

IRON & STEEL AND SCRAP



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IRON & STEEL AND SCRAP

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**GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES**

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9 Iron & Steel and Scrap

Steel is decidedly the vital component of a country's economy and is considered as amongst the driving force of modernisation. The level of per capita consumption of steel is treated as one of the important indicators of socio-economic development and living standards in any country. Steel continues to be the foremost engineering material, environment-friendly and recyclable.

The finished steel production in India has grown from a mere 1.1 million tonnes in 1951 to 73.42 million tonnes in 2011-12. The growth in the steel sector in the early decades after independence was mainly in the public sector units. However, following the adoption of new economic policy and subsequent deregulation and decontrol of Indian Iron & Steel Sector, the 1990s witnessed accelerated growth in the private sector, catapulting its share of finished steel from 45% in 1992-93 to 83.1% in 2011-12.

Steel exports from India began in 1964. Exports in the first five years were mainly as a result of recession in the domestic Iron and Steel market. Exports subsequently declined due to revival of domestic demand. India once again started exporting steel in 1975 only to witness slump in exports again due to rising domestic demand. Post liberalisation, a rejuvenation in the steel sector, resulted in large-scale exports of iron and steel. In 1991-92, the main producers exported 3.87 lakh tonnes iron & steel as against 9.26 million tonnes in 2011-12, including finished steel exports of 4.1 million tonnes. Though the country's production of iron & steel is sufficient to meet the domestic demand, it imports mainly finished/semi-finished steel and iron & steel (scrap) to meet requirement and supply of essential grades.

Liberalisation of the Indian Steel Sector

The Government's new economic policies have opened up opportunities for expansion of

the Steel Industry. With a view to accelerating growth in the steel sector, the Government since 1991 has been initiating and implementing a number of policy measures. These measures have impacted the Indian steel sector to achieve a positive growth.

NATIONAL STEEL POLICY-2005

The National Steel Policy (NSP) was announced in 2005. The salient features of the NSP 2005 are as under:

1. The NSP has set a target of 110 million tonnes of domestic steel production by 2019-20. This would require about 190 million tonnes iron ore. To meet the additional iron ore requirement, the Government plans to take the following steps:
 - (a) Create additional mining capacity of 200 million tonnes iron ore.
 - (b) Encourage investments totalling to about ₹ 20,000 crore.
 - (c) Ensure that clearances from authorities of Environment & Forest be obtained within a specified time frame.
 - (d) To make investment plans for large number of iron ore leases which are idle.
 - (e) Renewal of existing leases only against credible mining investment plans.
 - (f) Grant of fresh leases only against new norms and stringent assessment of technical and financial capabilities of the applicants.
 - (g) Restrictions on long-term exports of iron ore to a maximum of 5 year contract.
 - (h) Encourage sintering and pelletisation so as to use fines which make up about 90% of the present exports.

IRON & STEEL AND SCRAP

2. Projections for requirement of coking coal and non-coking coal were fixed at 70 million tonnes and 20 million tonnes, respectively, to achieve the target steel production. The NSP has recommended first priority to the Steel and Sponge Iron Industry in allocation of higher grade (below 12% ash content) non-coking coal. The policy makes it clear that 85% of the requirement of coking coal will have to be imported. Further, reduced rate of production of non-coking coal would necessitate import of non-coking coal as well for utilisation in the steel sector. The coal shortages have prompted the NSP to call for a constant review of allocation and pricing of natural gas as a suitable alternative.
 3. The NSP projects that 60% of the new steel capacity would come up through blast furnace route, 33% through sponge iron & EAF route and 7% through other routes. Sponge iron units are expected to increase capacity from 13 million tonnes at present to 38 million tonnes by 2020, especially in Jharkhand and Odisha. The NSP envisages a judicious blend of exports and domestic supply of steel.
 4. The NSP also seeks the upgradation and modernisation of the refractory industry.
 5. The NSP seeks to examine and formulate corrective measures to obtain fiscal incentives, which are usually available to other infrastructure projects as also the rationalisation of customs and excise duty structure for reducing the fiscal and revenue deficits.
 6. NSP 2005 is presently under review and Ministry of Steel has formulated a Committee in May, 2012 to review the existing National Steel Policy 2005.
- Further, the new National Steel Policy-2012 is being framed and some of the major objectives of the draft National Steel Policy 2012 are enumerated below:
- a) To attract investments in Indian steel sector from both domestic and foreign sources and facilitate speedy implementation of investment intentions on board so far, so as to attain crude steel capacity level of 300 million tonnes by 2025-26 to meet the domestic demand fully.
 - b) To ensure easy availability of vital inputs and necessary infrastructure to achieve a projected production level of 275 million tonnes by 2025-26.
 - c) To provide greater focus on Research and Development (R&D) for developing indigenous technologies, especially for finding solutions for optimum utilization of indigenous resources and mitigating the concerns of environment and climate change.
 - d) To develop indigenous capabilities of design, engineering and manufacturing of critical capital equipment required for steel production.
 - e) To encourage production and consumption of value added steel by providing necessary focus on availability and product development, especially for (a) meeting the special requirements of rural India; b) meeting the special requirement of auto, power, construction and shipping sectors; and c) producing lighter but stronger steel which helps in achieving higher energy efficiency in end applications and also helps in mitigating the concerns on environment, climate change and human health.

- f) To foster competition at the market place, discourage cartelisation and encourage production of quality steel for maximisation of consumer welfare and for protecting the interests of common man and the producers against unfair practices of domestic and overseas competitors.
- g) To ensure sustainable development of the industry with minimum possible displacement of local people and loss to their livelihoods and with minimum damage to the environment by adopting best practices in the production processes and ensuring adoption of environment friendly practices by the investors.
- h) To become globally competitive by achieving efficiency levels at par with the global standards especially in areas such as energy consumption, material efficiency, quality of steel, water consumption, productivity of major iron/steel making equipment, pollution levels and CO₂ emissions.

primary sector, there are 13 integrated steel plants in the public and private sectors.

The secondary sector constitutes Electric Arc Furnace/Induction Furnace, pig iron/sponge iron units, re-rolling units, HR units, CR units, galvanised/colour coated units, tin plate units, wire-drawing units, etc. for producing either semi-finished or finished steel.

Traditionally, Indian steel industry was classified into Main Producers and Secondary Producers. However, with the coming up of larger capacity steel making units of different process routes, the classification has been characterised as Main Producers & Other Producers. Other Producers comprise Major Producers in Private Sector namely, Tata Steel, Essar Steel, JSW Steel, Jindal Steel & Power Ltd, Bhushan Steel Ltd and Bhushan Power & Steel Ltd as well as large number of Mini Steel Plants based on Electric Furnaces & Energy Optimising Furnaces (EOF). Besides, the steel producing units, there are a large number of Sponge Iron Plants, Mini Blast Furnace units, Hot & Cold Rolling Mills & Galvanising/Colour Coating units which are spread across the country.

The structure of the Indian Steel Industry in 2011-12 is given in Table-1. Production of iron & steel by main producers and others during 2007-08 to 2011-12 is furnished in Table-2 and by public/private sector in Table-3. The details on plant-wise capacity and production of hot metal and crude/liquid steel are given in Table-4. Table-5 elucidates the production of crude/liquid steel by BOF and EAF/IF routes. Prices of steel are provided in Table-6.

STRUCTURE AND ROLE OF INDIAN STEEL INDUSTRY

India has risen to the 4th position as largest crude steel producing country in the world in 2011-12. The Indian Steel Industry comprises integrated steel plants in the primary sector using BF-BOF route of iron & steel production. In the

IRON & STEEL AND SCRAP

Table – 1 : Structure of the Indian Steel Industry, 2011-12

(In million tonnes)

Sector	Type of units	Working		Non-working		Total		Production	
		No. of units	Annual capacity	No. of units	Annual capacity	No. of units	Annual capacity	2010-11(R)	2011-12(P)
Primary (Crude/ Liquid Steel)	Integrated plants (Oxygen route)	13	35.55	–	–	13	35.55	30.65	31.24
Secondary	Electric Arc Furnace (EAF)	47	25.76	0	0	47	25.76	17.09	18.54
	Induction Furnace (IF)	1321	31.02	–	–	1321	31.02	22.94	24.01
	Pig iron	>19	+4.83	–	–	>19	+4.83	5.68	5.78
	Sponge iron	324	34.9	NA	NA	324	34.9	25.34	20.37
	HR (sheets/strips/plates rerolling units)	1720	30.98	568	4.21	2288	35.19	NA	NA
	HR steel (sheets, strips, plates units)	12	14.39	–	–	12	14.39	NA	NA
	CR Mills (sheets & strips)	65	9.55	–	–	65	9.55	6.72	6.93
	Steel wire drawing units	35	0.71	65	0.73	100	1.44	NA	NA
	GP/GC/PVC - coated sheets/strips	20	5.06	–	–	20	5.06	5.56	5.90
Tin plate	1	0.10	2	0.11	3	0.21	0.23	0.24	

Source: Annual Report of Ministry of Steel, 2012-13.

