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IRON, STEEL & SCRAP AND SLAG

(FINAL RELEASE)

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

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9 Iron, Steel & Scrap and Slag

Iron & steel is decidedly the vital component of a country's economy and is considered pivotal amongst the driving forces 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 of engineering materials, which is not only environment-friendly but also is recyclable.

The total finished steel (alloy/stainless+non-alloy) production in India has grown from a mere 1.1 million tonnes in 1951 to 101.287 million tonnes (measured in terms of crude steel equivalent) in 2018-19. The contribution of non-alloy, alloy and stainless steel segment is 94.844 million tonnes, 3.538 million tonnes and 2.905 million tonnes respectively. 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 production from 45% in 1992-93 to 83 % in 2018-19.

Steel exports from India began in 1964. Exports in the first five years were mainly as a result of low demand in the domestic Iron and Steel market. Exports subsequently declined due to revival of domestic demand. India once again started exporting steel in 1975 which subsequently registered a slump due to rising domestic demand. Post liberalisation, a rejuvenation in the Steel Sector resulted in large-scale exports of iron and steel. In 2018-19, India's total finished steel (alloy/stainless+non-alloy) exports & imports were at 6.36 & 7.83 million tonnes, respectively. 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 specific requirements and supply of essential grades.

Liberalisation of the Indian Steel Sector

At the time of independence in 1947, India had only three steel plants – the Tata Iron & Steel Company, the Indian Iron & Steel Company and

Visveswaraya Iron & Steel Ltd and a few electric arc furnace-based plants. In the period till 1947, the viable steel producers in the country that operated with a capacity of about 1 million tonnes was wholly under the Private Sector. The provisions of the economic policy implemented during the different phase of time engendered several marked changes in Indian Steel Industry. From the fledgling one million tonne capacity status at the time of independence, India has now risen to be the 2nd largest crude steel producer in the world and the largest producer of Sponge Iron. From a negligible global presence, the Indian Steel Industry is now globally acknowledged for its product quality.

The rapid pace of growth of the Industry and the observed market trends called for certain guidelines and framework. Thus, was born the concept of the National Steel Policy, with the aim to provide a roadmap of growth and development for the Indian Steel Industry. The National Steel Policy (NSP), 2005 was announced in November 2005 as a basic blueprint for the growth of a self-reliant and globally competitive steel sector. The long-term objective of the National Steel Policy 2005 was to ensure that India has a modern and efficient steel industry of world standards, catering to diversified steel demand. The focus of the policy was to attain levels of global competitiveness in terms of global benchmarks of efficiency and productivity. Then, after a detailed review in 2017, the Government released the National Steel Policy 2017, which laid down the broad roadmap for encouraging long-term growth for the Indian Steel Industry, both on demand and supply sides, by 2030-31, with a vision to create a technologically advanced and globally competitive steel industry that which would promote economic growth. At the same time, as a facilitator in the present-day de-regulated, liberalised economic/market scenario, the Government also announced a policy for providing preference to domestically manufactured Iron & Steel products in Government procurement. This policy seeks to accomplish Hon'ble Prime Minister's vision of 'Make in India' with the objective of nation building and to encourage domestic manufacturing.

NATIONAL STEEL POLICY

The Government has recently rolled out three national landmark policies

- (i) National Steel Policy 2017.
- (ii) Policy on Preference to Domestically Manufactured Iron & Steel Products.
- (iii) Steel Scrap Recycling Policy.

(I) National Steel Policy 2017

NSP 2017 aims to increase focus on expansion of MSME Sector, improve raw material security, enhance R&D activities, reduce import dependency and cost of production, and thus develop a technologically advanced and globally competitive steel industry that which would promote economic growth eyeing self-sufficiency in production, developing globally economical steel manufacturing capabilities by facilitating investments and cost efficient productions with adequate availability of raw materials.

With focus on R&D through establishment like Steel Research Technology Mission of India (SRTMI), the technology would be of utmost focus over the next decade and MSME steel plants would be the key drivers to achieve the additional capacity required for the India's consumption led growth and improvement in the overall productivity and quality.

Some of the Highlights of the National Steel Policy 2017 are enumerated below:

1. The Indian Steel Sector has grown rapidly over the past few years and presently India has become the world's 2nd largest producer of crude steel in January- December 2019, producing 111.245 million tonnes (MT) (provisional) crude steel with growth rate 1.8% over the corresponding period last year (CPLY).

