27 accounted for approximately 34.8 percent of global steel production, and Japan accounted for 12.5 percent. At the same time, China and India accounted for 15.1 percent and 3.2 percent, respectively, of global steel production. By 2005, however, contribution by the United States and EU27 decreased to 25.4 percent of global steel production and Japan decreased to 9.8 percent, while China and India accounted for 30.9 percent and 4.0 percent, respectively. In 2011, the United States and EU27 accounted for only 17.7 percent of global steel production, Japan accounted for 7.2 percent, while China and India contributed 45.9 percent and 4.8 percent, respectively. According to the WSA, in 2011, China was the single largest producer of crude steel in the world, producing approximately 683.3 MT of crude steel, which represents a 9.0 percent increase in
production over 2010. In 2011, India was the fourth largest producer of crude steel, producing approximately 72.2 MT of crude steel.

The recent production shift to Asia has largely been the result of proximity to the major growth markets for steel consumption and the greater availability of key raw materials. While both Europe and the United States are experiencing weakness in Gross Domestic Product (“GDP”) and industrial production, the GDP of China and India is expected to grow by 8.2 percent and 6.9 percent in 2012, respectively, according to the World Economic Outlook published by the International Monetary Fund (April 2012) (“IMF”). Moreover, while production in Europe, Japan and the United States has improved following the economic slowdown in 2008 and 2009, steel producers in those regions face continued challenges due to slowing demand. The recent shift to Asia is also evident in the number of Asia based steel producers who are ranked among the top ten in crude steel production. In 2001, there were four European companies in the top ten steelmakers. In 2010, the only steelmaker in the top ten with headquarters in Europe was Arcelor Mittal. The following Table (3.9) shows the growth in world steel production from the year 2002 to 2011.

### Table 3.9 Growth in world steel production

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011*</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>182.4</td>
<td>222.3</td>
<td>282.9</td>
<td>333.2</td>
<td>419.1</td>
<td>489.3</td>
<td>500.3</td>
<td>573.6</td>
<td>626.7</td>
<td>683.3</td>
</tr>
<tr>
<td>EU 27</td>
<td>188.2</td>
<td>192.5</td>
<td>202.3</td>
<td>195.5</td>
<td>206.9</td>
<td>210.2</td>
<td>198.2</td>
<td>199.4</td>
<td>172.6</td>
<td>177.4</td>
</tr>
<tr>
<td>Japan</td>
<td>107.7</td>
<td>110.5</td>
<td>112.7</td>
<td>112.5</td>
<td>116.2</td>
<td>120.2</td>
<td>118.7</td>
<td>87.5</td>
<td>106.6</td>
<td>107.6</td>
</tr>
<tr>
<td>India</td>
<td>28.8</td>
<td>31.8</td>
<td>32.6</td>
<td>45.8</td>
<td>49.5</td>
<td>53.5</td>
<td>57.8</td>
<td>63.5</td>
<td>68.3</td>
<td>72.2</td>
</tr>
<tr>
<td>Russia</td>
<td>59.8</td>
<td>61.5</td>
<td>65.6</td>
<td>66.1</td>
<td>70.8</td>
<td>72.4</td>
<td>68.5</td>
<td>60.0</td>
<td>66.9</td>
<td>68.7</td>
</tr>
<tr>
<td>United States</td>
<td>91.6</td>
<td>93.7</td>
<td>99.7</td>
<td>94.9</td>
<td>98.6</td>
<td>98.1</td>
<td>91.4</td>
<td>58.2</td>
<td>80.5</td>
<td>80.2</td>
</tr>
<tr>
<td>South Korea</td>
<td>45.4</td>
<td>46.3</td>
<td>47.5</td>
<td>47.8</td>
<td>48.5</td>
<td>51.5</td>
<td>53.6</td>
<td>48.6</td>
<td>58.4</td>
<td>63.5</td>
</tr>
<tr>
<td>South America</td>
<td>40.9</td>
<td>43.0</td>
<td>45.9</td>
<td>45.3</td>
<td>45.3</td>
<td>48.2</td>
<td>47.4</td>
<td>37.8</td>
<td>43.9</td>
<td>48.4</td>
</tr>
<tr>
<td>Middle East</td>
<td>12.5</td>
<td>13.4</td>
<td>14.3</td>
<td>15.3</td>
<td>15.4</td>
<td>16.5</td>
<td>16.6</td>
<td>17.7</td>
<td>19.6</td>
<td>20.3</td>
</tr>
<tr>
<td>Rest of World</td>
<td>146.2</td>
<td>154.9</td>
<td>167.2</td>
<td>167.6</td>
<td>176.9</td>
<td>186.7</td>
<td>176.7</td>
<td>146.3</td>
<td>170.8</td>
<td>157.5</td>
</tr>
<tr>
<td>World</td>
<td>904.2</td>
<td>965.9</td>
<td>1071.4</td>
<td>1146.9</td>
<td>1247.1</td>
<td>1346.6</td>
<td>1325.2</td>
<td>1225.4</td>
<td>1417.3</td>
<td>1499.1</td>
</tr>
</tbody>
</table>
Global Steel Consumption:

According to the WSA, overall apparent steel consumption in 2011 was 1373.2 MT, representing a 6.2 percent increase over the previous year. The following Table (3.10) sets forth apparent steel consumption data by country or region for the periods indicated:

Table 3.10 steel consumption data by country or region

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(in Mt)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>191.1</td>
<td>240.5</td>
<td>275.8</td>
<td>347.5</td>
<td>377.7</td>
<td>422.5</td>
<td>434.7</td>
<td>548.1</td>
<td>576.0</td>
<td>623.9</td>
</tr>
<tr>
<td>EU27</td>
<td>162.4</td>
<td>164.2</td>
<td>172.4</td>
<td>166.1</td>
<td>189.3</td>
<td>200.6</td>
<td>182.3</td>
<td>118.9</td>
<td>147.3</td>
<td>152.8</td>
</tr>
<tr>
<td>Japan</td>
<td>71.7</td>
<td>73.4</td>
<td>76.8</td>
<td>76.7</td>
<td>79.0</td>
<td>81.2</td>
<td>77.9</td>
<td>52.8</td>
<td>83.5</td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>30.7</td>
<td>33.1</td>
<td>35.3</td>
<td>39.9</td>
<td>45.6</td>
<td>51.5</td>
<td>51.4</td>
<td>57.9</td>
<td>64.5</td>
<td>67.8</td>
</tr>
<tr>
<td>Russia</td>
<td>24.9</td>
<td>25.3</td>
<td>26.3</td>
<td>29.3</td>
<td>34.9</td>
<td>40.4</td>
<td>35.4</td>
<td>24.9</td>
<td>35.7</td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>107.3</td>
<td>105.7</td>
<td>120.9</td>
<td>110.3</td>
<td>122.4</td>
<td>111.2</td>
<td>101.1</td>
<td>59.3</td>
<td>82.9</td>
<td></td>
</tr>
<tr>
<td>South Korea</td>
<td>43.7</td>
<td>45.4</td>
<td>47.2</td>
<td>47.1</td>
<td>50.2</td>
<td>55.2</td>
<td>58.6</td>
<td>45.4</td>
<td>52.4</td>
<td></td>
</tr>
<tr>
<td>South America</td>
<td>23.0</td>
<td>23.3</td>
<td>30.8</td>
<td>29.3</td>
<td>34.7</td>
<td>38.7</td>
<td>41.5</td>
<td>31.4</td>
<td>42.7</td>
<td></td>
</tr>
<tr>
<td>Middle East</td>
<td>25.3</td>
<td>39.2</td>
<td>31.0</td>
<td>34.6</td>
<td>36.2</td>
<td>41.5</td>
<td>44.7</td>
<td>40.7</td>
<td>43.2</td>
<td>48.1</td>
</tr>
<tr>
<td>Rest of World</td>
<td>145.8</td>
<td>149.7</td>
<td>163.3</td>
<td>167.9</td>
<td>174.9</td>
<td>184.7</td>
<td>182.6</td>
<td>159.1</td>
<td>185.3</td>
<td></td>
</tr>
<tr>
<td>World</td>
<td>828.1</td>
<td>892.8</td>
<td>979.8</td>
<td>1049.2</td>
<td>1148.1</td>
<td>1227.5</td>
<td>1210.4</td>
<td>1183.6</td>
<td>1293.5</td>
<td>1373.3</td>
</tr>
</tbody>
</table>

Source: WSA Steel Statistical Yearbook 2011
(1) 2011 figures taken from WSA Short Range Outlook (Apr. 2012), pending publication of the WSA Statistical Yearbook 2012. Note that many of the countries were not reported in the Short Range Outlook.

Global Steel Prices:

Steel prices are volatile and fluctuate in response to changes in global supply and demand, raw material costs and general economic conditions. After a downturn in demand beginning in 1998, global steel prices reached a historic low in the third quarter of 2001. Since then, global steel prices have generally increased, reflecting stronger global demand, notably led by China. The steel industry also fluctuates in response to a combination of factors, including the availability and cost of raw
materials, global production capacity, the existence of, and changes in, steel imports, exchange rates, transportation and labour costs and protective trade measures.

In recent years, global steel prices have also been increasingly volatile due to an increase in suppliers across global markets and levels of steel trading as a percentage of total steel production.

**Global Steel Outlook:**

Despite a series of developments in 2011, including the European sovereign debt crisis, earthquakes in Japan, the political/social unrest in some countries of the MENA region leading to a related surge in oil prices and the tightening of government monetary measures in many emerging economies, world steel demand achieved a growth of 5.6percent in 2011, according to the WSA.

According to the WSA, apparent steel consumption in the United States is forecast to rebound by 5.7percent in 2012 and 5.6percent in 2013. Consumption in the EU27, however, is expected to decrease by 1.2percent in 2012, with a modest recovery of 3.3percent in 2013, bringing it back to 77.0percent of its 2007 level.

Japan's demand for steel is expected to decline by 0.6percent in 2012 due to the impact of exchange rate appreciation. In 2013, apparent steel consumption in Japan is expected to further decline by 2.2percent, reaching 77.0percent of its 2007 level. China, on the other hand, is expected to witness a continual growth of 4.0percent in 2012 and 4.0percent in 2013. India is also expected to increase its steel consumption by 6.9percent in 2012 and 9.4percent in 2013.

Emerging economies are expected to continue to drive growth. According to the WSA, by 2013, steel use in the emerging economies is forecast to be 45.0percent above 2007 levels, and will account for 73.0percent of world steel demand, as opposed to 61.0percent in 2007.
References:


5. www.vizagsteel.com


10. On the fast track: JSW is growing rapidly but must avoid getting caught in a debt Trap,” Business India, March 9, 2008.