Table – 2 : Production of Iron and Steel, 2007-08 to 2011-12

(In '000 tonnes)

Item/producers	2007-08	2008-09	2009-10	2010-11(R)	2011-12(P)
I. Pig Iron : Total	5314	6207	5884	5684	5783
Main Producers	936	589	731	579	502
Other Producers	4378	5618	5153	5105	5281
II. Sponge Iron : Total	20376	21091	24326	25341	20372
Gas Based	5845	5516	6148	6071	5166
Coal Based	14531	15575	18178	19270	15206
III. Crude Steel : Total	53857	58437	65839	70672	73792
Main Producers	21789	21755	22969	23543	23314
ASP + VISL	315	263	308	308	291
Other Producers					
EAF Units (Including Corex & MBF/EOF)	14820	18365	22738	23880	26179
Induction Furnaces	16933	18054	19824	22941	24008
IV. Finished Steel for Sale (Alloy/Non-alloy) : Total	56075	57164	60624	68621	73416
Main Producers	18020	17216	18038	18407	17842
Other Producers	43332	46229	51093	57890	64918
Less: Inter Plant Transfer/Own Consumption	5277	6281	8507	7676	9344

Figures rounded off.

Source: Ministry of Steel, Annual Report, 2011-12 and 2012-13

EAF: Electric Arc Furnace, MBF: Mini Blast Furnace, EOF: Energy Optimising Furnace.

IRON & STEEL AND SCRAP

**Table – 3 : Production of Iron and Steel, 2007-08 to 2011-12
(By Sectors)**

(In '000 tonnes)

Item/producers	2007-08	2008-09	2009-10	2010-11(R)	2011-12(P)
I. Pig Iron : Total	5314	6207	5884	5684	5783
Public Sector	936 (17.6%)	589 (9.5%)	731 (12.4%)	579 (10.2%)	502 (8.7%)
Private Sector	4378 (82.4%)	5618 (90.5%)	5153 (87.6%)	5105 (89.8%)	5281 (91.3%)
II. Crude/Liquid Steel : Total	53857	58437	65839	70672	73792
Public Sector	17091 (31.7%)	16372 (28.01%)	16714 (25.4%)	16996 (24.05%)	16477 (22.33%)
Private Sector	36766 (68.3%)	42065 (71.98%)	49125 (74.6%)	53676 (75.95%)	57315 (77.67%)
III. Finished Steel for Sale (Alloy/Non-alloy) : Total	56075	57164	60623	68620	73416
Public Sector	13521 (24.1%)	12673 (22.2%)	13018 (21.5%)	13249 (19.3)	12386 (16.9%)
Private Sector	42554 (75.9%)	44491 (77.8%)	47605 (78.5%)	55371 (80.7%)	61030 (83.1%)

Figures rounded off.

Source: Ministry of Steel, Annual Report, 2011-12 and 2012-13.

**Table – 4 : Capacity and Production of Hot Metal and Crude/Liquid Steel, 2010-11 and 2011-12
(By Principal Producers)**

(In '000 tonnes)

Unit	Annual installed capacity		Production			
	Hot metal	Crude/Liquid steel	Hot metal		Crude/Liquid steel	
			2010-11(R)	2011-12(P)	2010-11(R)	2011-12(P)
Public Sector						
Bokaro Steel Plant (Jharkhand)	4585	4360	4108	4012	3592	3647
Bhilai Steel Plant (Chhattisgarh)	4700	3925	5708	5126	5329	3834
Rourkela Steel Plant (Odisha)	2120	1900	2303	2309	2160	2170
Durgapur Steel Plant (West Bengal)	2088	1802	2143	2099	1961	1914
IISCO Steel Plant, Burnpur (West Bengal)	550	500	495	451	411	330
Visvesvaraya Iron & Steel Plant (Karnataka)	205	118	131	118	108	91
Salem Steel Plant (Tamil Nadu)	–	320	–	–	NA	96
Alloy Steel Plant, Durgapur (West Bengal)	–	264	–	–	200	200
Visakhapatnam Steel Plant (Andhra Pradesh)	3400	3000	3830	3778	3235	3128
IDCOL Kalinga Iron Works Ltd	170	–	–	–	–	–
Private Sector						
JSW Steel Ltd (Karnataka)	NA	6800	NA	NA	6508	7363
Tata Steel Ltd (Jharkhand)	NA	6800	7501	7751	6856	7128
JSW Steel (Maharashtra)	2000	3000	NA	NA	2377	2466
Essar Steel Ltd (Gujarat)	NA	4600	NA	NA	3392	4309
Jindal Steel & Power Ltd (Chhattisgarh)	1670	3000	NA	NA	2270	2757
Lloyds Steel Industries Ltd (Maharashtra)	–	850	–	–	553	620
Jindal Stainless Ltd	–	NA	–	–	703	752

Figures rounded off.

Source: Annual Report of Ministry of Steel, 2011-12, 2012-13 and individual plants.

IRON & STEEL AND SCRAP

**Table – 5 : Production of Crude/Liquid Steel, 2007-08 to 2011-12
(By Route)**

Route/plant	2007-08	2008-09	2009-10	2010-11(R)	2011-12(P)
	(In '000 tonnes)				
All Routes : (A+B) Total	53857	58437	65839	70674	73792
A. Oxygen Route : Total	25966	26063	29832	30646	31242
Bhilai Steel Plant (Chhattisgarh)	5055	5183	5108	5329	4901
Durgapur Steel Plant (West Bengal)	1914	1886	1966	1961	1914
Rourkela Steel Plant (Odisha)	2093	2083	2128	2160	2170
Bokaro Steel Plant (Jharkhand)	4127	3577	3599	3592	3647
IISCO Steel Plant (West Bengal)	458	417	400	411	330
Salem Steel Plant (Tamil Nadu)	-	-	-	-	96
Visvesvaraya Iron & Steel Ltd (Karnataka)	158	95	103	108	91
Visakhapatnam Steel Plant (Andhra Pradesh)	3322	3145	3205	3235	3128
Tata Steel Ltd (Jharkhand)	5013	5646	6563	6856	7128
JSW Steel Ltd (Karnataka)	3147	3218	6254	6508	7363
Other Oxygen Route	872	995	506	486	474
B. Electric Route : Total	27891	32374	36007	40026	42550
Electric Arc Furnace	10958	14320	16180	17085	18542
Alloy Steel Plant, Durgapur (West Bengal)	157	168	205	200	200
Essar Steel Ltd (Gujarat)	3564	3342	3474	3392	4309
JSW Ispat Steel Ltd (Maharashtra)	2827	2201	2689	2377	2466
Jindal Steel & Power Ltd (Chhattisgarh)	1219	1457	1961	2270	2757
Lloyds Steel Ltd (Maharashtra)	463	460	505	553	620
Jindal Stainless Ltd (Haryana)	585	470	679	703	752
Other Electric Arc Furnace Route	2143	6222	6667	7590	7438
Electric Induction Furnace	16933	18054	19827	22941	24008

Figures rounded off.

Source: Ministry of Steel, Annual Report, 2011-12 and 2012-13.

IRON & STEEL AND SCRAP

**Table – 6 : Prices of Steel, 2009-10 to 2011-12
(Domestic Markets)**

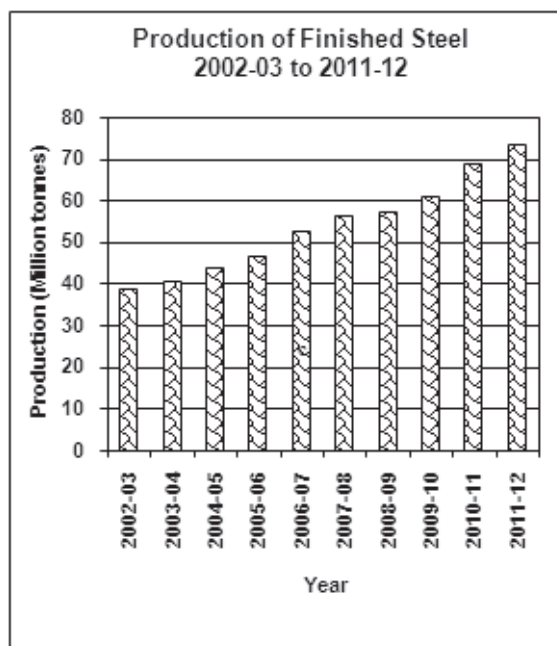
(In ₹ per tonne)

Grade	Market	2009-10	2010-11(R)	2011-12 (P)
CTD Bars (ISI, 8 mm)	Delhi	31600	32738	34742
Joists (150 x 75 mm)	"	29367	30312	32062
Channels (75 x 40 mm)	"	29437	30713	32671
MS Squares (8 mm)	"	30796	31755	33742
MS Angles (25 x 3 mm)	"	29965	31358	34532
Melting Scrap	"	19333	22704	27629
Blooms (SAIL, 150 mm)	Mandi Gobindgarh	40583	40860	39035
Heavy Slab (BOKARO)	"	26560	28971	32752
Melting Scrap (rolling)	"	20815	24355	29853
MS Rounds (10 mm)	"	28127	31196	38219
CTD Bars (ISI, 8 mm)	"	34446	36827	40900
MS Squares (8 mm)	"	27742	30637	37396
MS Angles (25 x 3 mm)	"	30965	33758	40256
Joists (150 x 75 mm)	"	28473	27957	30508
Induction Ingots (round)	"	25190	29588	35891
Old Ship Breaking Scrap	"	22962	26917	32427
Joists (150 x 75 mm)	Mumbai	28587	28173	30626
MS Angles (40 x 6 mm)	"	29046	30358	32892
Induction Ingots	"	23244	26515	30606
Melting Scrap	"	18121	22371	27740
CTD Bars (local 8 mm)	"	30985	30735	32975
MS Rounds (8 mm)	"	28792	30075	31915
CTD Bars (ISI, 8 mm)	Kolkata	25727	26348	28389
MS Squares (8 mm)	"	25881	25922	28085
MS Angles (25 x 3 mm)	"	25227	30819	34092
Channels (75 x 40 mm)	"	26446	26935	29221
Joists (150 x 75 mm)	"	22606	23131	25932
Induction Ingots	"	18729	19689	28048
Melting Scrap	"	15204	18380	25519
Arc Ingots	"	19131	20057	27913
Concast Billet Ingots	"	19223	20647	28954

Source: Minerals & Metals Review.