2. The New Steel Policy, 2017 aspires to achieve 300 million tonnes of steel making capacity by 2030. This would translate into additional investment of ` 10 lakh crore by 2030-31.

3. The Policy seeks to increase consumption of steel and the major segments that are likely to influence consumption would be Infrastructure, Automobiles and Housing. New Steel Policy seeks

to increase per capita steel consumption to the level of 160 kg by 2030.

4. Potential of MSME Steel Sector has been recognised. Policy stipulates encouragement and adoption of energy-efficient technologies in the MSME Steel Sector to improve the overall productivity and reduce energy intensity.

5. Steel Ministry will facilitate R&D in the Sector through the establishment of Steel Research and Technology Mission of India (SRTMI). The initiative is aimed with a purpose of creating an environment to spearhead R&D of national importance in Iron & Steel Sector utilising tripartite synergy amongst Industry, national R&D laboratories and academic institutions.

6. Ministry through policy measures will ensure availability of raw materials like iron ore, coking coal and non-coking coal, natural gas etc. at competitive rates.

7. With the roll out of the National Steel Policy-2017, it is envisaged that the Industry will be steered in creating an environment for promoting domestic steel and thereby ensuring a scenario where production meets the anticipated pace of growth in consumption, through a technologically advanced and globally competitive Steel Industry. This will be facilitated by Ministry of Steel, in coordination with relevant Ministries, as may be required.

The principal objectives that the National Steel Policy 2017 aims to achieve are the following:

- a) Build a globally competitive industry with a crude steel capacity of 300 million tonnes by 2030-31.
- b) Increase per Capita Steel Consumption to 160 kg by 2030-31.
- c) To domestically meet entire demand of high-grade automotive steel, electrical steel, special steels and alloys for strategic applications by 2030-31.
- d) Increase domestic availability of washed coking coal so as to reduce import dependence on coking coal to 50% by 2030-31.
- e) To be net exporter of steel by 2025-26.

- f) Encourage industry to be a world leader on energy and raw material efficient steel production by 2030-31, in a safe and sustainable manner.
- g) Develop and implement quality standards for domestic steel products.

Expected Impact/Outcome of NSP 2017

- a) India to be world leader in energy efficiency and sustainability.
- b) Cost-effective and quality steel destination.
- c) Attain global standards in Industrial Safety & Health.
- d) Substantially reduce the carbon footprint of the industry.
- e) Domestically meet the entire demand of high grade steel.

Steps taken by Ministry for Achieving the Targets in NSP 2017

a) To fulfill policy objectives Ministry of Steel organised a conclave on “Capital Goods for Steel Sector: Manufactured in India” on 23rd October, 2018 at Bhubaneswar Odisha.

b) Ministry of Steel has appointed a consultant for development and implementation of a strategic roadmap for the Ministry of Steel in relation to the National Steel Policy, 2017.

(II) Policy on Preference to Domestically Manufactured Iron & Steel Products (DMI&SP)

The Government has introduced the Policy on preference to DMI&SP in Government tenders. The policy mandates for domestic value addition of 15% on the imported input steel to be eligible for big ticket public procurement in steel. The policy encourages the downstream companies to set up capacities for steel products which were otherwise getting directly imported in the past, leading to substantial outflow of valuable Forex.

Objective of this policy is to provide a level playing field for the domestic manufacturers and not to encourage inefficient practices. The policy mandates to provide preference to DMI&SP in government procurement for its own use and not with a view to commercial resale. The policy is applicable to all such projects and procurements, where the aggregated estimated value of the “iron &

steel products” is either ` 50 crore or more. DMI&SP has been defined as those iron & steel products, in which a minimum value addition of 15% has taken place domestically.

The policy is envisaged to promote growth and development of domestic Steel Industry and reduce the inclination to use low-quality and low-cost (unfairly traded) imported steel in Government funded projects.

Impact of the DMI&SP Policy

The policy has been well-appreciated by the Industry players and some of the major implications of the policy has been as follows-

- (i) GAIL had to cancel several tenders on procurement of steel pipe in order to comply with the DMI&SP Policy.
- (ii) ONGC was given waiver for limited time period of 1 to 2 years, to float procurement tender for various categories of steel pipes, till the time the domestic industry builds its capability through their product development programme.
- (iii) Railways had to comply with the policy and their global procurement tender for rails was not in the line with the spirit of the Policy.