Finished Steel

The Indian Steel Industry continued to record increased production of finished steel from 56.08 million tonnes in 2007-08 to 73.42 million tonnes in 2011-12. Finished steel produced by the steel plants of SAIL in 2011-12 was 9.56 million tonnes. In 2011-12, Visakhapatnam Steel Plant of Rashtriya Ispat Nigam Ltd produced 2.83 million tonnes and Tata Steel produced 5.46 million tonnes. JSW Steel (Vijayanagar) is the largest finished steel producer among private sector integrated steel plants. It produced 6.89 million tonnes saleable steel (comprising 5.37 million tonnes flat products and 1.52 million tonnes long products). Various finished steel products produced by principal steel plants are furnished in Table-7.



Electric Arc Furnace (EAF)

Steel produced in the Secondary Sector is mostly by recycling of steel scrap using Electric Arc Furnace (EAF). Presently, there are 47 EAF based steel plants operational in the country with an aggregate capacity of 25.76 million tonnes per annum. The reported production of steel ingots/concast billets by EAF units in 2011-12 was estimated at 18.54 million tonnes as against 17.09 million tonnes in 2010-11 (Table-5).

The recent developments in EAF technology, viz, to increase oxygen consumption, to reduce power consumption and to reduce tap time have led to increase in metal production. The development of thin slab casting has made EAF route more productive. This route enables slab strips rolling at lesser cost, facilitating production of cheaper strips/sheets than those that can be achieved through BF/BOF route.

Induction Furnace (IF)

Presently, in India, EAF based industries are yet to switch over to induction furnace route. An induction furnace is an electrical furnace in which heat is generated through electro-magnetic

induction in an electrically conductive medium. Induction furnaces use steel melting scraps, sponge iron and pig iron/cast iron. On an average, the proportion of these items is 40% sponge iron + 10% cast iron or pig iron and the remaining is steel melting scraps. Induction furnace has capability to operate on a charge up to 85% DRI (sponge iron). There are 1,321 induction furnaces with an aggregate capacity of 31.02 million tonnes. These units reported production of about 24.01 million tonnes steel in 2011-12 as against production of 22.94 million tonnes in 2010-11.

Pig Iron

Pig iron is one of the basic raw materials required by the foundry & casting industry for manufacturing various types of castings for the engineering section. The main sources of pig iron have traditionally been the integrated steel plants of SAIL besides plants of Tata Steel Ltd and Rashtriya Ispat Nigam Ltd. Domestic production of pig iron lags and is not in tandem with the demand. Efforts were, therefore, made to increase pig iron manufacturing facilities in the secondary sector.

IRON & STEEL AND SCRAP

Table – 7 : Various Finished Steel Products Produced by Principal Steel Plants

Plant	Products
Bokaro Steel Plant (Jharkhand)	Plates, HR coils, HR sheets, CR coils, CR sheets, GP/GC sheets, TMBP.
Durgapur Steel Plant (West Bengal)	Bars & rods, rails & railway materials, wheels and axles, fish plates, sleeper structurals, bars, rods, TMT bars, skelp, bloom, billets, slabs.
Rourkela Steel Plant (Odisha)	Flat products, bars and rods, plate, HR coil, CR coil, CR sheets, GP/GC sheets, electrical sheets, electrolytic tin plates, spirally welded large dimension pipes.
Bhilai Steel Plant (Chhattisgarh)	Billets, slabs, rails & railway materials, heavy structurals and squares, plates, merchant products, wire rods, plates and blooms.
IISCO Steel Plant (West Bengal)	Bars & rods, rail & railway materials, foundry & pipes and structural steel.
Visvesvaraya Iron & Steel Ltd (Karnataka)	Stainless steel, tool steel, other alloys & steel, bearing steel, spring steel, free cutting steel, constructional steel (a) carbon steel, (b) case hardening steel & (c) heat treatable steel.
Visakhapatnam Steel Plant (Andhra Pradesh)	Steel products in long categories, finished steel (round & square), wire rods, re-bars, angles (equal & unequal), sections, channels, beams, saleable billets, flat products, light & medium merchant products (bars), medium merchant products (structural).
Tata Steel Ltd (Jharkhand)	Bars & rods, HR sheets and strips, CR coils, rolled/forged bars & structurals, plates, GP/GC sheets.
JSW Steel Ltd (Karnataka)	Plates, HR sheets, HR coils, CR coils/sheets, GP/GC sheets.
Ispat Industries Ltd (Maharashtra)	HR coils, CR coils/sheets, GP/GC sheets.
Essar Steel Ltd (Gujarat)	Plates, HR sheets, HR coils, CR coils/sheets, GP/GC sheets.
Jindal Steel & Power Ltd (Chhattisgarh)	Plates, structurals, HR coils, rails & railway materials.

Source: Annual Report of Ministry of Steel, 2011-12 and information from individual plants.

As a result of various policy initiatives taken by the Government, private sector showed considerable interest in setting up new pig iron units, especially in the post-liberalised period. This has resulted in drastic change, in the contribution of private/secondary sector units from merely 8% in 1991-92 to about 91.3% by 2011-12. In 2011-12, about 5.28 million tonnes pig iron was produced. The production

of pig iron by public and private sector plants is furnished in Table-3. The share of private/secondary producers in the years 2010-11 and 2011-12 was around 89.8% and 91.3%, respectively, in spite of the unprecedented increase in the prices of imported metallurgical coke that the industry was constrained with. Location and capacity of principal pig iron units in private sector are furnished in Table - 8.

Table – 8 : Location and Capacity of Principal Pig Iron Units

(In lakh tonnes)

Sl.No.	Unit	Location	Capacity
1.	Lanco Industries Ltd	Chittoor, Andhra Pradesh	2.25
2.	Sathavahana Ispat Ltd	Anantapur, Andhra Pradesh	1.20
3.	Jayaswal NECO Industries Ltd	Raipur, Chhattisgarh	7.50
4.	Sesa Goa Ltd	Bicholim, Goa	1.80
5.	Usha Martin Industries	Jamshedpur, Jharkhand	1.10
6.	JSW Steel Ltd	Bellary, Karnataka	7.20
7.	Kalyani Ferrous Industries Ltd	Koppal, Karnataka	1.20
8.	Kirloskar Ferrous Industries Ltd	Koppal, Karnataka	2.40
9.	KIOCL Ltd	Mangalore, Karnataka	2.27
10.	Usha Ispat Ltd	Redi, Maharashtra	3.00
11.	JSW Ispat Steel Ltd	Dolvi, Raigad, Maharashtra	20.00
12.	Kalinga Iron Works	Barbil, Keonjhar, Odisha	1.70
13.	Kajaria Iron Castings Ltd	Durgapur, West Bengal	1.10
14.	Electrosteel Castings Ltd	Khardah, West Bengal	1.10
15.	Tata Metaliks Ltd	Kharagpur, West Bengal	0.90
16.	Sona Alloys Pvt. Ltd	Satara, Maharashtra	3.14
17.	Aparant Iron & Steel Pvt. Ltd	Samguem, Goa	1.55

Source: Development Commissioner for Iron & Steel, Ministry of Steel, Kolkata and individual plants.

Sponge Iron

India is the largest producer of sponge iron in the world. Sponge is produced from iron ore by using non-coking coal. Direct reduced iron (DRI), called as sponge iron, is a metallic material formed by reduction of iron oxide at temperatures below the fusion point of iron. Hot briquetted iron (HBI) is a product obtained after densification process where the DRI feed material is at temperature more than 650°C at the time of moulding (hot briquetting) with density more than 5.0 g/cm³.

During early 1990s, sponge iron industry was specially promoted to provide an alternative to steel melting scrap which was increasingly becoming scarce. The production of sponge iron during the last five years is given in Table-2. The installed capacity of sponge iron has also increased over the years from 1.52 million tonnes in 1990-91 to currently at 34.9 million tonnes, which includes 3 gas-based units having

9.3 million tpy capacity. The production has risen from 0.9 million tonnes in 1991-92 to about 20.37 million tonnes in 2011-12. Over the years, the coal-based route has emerged as a key contributor to overall production; its share has increased from 63% in 2004-05 to 75% in 2011-12. About 80% coal-based sponge iron produced in the world comes from India. However, the constraints faced by sponge iron industry include non-availability of right grade of iron ore and non-coking coal at affordable prices.