The Policy has provided and is expected to further provide significant savings to the Indian Economy and restrict the use of low quality and cheap imported steel in Government funded projects, alongside developing domestic capability for import substitution.

(III) Steel Scrap Recycling Policy

Ministry of Steel has issued the Steel Scrap Recycling Policy, which is notified on 07th November 2019. The Preamble of the policy states that "Ministry of Steel’s endeavor is to develop a globally competitive steel industry by adopting state-of-the-art environment-friendly technologies. Ferrous scrap being the primary raw material for EAF/IF based steel production, the policy envisages a framework to facilitate and promote establishment of metal scrapping centers in India. This will ensure scientific processing & recycling of ferrous scrap generated from various sources and a variety of products. The policy framework shall provide standard guidelines for collection, dismantling and shredding activities in an organised, safe and environmentally sound

manner". The policy aims to achieve the following objectives –

- (i) To promote circular economy in the Steel Sector
- (ii) To promote a formal and scientific collection, dismantling and processing activities for end of life products that are sources of recyclable (ferrous, non-ferrous and other non-metallic) scraps which will lead to resource conservation and energy savings and setting up of an environmentally sound management system for handling ferrous scrap.
- (iii) Processing and recycling of products in an organised, safe and environment-friendly manner.
- (iv) To evolve a responsive ecosystem by involving all stakeholders.
- (v) To produce high quality ferrous scrap for quality steel production thus minimising the dependency on imports.
- (vi) To decongest the Indian cities from ELVs and reuse of ferrous scrap.
- (vii) To create a mechanism for treating waste streams and residues produced from dismantling and shredding facilities in compliance to Hazardous & Other Wastes (Management & Transboundary Movement) Rules, 2016 issued by MoEF & CC.
- (viii) To promote 6Rs principles of Reduce, Reuse, Recycle, Recover, Redesign and Remanufacture through scientific handling, processing and disposal of all types of recyclable scraps including non-ferrous scraps, through authorised centers/ facilities.

STRUCTURE AND ROLE OF INDIAN STEEL INDUSTRY

India has become the world's 2nd largest producer of crude steel in the calendar year 2018. Earlier, as per the Notifications released by Ministry of Steel dated 12.12.2013 and 24.04.2015, a steel plant had been classified on the basis of process route/technology adopted and on the basis of size/capacity. The classification was Primary steel producers, Integrated steel producers, Secondary steel producers and other steel producers. Subsequently, the guidelines for classification have been revised vide Notification dated 12.05.2016, and as per the latest classification, steel producers with their registered office addresses will be listed plant-wise & location-wise in accordance with the crude steel production capacity. The earlier classification along

with process route adopted for iron/steel making as 'Integrated steel plants', 'Primary steel producers', 'Secondary steel producers', 'Main producers', 'Major producers' and 'Others' stands to be withdrawn as per the latest notification.

In 2018-19, the total production of pig iron was 6.414 million tonnes and the percentage share of Private Sector and Public Sector was about 91% and 19% respectively.

In the year 2018-19, the production of sponge iron was 34.705 million tonnes. The production of crude steel was 110.922 million tonnes and finished steel was 101.287 million tonnes.

The Secondary Steel 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.

The important iron & steel units in India are Steel Authority of India, Rashtriya Ispat Nigam, Tata Steel, Essar Steel, JSW Steel and Jindal Steel & Power 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 2018-19 is furnished in Table-1. Production of iron & steel, crude steel, pig iron and finished steel (alloy + non-alloy) by SAIL, TSL, RINL, ESL, JSWL, JSPL and other producers along with production of crude steel from oxygen route, electric arc furnace route and induction furnace route during the year 2014-15 to 2018-19 has been reflected in Table-2 along with the production of sponge iron through gas-based & coal-based units during the year 2014-15 to 2018-19. The production of iron & steel by Public and Private Sectors during 2014-15 to 2018-19 is furnished in Table-3. The details on plant-wise capacity and production of hot metal and crude/liquid steel are listed out 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.