Production of the sponge iron in the country has also resulted in providing an alternative feed material to steel melting scrap which was hitherto imported in large quantities by the Electric Arc Furnace units and the Induction Furnace units for steel making. This has resulted in a considerable saving in foreign exchange. The available data on annual installed capacity of principal sponge iron units are given in Table-9.

IRON & STEEL AND SCRAP

Table – 9 : Capacities of Principal Sponge Iron (DRI) Plants

(In lakh tonnes)

Unit	Location	Capacity
Gas-based		
Essar Steel Ltd	Hazira, Gujarat	68.00
Welspun Maxsteel Ltd (formerly Vikram Ispat)	Salav, Raigad, Maharashtra	9.00
JSW Steel (formerly Ispat Industries Ltd)	Geetapuram, Dolvi, Raigad, Maharashtra	16.00
Coal-based		
Action Ispat & Power Pvt. Ltd	Marakuta & Pandaripathar, Jharsuguda, Odisha	2.50
Adhunik Metaliks Ltd	Chandrihariharpur, Sundergarh, Odisha	1.80
Alliance Integrated Metallics Ltd	Bemta, Raipur, Chhattisgarh	5.00
Anjani Steel Ltd	Ujalpur, Raigarh, Chhattisgarh	1.02
API Ispat Powertech Pvt. Ltd	IGC Siltara, Raipur, Chhattisgarh	1.05
Beekay Steel & Power Ltd	Uliburu, Barbil, Odisha	1.05
Bhushan Steel & Strips Ltd	Meramandali, Dhenkanal, Odisha	3.00
Bihar Sponge Iron Ltd	Chandil, Singhbhum, Jharkhand	2.10
Crest Steel & Power Pvt. Ltd	IGC Borai, Durg, Chhattisgarh	1.15
Deepak Steel & Power Ltd	Topadihi, Keonjhar, Odisha	1.44
Gallant Metal Ltd	Samakhilai, Kachchh, Gujarat	1.70
Global Hi-tech Industries Ltd	Gandhidham, Gujarat	1.05
Goa Sponge Iron & Power Ltd	Santona, Sanguem, Goa	1.00
Godawari Power & Ispat Ltd	IGC Siltara, Raipur, Chhattisgarh	4.95
Goldstar Steel & Alloys Ltd	Srirampuram, Vizianagaram, Andhra Pradesh	2.20
Ind Synergy Ltd	Kotmar, Raigarh, Chhattisgarh	3.00
Jai Balaji Sponge Ltd	Baktarnagar, Raniganj, West Bengal	1.05
Jai Shri Balaji Steel Pvt. Ltd (HEG Ltd)	Borai, Durg, Chhattisgarh	1.20
Jayaswal Neco Ltd	IGC Siltara, Raipur, Chhattisgarh	2.55
Janki Corporation Ltd	Sidiginamola, Bellary, Karnataka	1.80
Jindal Steel & Power Ltd	Kharsia Road, Raigarh, Chhattisgarh	13.70
Lloyds Metals & Engineering Ltd	Ghuggus, Chandrapur, Maharashtra	2.70

(Contd.)

IRON & STEEL AND SCRAP

Table - 9 (Concl.d.)

Unit	Location	Capacity
Mastek Steels Pvt. Ltd	Holakundi, Bellary, Karnataka	1.05
MGM Steels Ltd	Chintapokhri, Dhenkanal, Odisha	1.00
Monnet Ispat Energy Ltd	Chandkhuri Marg, Hasaud, Raipur, Chhattisgarh	3.00
Monnet Ispat & Energy Ltd	Naharpalli, Raigarh, Chhattisgarh	5.00
MSP Steel & Power Ltd	Jamgaon, Raigarh, Chhattisgarh	1.92
Nalwa Steel & Power Ltd	Taraimal, Raipur, Chhattisgarh	1.98
Nova Iron & Steel Ltd	Dagori, Bilaspur, Chhattisgarh	1.50
OCL Iron & Steel Ltd	Lamloi, Sundergarh, Odisha	1.20
Orissa Sponge Iron Ltd	Palaspanga, Keonjhar, Odisha	2.50
Prakash Industries Ltd	Champa, Jangir Champa, Chhattisgarh	4.50
Rungta Mines Ltd	Karakola and Kamando, Sundergarh, Odisha	3.30
Sarda Energy & Minerals Ltd	IGC Siltara, Raipur, Chhattisgarh	2.10
Scaw Industries Pvt. Ltd	Gundichapara, Dhenkanal, Odisha	1.00
Shivshakti Steel Ltd	Chakradharpur, Raigarh, Chhattisgarh	1.00
Shri Bajrang Power & Ispat Ltd	Urla, Raipur, Chhattisgarh	2.10
Shraddha Ispat Pvt. Ltd	Santona, Sanguem, Goa	1.28
Shyam Sel Ltd	Dewabdighi, Burdwan, West Bengal	1.00
Singhal Enterprises Pvt. Ltd	Taraimal, Bilaspur, Chhattisgarh	1.94
Sree Metaliks Ltd	Loidapada, Keonjhar, Odisha	1.74
S.K.S. Ispat & Power Ltd	Raipur, Chhattisgarh	2.70
Sunflag Iron & Steel Co Ltd	Bhandara, Maharashtra	1.50
Sunil Ispat & Power Ltd	IGC Siltara, Raipur, Chhattisgarh	1.15
Sunil Sponge Iron Ltd	Chiraipani, Raigarh, Chhattisgarh	1.05
Tata Sponge Iron (Ipitata Sponge)	Joda, Keonjhar, Odisha	3.90
Topworth Steel Pvt. Ltd	IGC Borai, Durg, Chhattisgarh	1.65
Vandana Global Ltd	IGC Siltara, Raipur, Chhattisgarh	2.16
Vallabh Steels Ltd	Sahnawal, Ludhiana, Punjab	1.20
Visa Steels Ltd	KIC, Jajpur Road, Odisha	3.00
Zoom Vallabh Steels Ltd	Dughda, Saraikela-Kharswan, Jharkhand	1.20

I.G.C.: Industrial Growth Centre.

Source: *Sponge Iron Manufacturers' Association (SIMA) and individual plants.*

Apparent Consumption of Steel

India's per capita steel consumption increased from 38 kg in 2005-06 to 59 kg in 2011-12 and it is far below the level of other developed and developing countries. The world average of per capita steel consumption stands at 150 kg and that of developed country stands at 400 kg.

Apparent consumption of steel is calculated by taking into consideration export of steel, total domestic production and import of steel in the country. Sometimes, change in stock is adjusted to arrive at the consumption figures. It is also treated as the actual domestic demand of steel in the country. The apparent consumption of finished steel since 2002-03 is given in Table-10.

Table – 10 : Domestic Consumption of Finished Steel

(In million tonnes)	
Year	Consumption
2002-03	30.68 (11.81%)
2003-04	33.12 (7.95%)
2004-05	36.38 (9.84%)
2005-06	41.43 (13.88%)
2006-07	46.78 (12.91%)
2007-08	52.13 (11.41%)
2008-09	52.35 (0.42%)
2009-10	59.34 (13.35%)
2010-11	66.42 (11.93%)
2011-12	70.92 (6.78%)

Source: Annual Report, Ministry of Steel, 2008-09 to 2012-13.

Figures in parentheses indicate the percentage increase over the previous year.

The normal demand of steel for infrastructure is 23%, construction 22%, manufacturing 18%, automobiles 12%, consumer durables 6% and other sectors 19%. With the ongoing economic liberalisation resulting in faster economic growth, the steel consumption is expected to increase rapidly.

With the expansion of capacities in the integrated plants and installation of new plants, additional supply of steel in Indian markets has increased considerably. This has created an intense competition in the domestic market in the short run.

MODERNISATION & EXPANSION

Modernisation and expansion works undertaken by different plants are as follows:

SAIL

SAIL is in the process of modernising and expanding its production units. The objective is to achieve a production capacity of 26.2 million tonnes/annum of hot metal. The expansion plans would increase the hot metal production capacity of SAIL from 14.61 million tonnes in 2006-07 per annum to 26.18 million tonnes by 2012-13 as per the table given below:

(In million tonnes)	
Plant	Hot metal capacity by 2012-13
Bokaro Plant	7.44
Bhilai Plant	7.50
Rourkela Plant	4.50
Durgapur Plant	3.50
IISCO Plant	2.91
VISL	0.33
Total	26.18

Order for all major packages of ISP & SSP and part packages for expansion of Bokaro, Bhilai, Rourkela and Durgapur Steel Plants have been placed and they are in various stages of implementation. Objectives of expansion plan are:

- * 100% production of steel through Basic Oxygen Furnace (BOF) route.
- * 100% processing of steel through continuous casting.
- * Value addition by reduction of semi-finished steel.
- * Auxilliary fuel injection system in all the Blast Furnaces.
- * State-of-the-art process control computerisation/ automation.
- * State-of-the-art online testing and quality control.
- * Energy saving schemes.
- * Secondary refining and
- * Adherence to environment norms.