Table – 1 : Structure of the Indian Steel Industry, 2018-19

(Capacity/Production: In million tonnes)

Sector	Total Annual capacity	Production	
		2017-18	2018-19
Crude Steel	142.236	103.132	110.922
(A) Producer-wise			
SAIL, TSL, RINL, ESL, JSWL, JSPL	75.032	59.387	63.534
Other Producers	67.204	43.745	47.388
(B) Sector-wise			
Public Sector	25.432	19.753	21.496
Private Sector	116.804	83.378	89.426
Hot Metal	80.478#	68.0167	74.377
Pig iron	NA	5.728	6.414
Sponge Iron	46.556	30.511	34.705
Total Finished Steel (Non alloy + Alloy + stainless)	NA	126.855	101.287
(A) Finished Steel (Non-alloy)	NA	117.914	94.844
Non-Flat Products	NA	45.100	47.873
Flat Products	NA	72.814	46.971
(B) Finished Steel (Alloy)	NA		3.538
Non-Flat Products	NA		3.316
Flat Products	NA		0.222
		8.942*	
(C) Finished Steel (Stainless)	NA		2.905
Non-Flat Products	NA		1.017
Flat Products	NA		1.888

*Source: Ministry of Steel; Annual Report, 2019-20 and JPC;**Note : The figures related to 2018-19 are not comparable to the other FYs, as they are reported in terms of Crude Steel Equivalent. This change is due to change in reporting system of JPC as approved by Ministry of Steel and Industry Experts. # : Hot Metal/Pig Iron ; * : Total Finished Steel (Alloy/Stainless) ; Figures rounded off.***Table – 2 : Production of Iron and Steel, 2014-15 to 2018-19**

(In '000 tonnes)

Item/producers	2014-15	2015-16	2016-17	2017-18	2018-19
I. Pig Iron : Total	10228	10240	10342	5728	6414
SAIL, TSL, RINL, ESL, JSWL, JSPL	1213	1287	905	726	953
Other Producers	9015	8953	9437	5002	5461
II. Sponge Iron : Total	24243	22427	28762	30511	34705
Gas Based	2354	2440	4854	6458	6899
Coal Based	21889	19987	23908	24053	27806
III. Crude Steel : Total	88979	89790	97936	103132	110921
Integrated steel Plants (SAIL, TSL, RINL, ESL, JSWL and JSPL)					
Oxygen Route	36610	36174	39711	41845	44602
EAF Units	9473	11247	15775	17542	18932
Other Producers					
Oxygen Route	961	2221	2291	5645	4853
E.A.F Route	13652	13352	13187	8879	9544
IF Route	28283	26796	26972	29221	32990
IV. Total Finished Steel (Non alloy + Alloy+ Stainless)	104578	106602	120140	126855	101287
SAIL, TSL, RINL, ESL, JSWL, JSPL	50717	52225	61927	69143	56014
Other Producers	53861	54377	58213	57712	45273

*Source: Ministry of Steel; Annual Report, 2019-20.**Note : The figures related to 2018-19 are not comparable to the other FYs, as they are reported in terms of Crude Steel Equivalent. This change is due to change in reporting system of JPC as approved by Ministry of Steel and Industry Experts.*

**Table – 3 : Production of Iron and Steel, 2014-15 to 2018-19
(By Sectors)**

(In '000 tonnes)

Item/producers	2014-15	2015-16	2016-17	2017-18	2018-19
I. Pig Iron : Total	10228	10240	10342	5728	6414
Public Sector (SAIL+RINL)	920	732	573	364	588
Private Sector (JSWL+JSPL+ Other Blast Furnace /Corex Unit)	9308	9508	9769	5364	5826
II. Crude/Liquid Steel : Total	88979	89790	97936	103131	110922
Public Sector	17205	17920	18456	19753	21496
Private Sector	71774	71870	79480	83378	89426
III. Finished Steel (Non-Alloy+Alloy+ Stainless): Total	104578	106602	120140	126855	101287
Public Sector (SAIL+RINL)	14206	14333	16571	17944	16933
Private Sector (TSL + ESL+JSWL+JSPL +Other Producers)	90372	92269	103569	108911	84354

*Source: Ministry of Steel; Annual Report, 2019-20.**Note : The figures related to 2018-19 are not comparable to the other FYs, as they are reported in terms of Crude Steel Equivalent. This change is due to change in reporting system of JPC as approved by Ministry of Steel and Industry Experts.***Table – 4 : Capacity and Production of Hot Metal and Crude/Liquid Steel, 2017-18 and 2018-19
(By Principal Producers)**