Bhilai Steel Plant

The Board of SAIL has given permission to the proposal in principle, for modernisation and capacity expansion of Bhilai Steel Plant to 7.5 million tonnes of hot metal and 7 million tonnes of crude steel per annum. The proposal includes: a) Installation of a new blast furnace; b) A new 7 metre tall coke oven battery and a new sinter machine; c) Phasing out of ingot route with 100% continuous casting by adding a new steel melting shop of 4 million tpy capacity; d) Installation of a universal beam mill of 1 million tpy capacity; e) Addition of a new bar & roll mill of 0.9 million tpy capacity; f) Installation of a new universal rail mill of 1.2 million tpy capacity and g) capacity expansion of plate mill to 1.42 million tpy.

Bokaro Steel Plant

The hot metal production capacity at Bokaro is likely to touch 7.44 million tpy by 2012-13 from 4.59 million tpy in 2006-07. The facilities as planned for expansion include a) new Steel Melting Shop Complex (SMS III) with an installed annual capacity of 3.8 million tonnes crude steel; b) Cold Rolling Mills Complex of 1.2 million tpy capacity and c) Rebuilding of three coke oven batteries.

Rourkela Steel Plant

The hot metal production from RSP is to reach to 4.50 million tonnes by 2012-13 from 2.12 million tonnes. The progress at RSP includes a) New half coke oven battery (0.23 million tpy); b) New Sinter plant (3.9 million tpy); c) New blast furnace (1.6 million tpy); d) Third BOF converter (150 tonnes); e) Third slab caster in SMS II; f) Upgradation of Hot Strip Mill and Plate Mill; g) New CRNO Line (0.1 million tpy) and h) New Pipe Coating Plant (0.06 million tpy).

Durgapur Steel Plant

DSP's hot metal production is projected to touch 3.50 million tonnes by 2012-13 from 2.06 million tonnes in 2006-07. The new facilities as planned are a) New Sinter Plant; b) Bloom-cum-Round Caster; c) Medium Structural Mill; d) Additional finishing Mill and e) New Bar and Rod Mill (0.6 million tpy).

IISCO Steel Plant

The plant is set to undergo modernisation-cum-expansion through which its hot metal production capacity will be raised to 2.91 million tpy by 2012-13.

Salem Steel Plant

Expansion and modernisation of the Salem Steel Plant envisages installing Steel Melting and Continuous Casting facilities to produce 180,000 tpy slabs along with expansion of Cold Rolling Mill complex for stainless steel products from 60,000 tpy to 146,000 tpy and an additional Roll Grinding Machine for Hot Rolling Mill for enhancing the production to 364,000 tpy.

Rashtriya Ispat Nigam Ltd (RINL)

Visakhapatnam Steel Plant (VSP) of RINL is the first shore-based integrated steel plant located at Visakhapatnam in Andhra Pradesh. The plant was commissioned in 1992 with a capacity to produce around 3 million tonnes of liquid steel per annum. 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. Visakhapatnam has excellent layout which allows expansion of the plant capacity. VSP is in the midst of implementing an expansion plan to double its annual liquid steel making capacity from the present level of 3 million tpy to 6.3 million tpy and is almost completed. Other units namely Blast Furnace-3 and Wire Rod Mill-2 with first billet rolling have been commissioned in April, 2012 and June, 2012, respectively.

Tata Steel Ltd (formerly TISCO)

The company has been rechristened as Tata Steel Ltd (TSL). The company has an integrated steel plant located at Jamshedpur, Jharkhand, with annual crude steel making capacity of 6.8 million tonnes. The 2.9 million tpy expansion inter alia comprises a 2.9 million tpy blast furnace, 6 million tpy pellet plant, 2.4 million tpy Linz - Donawit (LD) basic oxygen converter, etc. TSL has achieved a production of 5.16 million tonnes and 5.50 million tonnes of finished steel and 7.50 million tonnes and 7.75 million tonnes of crude steel in 2010-11 and 2011-12, respectively.

Setting up of a new integrated steel plant with 12.5 million tonnes capacity in Kalinganagar, Jajpur, Odisha by TSL is currently underway, which the company plans to complete in phases. Government of Odisha has allotted 2000 acres of land for the plant at Kalinganagar. The company has further plans to set up a 7.0 million tpy capacity integrated steel plant at Jagdalpur in Bastar region of Chhattisgarh. In the first phase, installation of a 2 million tpy capacity plant is likely to be taken up; and it is expected to be completed in 3.5 to 5 years. Capacity expansion to 5 million tpy will be undertaken subsequently. The process of acquiring of land is under progress. The company also signed an MoU with the Government of Jharkhand for setting up of a 12 million tonnes per year integrated steel plant at Saraikela in phases. The above projects are, however, subjected to raw material linkages and receipt of requisite approvals.

JSW Steel Ltd.

JSW Steel Ltd has combined (Karnataka, Tamil Nadu and Maharashtra) installed crude steels capacity of 14.3 million tpy with value added products constituting 1.8 million tpy spread across four locations; Toranagallu (Vijayanagar Works), Salem (Salem Works), Vasind, and Tarapur (downstream units). Vijayanagar Works existing operations produce flat and long steel products, Salem Works focus only in long products and the downstream units produce CR/Galvanised, colour coated, value added flat products. All the existing operating facilities have been accredited with OHSAS-18001, ISO-9001: 2000 and ISO - 14001. Vijayanagar Works has integrated operations from beneficiation plant to 1 million tpy Cold Rolling Mill Complex. The Salem Works has an integrated manufacturing facility with an overall crude steel capacity of 1 million tpy, comprising sinter plant, blast furnace, EOF, billet caster, bloom caster and rolling with associated facilities such as coke oven, power plant, oxygen plant, etc. The slabs and HR coil produced at Vijayanagar Works are further processed in downstream units at Vasind and Tarapur into value added HR plates, CR, galvanised, galvalume and colour coated products.

The Company has enhanced the total capacity to 10 million tpy at Vijayanagar Works. Two subsidiaries of the company - M/s JSW Bengal Steel Ltd and M/s JSW Jharkhand Steel Ltd are incorporated to set up greenfield steel plants with 10 million tpy capacity each in West Bengal and Jharkhand, respectively. The company is in possession of required land in West Bengal while in Jharkhand, it has obtained a mining lease for iron ore.

In January 2011, company acquired the assets of Integrated Steel Plant division of Bellary Steel & Alloys Ltd. In February 2011, the company commissioned the Sinter plant 3 (5.75 mtpa capacity) at Vijayanagar Works, the largest of such facility in India. In October 2011, the company signed a joint venture agreement with Marubeni-Itochu Steel Inc. Tokyo, (MISI) to set-up a steel processing center in North India, under the name of JSW MI Steel Service Center Pvt Ltd. The company has decided to set up a new cold rolling mill complex of 2.3 mtpa in two phases at its Vijayanagar Works, considering the growing demand from consumer durables and automobile segment for CRCA products. By 2020, the company aims to produce 34 million tonnes of steel annually with Greenfield integrated steel plants coming up in West Bengal and Jharkhand.

Jindal Steel & Power Ltd (JSPL)

JSPL has set up a rail & universal beam plant with capabilities to produce 120 m long finished rails, the longest in the world for the first time in India. The company has captive coal mines at Dongamahua in Raigarh district, Chhattisgarh and coal washing unit with capacity of 6 million tonnes per year to wash 47-48% coal ash to 26%. The sponge iron plant at Raigarh, Chhattisgarh has capacity of 1.37 million tpy. Facilities at Raigarh also include following capacities - steel 3 million tonnes (Rail and structurals 0.75 million tonnes, plates 1.00 million tonnes and slabs, rounds, blooms and billets 1.25 million tonnes), hot metal 1.67 million tonnes and captive power plant 623 MW.

As part of expansion projects, JSPL is setting up a 6 million tpy integrated steel plant at Angul in Odisha. Other plants being set up are : 6 million tpy integrated steel plant at Patratu, Jharkhand and 7 million tpy steel plant at Raigarh, Chhattisgarh. It

has planned to implement these projects in phases. The present plant at Raigarh is also under expansion to 7 million tpy (3 million tpy through EF route and 4 million tpy through BOF route) comprising 3 million tpy flat products and 4 million tpy long products. It will also have 6 million tpy gas-based DRI plant with matching coal gasification unit and 4 million tpy hot metal capacity.

Essar Steel Limited (ESL)

A state-of-the-art hot rolled coil steel plant was set up at Hazira, Gujarat with 4.6 million tpy capacity and is expanded to 10 million tonnes per annum. It is the largest fully-integrated manufacturer of high-quality flat steel products in western India. Company's operations include 8 million tpy and 12 million tpy beneficiation plants at Bailadila in Chhattisgarh and Dabuna in Odisha. Essar has the world's second largest slurry pipeline of 267 km and also 253 km to transport beneficiated iron ore slurry to the pellet plants namely, 8 million tpy pellet complex at Visakhapatnam, Andhra Pradesh and 6 million tpy plant at Paradip, Odisha. The Essar Steel Complex at Hazira in Surat district, Gujarat houses the world's largest gas-based single location sponge iron plant with a capacity of 6.8 million tpy. The complex also houses 1.4 million tpy cold rolling plant, 4.6 million tpy electric arc furnace, 4.6 million tpy continuous caster and 3.6 million tpy hot strip mill. Outstanding performance has been observed in the 3 DRI-HBI modules of the company.

The company has plans to set up a steel plant of 6 million tonnes per annum capacity at Paradip, Odisha. The scheme also includes installation of pellet plant and iron ore beneficiation plant. The company has plans to set up a steel plant of 3.2 million tonnes per annum capacity at Bastar, Chhattisgarh, (In first phase, a 1.6 million tpy steel plant with a captive power plant is to be set up), 3 million tonnes per annum in Jharkhand and 6 million tonnes per annum in Karnataka.

JSW Ispat Steel Ltd (formerly, Ispat Industries Ltd)

JSW Steel has acquired a 45.53% majority stake in JSW Ispat Steel w.e.f. 21.12.2010. It has set up one of the largest integrated steel plants in the private sector in India at Dolvi in Raigad district, Maharashtra. The plant has a capacity to produce

3 million tpy of hot rolled coils (HRC). The company also manufactures sponge iron and pig iron at their Dolvi complex. The company has a gas-based DRI plant of 1.6 million tpy capacity and an ultra-modern blast furnace of 2 million tpy capacity to produce hot metal/pig iron. It also has a 2.24 million tpy sinter plant at Dolvi. The integrated steel plant functions on the Converter-cum-Electric Arc Furnace route (CONARC process) to produce steel through modern Twin Shell Electric Arc Furnace.

JSW Ispat Steel Ltd, has plans to expand its HR coils capacity at Dolvi to 3.6 million tonnes per year. A new 2 million tonnes sinter plant, a 1,260 tonnes/day oxygen plant and a new electric arc furnace have also been commissioned at IIL Dolvi. The company is considering to scale up the plant capacity to 5 million tpy and also has plans to set up 5 million tpy integrated steel plant at Paradip, Odisha.

Neelachal Ispat Nigam Limited (NINL)

NINL has a 1.1 million tonnes per annum capacity iron & steel plant located at Duburi, Jajpur district, Odisha. The NINL and Odisha Government will be setting up one million tonne steel plant at Kalinganagar, Jajpur, Odisha. The other product of the company that is sold in the domestic market is granulated slag which is consumed by several cement plants.

NEW STEEL PROJECTS

In the context of long-term demand projection of steel, the Government adopted a two-pronged strategy for increasing steel production in the country. Firstly, through modernisation and expansion of existing public sector steel plants in the country and secondly, by offering initiatives plant to private sector to install new steel capacities. After the announcement of the Industrial Policy in 1991 and encouraged by the various other policy initiatives of the Government, substantial interest by several entrepreneurs to set up new steel plants has been witnessed. Besides the steel PSUs, massive capacity addition is in the pipeline by private steel producers including foreign direct investors. As per the latest information available, 301 MoUs have been signed in various states with intended capacity of around 488.56 million tonnes with an

investment of over ₹ 5-10 lakh crore by 2020. Some projects were at various stages of implementation. POSCO has planned to set up 12 million tpy capacity steel plant in Odisha by using "Finex" process with direct utilisation of sinter feed iron ore (-8 mm) besides utilising the advantages of "Corex" technology. Similar expansion is also coming up in secondary steel sector consisting of sponge iron, EAF, induction furnace, rolling mill, etc. With these new steel plants, contribution of private sector units is gradually increasing and this trend is expected to continue.

National Mineral Development Corporation Ltd

NMDC is now directing its resources to diversify into steel making. An integrated steel plant with a capacity of three million tonnes will be set up in Chhattisgarh near Nagarnar, Bastar district. NMDC is in the process of expanding its business through forward integration in both greenfield and brownfield projects by setting up (a) 2.0 million tpy pellet plant in Chhattisgarh (b) 1.2 million tpy pellet plant at Donimalai in Karnataka and (c) 0.36 million tpy BHI ore beneficiation plant at Donimalai.

Further, NMDC has acquired 50% equity in legacy Iron Ore Ltd Australia and has signed an MoU with RINL for laying a slurry pipeline from Bailadila Complex (Chhattisgarh) to Vizag (Andhra Pradesh) via Jagdalpur to facilitate evacuation of iron ore concentrate.

KIOCL Ltd

The company is operating 350 cu m capacity blast furnace at Panambur, New Mangalore Port for production of pig iron with 2.27 lakh tpy capacity and a Ductile Iron Spun Pipe (DISP) plant of 100,000 tonnes per year capacity. The hot metal from blast furnace will be the main feed stock for the DISP plant. The company was also in the process of selecting a joint venture equity partner for an integrated steel plant to be set up in Karnataka. The company also operates a 3.5 million tpy pellets plant at Mangalore with hematite ore purchased from NMDC. It has signed an MoU with Kerala State Industrial Development Corporation Ltd (KSIDL) for setting up of iron ore mining, beneficiation and pelletisation plant in Kerala.

VISA Steel Ltd

The Kolkata-based VISA Group was in the process of implementing a 500,000 tpy integrated special and stainless steel plant along with a 400,000 tpy coke

oven plant. Its first blast furnace with 225,000 tonnes of pig iron per annum capacity was commissioned in 2005 at Kalinganagar Industrial Complex, Odisha. The 250 cu m blast furnace will have carbon hearth refractories, stoves & blowers and twin pig casting machines.

IRON & STEEL SCRAP

Iron & Steel Scrap is one of the essential requirements for manufacture of steel in mini-steel industry. It is also consumed by some major steel plants. Scrap, especially from the ship breaking industry supplies substantial quantity of re-rollable steel and steel scrap for the iron & steel industry. Iron scrap is available in the country in the form of pressed bundles, a mixture of used steel components (called as a commercial scrap), turnings and borings and heavy melting scrap. These are generated by industries of all sectors like automobiles, railways and engineering workshops.

The collection and processing of scrap in an organised manner is undertaken by a few units in the country. In the local market, scrap is supplied by dealers who in turn arrange to have scrap collected manually or through sub-dealers.

The consumption of scrap is mainly reported by Induction Furnace and Electric Arc Furnace units, integrated steel plants and alloy steel & foundry industries. Scraps are used in the steel sector after recycling. Recycling scrap helps in conservation of energy as remelting of scrap requires much less energy than production of iron or steel from iron ore. Also, the consumption of iron and scrap by remelting reduces the burden on land fill disposal facilities and prevents the accumulation of abandoned steel products in the environment. It increases the availability of semi-finished material, which otherwise would have to be produced using the ore. Thus, it helps in conservation of natural resources.

Ship breaking

Ship breaking has been a major source of scrap generation. Ship breaking activities are carried out at various places on the Indian Coast, the largest concentration being in the West Coast. Private entrepreneurs handle the task of ship breaking in India. It is a labour-intensive job, and in India, it is cost efficient activity. Locations of present ship breaking activities are:

- i) Alang and Sosiya yards in Bhavnagar district, Gujarat,
- (ii) Sachana in Gujarat
- (iii) Mumbai and
- (iv) Kolkata

Alang & Sosiya yards account for 90% concentration of the ship breaking industry in India. During 2009-10, 2010-11 and 2011-12, a total of 379, 357 and 291 ships were beached by the industry accounting for 2.0 million tonnes, 3.1 million tonnes and 3.1 million tonnes, respectively, in terms of LDT (Light Displacement Tonnage, viz, physical weight of a ship). Today, Alang possibly represents the single largest concentration of ship breaking industry in the world. The life of an average ocean-going ship is about 20 years. About 40% of the ships broken are dry cargo ships, while the remaining 40% of the ships broken are wet cargo, tanker and specialised ships. These recyclable steels mainly as steel scrap provide feed to steel and foundry industry in India. The steel generated from ship recycling contributes to around 1% to 2% of the domestic steel demand.

The recommendations of a committee of Technical Experts on Ship Breaking set up by the Government of India on the directions of the Hon'ble Supreme Court have been accepted by the Hon'ble Supreme Court on 6.9.2007, on the issue of handling & management of the hazardous industrial waste generated during ship breaking. The Court has also directed the Government to formulate a comprehensive Code incorporating the recommendations which are operative till the statutes are amended. The Code is under formulation in the Ministry of Steel.

MSTC Ltd

(Formerly Metal Scrap Trade Corp. Ltd)

Presently, the company undertakes trading activities, e-commerce, disposal of ferrous and non-ferrous scrap, surplus stores and other secondary arising mostly from Public Sector

Undertakings and Government Departments, including Ministry of Defence. The Company also undertakes import of raw materials in bulk required by large industrial houses on back-to-back basis. The items of import include petroleum products, LAM Coke, Coking Coal, DR Pellets, HR Coils and Melting Scrap, etc. It also undertakes trading in items within the country in competition with any other private trader.

Ferro Scrap Nigam Ltd (FSNL)

FSNL has become a fully-owned subsidiary of MSTC Ltd under the Ministry of Steel. The company undertakes the recovery and processing of scrap, slag and refuse dumps, in the nine steel plants at Bhilai, Bokaro, Burnpur, Durgapur, Rourkela, Visakhapatnam, Dolvi, Duburi and Raigarh. The scrap so recovered is returned to the steel plants for recycling or disposal and the company is paid processing charges on the quantity recovered at varying rates depending on the category of scrap. Scrap is generated during iron & steel making and also in the Rolling Mills. In addition, the company provides steel mill services, such as scarfing of slabs and handling of BOF slag, etc.

The recovery of scrap by FSNL in 2011-12 was 2.16 million tonnes in comparison to 2.65 million tonnes in 2010-11.

TRADE POLICY

As per the modified Export-Import Policy incorporated under the Foreign Trade Policy (FTP) for 2009-14, the imports of primary forms of pig iron, spiegeleisen, sponge iron, ferro-alloys, stainless steel, remelting scrap, as also the semi-finished products of iron, non-alloy steel or stainless steel (such as flat-rolled products, bars, rods, coils and wires), primary and semi-finished forms of other alloy-steels, etc. are unrestricted. Similarly, the exports are also allowed freely. In order to preserve iron ore resources for domestic use on cheaper rates, export duty on iron ore has been increased to 30% ad valorem on all varieties of iron ore (except pellets) from December, 2011.

WORLD REVIEW

The world production of pig iron in 2011 was about 1,159 million tonnes as against 1,106 million tonnes in 2010. China, Japan, India, Russia, Rep. of Korea, Brazil, Ukraine, Germany and USA were the principal producers (Table-11).

World crude steel production in 2011 increased to 1,516 million tonnes from 1,429 million tonnes in 2010. China was the top producer accounting for 45% of world's crude steel production, followed by Japan (7%), USA (6%) and India (5%). Other important producers were Republic of Korea, Russia, Germany, Ukraine, Brazil, Turkey and Italy (Table-12).

FOREIGN TRADE

Exports

Exports of iron and steel (total) increased by 11% in 2011-12 to 9.26 million tonnes from 8.35 million tonnes in the previous year. Steel exports in 2011-12 comprised finished steel (including cold rolled sheets) 4.1 million tonnes (44%) and semi-finished steel (including steel ingots) 3.1 million tonnes (33%). Other items together accounted for remaining 23% exports. Exports in 2011-12 were mainly to USA (11%), UAE (9%), Belgium (6%), Nepal (5%) and Saudi Arabia & Spain (about 4% each). Exports of pig and cast iron including spiegeleisen increased to 8.2 lakh tonnes in 2011-12 from 8.1 lakh tonnes in the previous year. Exports were mainly to China (25%), Rep. of Korea (22%) and Thailand (19%) (Tables - 13 to 22).

Imports

Imports of iron and steel (total) in 2011-12 increased to 17.38 million tonnes from 14.40 million tonnes in the previous year. Imports in 2011-12 comprised semi-finished steel, including ingots 5.4 million tonnes (31%) iron and steel scrap 6.9 million tonnes (40%) and finished steel, including cold rolled sheets 3.6 million tonnes (21%). Imports in 2011-12 were mainly from China (15%), Republic of Korea (10%), USA, Japan & UK (7% each), UAE (6%) and Russia & Ukraine (4% each). The imports of pig and cast iron (including spiegeleisen) decreased to 44 thousand tonnes in 2011-12 from 48 thousand tonnes in the previous year. Imports were mainly from South Africa (20%), China (16%) and Sweden (11%) (Tables-23 to 32).

**Table – 11 : World Production of Pig Iron
(By Principal Countries)**

(In '000 tonnes)

Country	2009	2010	2011
World : Total	978000	1106000	1159000
Brazil	25135	30898	32600 ^(e)
China	552835	597333	629693
France	8104	10137	9698
Germany	20104	28560	27943
India	61677	64987	66460
Iran	10760	10532	12670
Japan	66943	82283	81028
Korea, Rep. of	27475	35065	42213
Mexico	8065	10075	10473
Russia	43900	48200	48200
Ukraine	25683	27366	28878
USA	19018	26843	29000
Other countries	108301	133721	140144

Source: World Mineral Production, 2007-2011.

**Table – 12 : World Production of Crude Steel
(By Principal Countries)**

(In '000 tonnes)

Country	2009	2010	2011
World : Total	1231000	1429000	1516000
Brazil	26506	32948	35220
Canada	9286	13013	13090
China	572182	637230	683883
France	12840	15414	15781
Germany	32670	43830	44284
India	63527	68321	72200
Iran	10873	11995	13040
Italy	19848	25750	28735
Japan	87534	109598	107601
Korea, Rep. of	48572	58914	68519
Mexico	14132	16870	18102
Russia	59200	66300	68400
Spain	14358	16343	15504
Taiwan	15873	20498	22879
Turkey	25304	29028	34107
Ukraine	30302	33446	35512
UK	10074	9708	9478
USA	58196	80495	86000
Other countries	119723	139299	143665

Source: World Mineral Production, 2007-2011.

IRON & STEEL AND SCRAP

**Table – 13 : Exports of Iron & Steel
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	8353454	505936539	9257059	606834662
USA	894043	71091860	1037296	95757998
UAE	618283	38510781	810231	45149799
Belgium	805860	31053189	581963	27221378
Nepal	263568	9159667	440719	16195476
Saudi Arabia	575230	42134255	412618	21244699
Spain	102043	5477683	365079	14992127
Germany	180359	23393470	258237	32302180
Italy	197802	16466301	287408	22515211
UK	373592	19458799	236615	19398556
Indonesia	102344	6074857	207022	16754620
Other countries	4240330	243115677	4619871	295302618

Source: DGCI & S, Kolkata.

**Table – 14 : Exports of Iron & Steel
(Finished Steel Including CR Sheet)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	4276634	247627934	4092036	239679414
USA	587468	39926662	535543	38450243
UAE	314944	21489051	388123	20111703
Indonesia	65376	3960084	181973	14050425
Myanmar	20336	932395	244447	11314945
Iraq	238211	11778329	165789	9014459
Nepal	107335	3109261	234600	8269492
Saudi Arabia	345924	32176129	160162	7935048
Iran	458790	21805502	129873	7010316
Belgium	84952	4996238	91548	6529648
Italy	130653	7282918	84031	5856863
Other countries	1922645	100171365	1875947	111136272

Source: DGCI & S, Kolkata.

**Table – 15 : Exports of Iron & Steel Wire
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	101051	13540016	180872	19154467
USA	16537	2399557	22044	3280276
Germany	9249	1769065	10385	2161069
Italy	5416	893491	7286	1265009
Belgium	4710	813669	9621	1161124
UAE	7540	395404	22919	1072135
France	5927	913014	5726	977212
UK	3797	666459	9496	814046
Turkey	2611	411582	3434	590102
Iran	730	127131	7378	464047
Saudi Arabia	315	29221	11890	461038
Other countries	44219	5121423	70693	6908409

Source: DGCI & S, Kolkata.

**Table – 16 : Exports of Iron & Steel
(Other Finished Steel, NES)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1427472	137091359	1813912	202806358
USA	220829	23486523	324342	43576199
Germany	111999	13157252	174666	19336743
UAE	121880	10401159	120400	13650050
UK	177438	11614244	116863	12762333
Italy	27675	3952870	43741	7626096
Canada	31401	2601975	66344	6472397
Saudi Arabia	56735	3916929	62902	5614923
South Africa	43731	3057454	80730	5097780
France	22373	2508266	30552	3973181
Nigeria	18025	1672165	47378	3852988
Other countries	595386	60722522	745994	80843668

Source: DGCI & S, Kolkata.

IRON & STEEL AND SCRAP

**Table – 17 : Exports of Iron & Steel
(Semi-Finished Steel Including Steel Ingot)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	2462885	105597743	3077643	142508319
Belgium	694350	22552312	456965	16307466
USA	69062	5266963	155031	10421450
UAE	172717	6202113	278322	10301650
Spain	22726	1005782	284439	9367875
Italy	34053	4336602	152343	7766123
Germany	39430	6086701	48857	7263314
Saudi Arabia	171725	6001715	177527	7225709
Nepal	126366	4786806	158282	6257046
Nigeria	90528	3644302	84928	3554618
Sri Lanka	98832	3717228	94383	3279519
Other countries	943096	41997219	1186566	60763549

Source: DGCI & S, Kolkata.

**Table – 19 : Exports of Iron & Steel: Alloy Steel
(Powder)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	89	7605	134	15496
Canada	6	706	74	9397
UK	5	1017	19	2834
Brazil	-	-	2	1082
UAE	31	2448	24	996
Saudi Arabia	2	600	5	480
Bangladesh	-	-	++	252
Belgium	-	-	1	174
Spain	++	124	1	113
South Africa	33	1003	8	108
Nepal	-	-	++	22
Other countries	12	1707	++	38

Source: DGCI & S, Kolkata.

**Table – 18 : Exports of Iron & Steel : Alloy Steel
(Granules)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	732	105131	724	49473
Saudi Arabia	4	201	132	7491
Germany	++	1	142	6946
USA	2	264	65	6365
France	-	-	139	6356
UAE	1	72	45	5717
UK	++	1	27	5042
Kenya	-	-	17	1681
Peru	-	-	22	1624
Jordan	-	-	25	1519
Canada	-	-	19	1467
Other countries	725	104592	91	5265

Source: DGCI & S, Kolkata.

**Table – 20 : Exports of Iron & Steel (Scrap)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	8301	538084	7301	601715
Sweden	2091	381027	2625	435511
China	3700	37064	1984	42818
Germany	194	24624	166	32385
Netherlands	150	13852	178	17147
Oman	1104	20383	428	11312
Chinese				
Taipei/Taiwan	37	9089	88	8024
UAE	170	3459	376	6347
Malaysia	-	-	50	5774
South Africa	10	1375	20	3024
Unspecified	-	-	824	18926
Other countries	845	47211	562	20447

Source: DGCI & S, Kolkata.

IRON & STEEL AND SCRAP

**Table – 21: Exports of Iron & Steel
(Sponge Iron)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	76290	1428667	84437	2019420
Bangladesh	7306	187046	28524	696979
Nepal	9936	165111	17194	455976
Malaysia	44110	819308	17610	380145
Kuwait	1216	22833	4069	103750
Chile	1300	21969	3966	91580
Indonesia	-	-	4142	86246
Bhutan	3675	46581	4272	71532
Pakistan	-	-	1550	40692
USA	96	7982	197	20498
Djibouti	1041	20943	716	17010
Other countries	7610	136894	2197	55012

Source: DGCI & S, Kolkata.

**Table – 22 : Exports of Pig & Cast Iron
(Including Speigeliessen)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	807783	15412694	821428	27396836
China	402751	6677291	202300	12668707
Korea Rep. of.	94696	1893162	183021	4210806
Thailand	97586	1942782	154151	3620555
Chinese Taipei/Taiwan	17695	444479	114371	2760426
Malaysia	20373	399006	73202	1762407
Indonesia	2861	71699	49828	1131303
Bangladesh	28	1209	19856	353121
Japan	57708	1110941	4300	129226
Vietnam	116	3282	5568	127422
Bhutan	16	376	5256	98951
Other countries	113953	2868467	9575	533912

Source: DGCI & S, Kolkata.

**Table - 23 : Imports of Iron & Steel
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	14401512	616497590	17381812	814625474
China	2787471	131656321	2592993	154709468
Korea, Rep. of	1436746	71703116	1670388	87281984
Japan	975544	57213855	1249861	77572961
USA	1189478	35281101	1254217	48715391
Germany	446603	28646270	505008	38364592
UK	855569	22649941	1174164	36783767
UAE	750588	19002979	1039922	30205510
Russia	698188	22451680	737686	27023242
Ukraine	681388	19693753	644067	23012650
Italy	163687	13964760	202147	19322099
Other countries	4416250	194233814	6311359	271633810

Source: DGCI & S, Kolkata.

**Table – 24: Imports of Iron & Steel
(Finished Steel Including CR Sheet)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	2981662	200100488	3631437	258832822
China	821118	50746614	1316828	79700840
Japan	419525	29890664	448401	36229380
Korea, Rep. of	397749	24925596	414201	30181632
Germany	132401	11844223	126400	13997780
USA	159878	11512603	165257	13096098
Italy	83975	7713635	139229	11619650
Belgium	112018	5603634	112205	6763589
Russia	101277	5415477	92214	5683815
France	63357	5401769	39595	5265901
Nepal	85929	4094506	77119	4647083
Other countries	604435	42951767	699988	51647054

Source: DGCI & S, Kolkata.

IRON & STEEL AND SCRAP

**Table – 25 : Imports of Iron & Steel
(Steel Wire)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	163060	11174142	154054	12647308
China	70749	3951062	58853	4028965
Nepal	16904	880091	20899	1112356
Korea, Rep. of	11013	873258	11064	1102414
Japan	3948	1111636	4760	1080529
Malaysia	20214	1053580	18835	1073813
Sweden	1012	639068	1382	938484
Germany	1082	299954	2245	523604
Thailand	5068	273453	9016	491603
USA	1813	197958	2074	266115
Chinese				
Taipei/Taiwan	2243	194681	2476	247108
Other countries	29014	1699401	22450	1782317

Source: DGCI & S, Kolkata.

**Table – 26 : Imports of Iron & Steel
(Other Finished Steel, NES)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	788681	94967205	576428	123553792
China	189051	21677531	199814	31262301
Japan	54353	7148914	41567	11546901
Germany	76195	7938977	36691	10887491
Malaysia	35987	7540822	46361	9582280
USA	202406	6046283	21369	7821004
Korea, Rep. of	71917	6965805	29640	7043804
Thailand	17863	3362546	21399	5803421
Italy	15678	3723229	16381	5153610
UK	10901	2919600	9298	4134061
UAE	22721	2432981	37704	4122335
Other countries	91609	25210517	116204	26196584

Source: DGCI & S, Kolkata.

**Table – 27 : Imports of Iron & Steel
(Semi-Finished Steel Including Steel Ingots)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	5853171	199872343	5379027	213386401
Korea, Rep. of	915142	35109601	1155744	45607078
China	1692996	54893008	804362	33511547
Japan	490717	18869671	722963	27945531
Ukraine	653721	18793115	591082	20868590
Russia	547286	15841704	551484	17837867
France	45997	2331147	228656	8724795
Austria	45240	2602253	104868	7100088
Germany	143758	6291175	87321	4963806
Belgium	84495	2985246	104592	4805351
Brazil	259593	7403852	134754	4432060
Other countries	974226	34751571	893201	37589688

Source: DGCI & S, Kolkata.

**Table – 28 : Imports of Iron & Steel:
Alloy Steel (Granules)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	13866	567809	15277	736042
Spain	4727	197434	5160	262311
China	1893	70707	2924	126369
France	1779	69559	1931	88261
Italy	1613	68372	1287	64783
Germany	329	18552	756	43141
South Africa	1166	43916	868	40173
Chinese				
Taipei/Taiwan	527	20108	860	36643
USA	165	9208	289	16618
Thailand	605	24701	295	11560
Ukraine	580	19912	223	9852
Other countries	482	25340	684	36331

Source: DGCI & S, Kolkata.

IRON & STEEL AND SCRAP

**Table – 29 : Imports of Iron & Steel : Alloy Steel (Powder)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	2068	39672	2263	543391
UK	133	68121	214	125553
Sweden	696	98495	549	97305
China	145	41091	250	71072
USA	645	105030	242	65645
Canada	373	39087	472	55123
Belgium	44	23490	104	44938
Germany	4	1551	166	33930
Japan	22	14906	35	11269
Korea, Rep. of	-	-	59	8777
Italy	2	3117	53	7699
Other countries	4	1904	119	22080

Source: DGCI & S, Kolkata.

**Table – 30 : Imports of Iron & Steel (Scrap)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	4557022	108688994	6962722	188938245
UK	773632	15670411	1068049	26604818
USA	777008	16007120	997377	24696624
UAE	663714	14120429	907825	22074168
South Africa	394668	7956590	602414	13821442
Netherlands	138417	10071507	207358	12863429
Germany	92791	2247929	251428	7914818
China	11519	276302	209684	6002782
Malaysia	95103	3949944	123909	5124278
Singapore	85094	2972743	100103	4104053
Sweden	74576	1561593	149127	3976165
Other countries	1450500	33854426	2355448	61755668

Source: DGCI & S, Kolkata.

IRON & STEEL AND SCRAP

**Table – 31: Imports of Iron & Steel
(Sponge Iron)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	41982	729817	660604	15987473
Oman	-	-	606610	14800323
Qatar	37775	650050	39000	906741
UAE	-	-	6515	139022
Saudi Arabia	508	7820	4776	84964
Russia	3256	48822	1579	19827
Trinidad	-	-	964	19002
USA	156	4083	433	6929
China	++	6	278	5594
Brazil	-	-	380	3714
Sweden	229	9743	59	954
Other countries	58	9293	10	403

Source: DGCI & S, Kolkata.

**Table – 32 : Imports of Pig & Cast Iron
(Incl. Spiegeleisen)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	48291	2316267	44156	2713997
Sweden	6669	366669	4804	365418
China	5288	238398	6992	363391
South Africa	10464	294281	8816	316854
Germany	724	205999	1564	238831
Italy	3532	172208	3995	202601
USA	1893	120152	1902	166465
Japan	222	69090	401	139038
France	1823	105789	1483	129096
Spain	4596	187910	2524	126230
UK	341	66224	288	110871
Other countries	12739	489547	11387	555202

Source: DGCI & S, Kolkata.

FUTURE OUTLOOK

India ranked fourth as a largest producer of crude steel in the world and is expected to become the 2nd largest producer by 2015-16, provided all requirements for fresh capacity creation are met. The Steel Industry in general is on the upswing due to strong growth in demand propelled by the strong domestic demand for steel particularly from the construction, manufacturing and automotive sectors. India is also the largest producer of sponge iron in the world. The economic reforms and the consequent liberalisation of the Iron & Steel sector brought a sea change in the industry, particularly in the field of greenfield steel plants in the private sector.

The growth of the steel sector is linked intricately with the growth of the Indian economy, especially with growth of the steel consuming sectors. Union Budget 2013-14 has maintained its focus on infrastructure development, especially rural infrastructure. This coupled with 12th Plan's target of trillion dollar infrastructure investment are big positives for steel demand.

As per the report of Working Group on Mineral Exploration and Development (other than coal & lignite) for XII Five Year Plan (2012-17) of the Planning Commission, technologies for agglomeration, pelletisation and direct use of fines to produce steel must be identified and taken up in Mission Mode to achieve the national goal to produce 200 million tonnes per annum of steel by 2020.