(In '000 tonnes)

Unit	Annual installed capacity		Production			
	Hot metal	Crude/Liquid steel	Hot metal		Crude/Liquid steel	
			2017-18	2018-19	2017-18	2018-19
Public Sector						
Bokaro Steel Plant (Jharkhand)			4046	4209	3694	3833
Bhilai Steel Plant (Chhattisgarh)			4280	4752	4072	4447
Rourkela Steel Plant (Odisha)	17105	19132	3320	3836	3220	3658
Durgapur Steel Plant (West Bengal)			2282	2515	2042	2219
IISCO Steel Plant, Burnpur (West Bengal)			2055	2200	1801	1888
Visvesvaraya Iron & Steel Plant (Karnataka)			-	-	-	-
Salem Steel Plant (Tamil Nadu)			-	-	97	117
Alloy Steel Plant, Durgapur (West Bengal)			-	-	96	101
Rashtriya Ispat Nigam Ltd (Andhra Pradesh)	7500	6300	5132	5770	4731	5233
Private Sector						
JSW Steel Ltd	16500	18000	15011	15477	16407	16743
Tata Steel Ltd (Jharkhand)	12600	13000	13855	14236	12459	13228
Essar Steel Ltd (Gujarat)	3490	10000	3002	3257	6753	6813
Jindal Steel & Power Ltd (Chhattisgarh)	5325	8600	3147	5042	4014	5254
Others	17958	67204	11886	13083	43745	47388
Other BOF	-	-	-	-	5645	4853
Other EAF	-	-	-	-	8879	9545
IF Units	-	-	-	-	29221	32990

Source: Ministry of Steel, Annual Report, 2019-20 and JPC.

**Table – 5 : Production of Crude/Liquid Steel, 2015-16 to 2018-19
(By Route)**

Route/plant	2015-16	2016-17	2017-18	2018-19
	(In'000 tonnes)			
All Routes: (A+B) Total	89790	97936	103131	110921
A. Oxygen Route : Total	38275	41894	47392	49455
Bhilai Steel Plant (Chhattisgarh)	5058	4737	4072	4447
Durgapur Steel Plant (West Bengal)	1975	2042	2042	2219
Rourkela Steel Plant (Odisha)	2730	2932	3220	3658
Bokaro Steel Plant (Jharkhand)	3392	3154	3694	3833
IISCO Steel Plant (West Bengal)	871	1394	1801	1888
Visvesvaraya Iron & Steel Ltd (Karnataka)	42	39	-	
Visakhapatnam Steel Plant (RINL, Andhra Pradesh)	3641	3962	4731	5233
Tata Steel Ltd (Jharkhand)	9960	11688	12459	13228
JSW Steel Ltd (Karnataka)	8385	9655	9728	10096
Bhushan Steel Ltd	-	-	3167	2810
Other Oxygen Route	2221	2291	2478	2043
B. Electric Route: Total	51515	56042	55739	61466
Electric Arc Furnace	24719	29070	26518	28476
Salem Steel Plant (Tamil Nadu)	120	108	97	117
Alloy Steel Plant, Durgapur (West Bengal)	91	88	96	101
Essar Steel Ltd (Gujarat)	3685	5391	6753	6813
JSW Ispat Steel Ltd//JSW Steel Ltd (Maharashtra)	4294	6851	6679	6647
Jindal Steel & Power Ltd (Chhattisgarh)	3177	3445	4014	5254
Lloyds Steel Ltd	569	575	560	518
Jindal Stainless Ltd	1258	1391	1497	1554
Bhushan Steel Ltd	3078	5601	87	1344
Bhushan Power & Steel Ltd (Odisha)	1832	3324	2018	2778
Other Electric Arc Furnace	6615	2296	4717	3350
Electric Induction Furnace	26796	26972	29221	32990

*Source: Ministry of Steel, Annual Report, 2019- 2020
Figures rounded off*

Table – 6: Prices of Steel, 2016-17 to 2017-18 & March-2019#
(Domestic Markets)

(In ` per tonne)				
Grade	Market	2016-17	2017-18	(March-19)#
TMT Bars (ISI, 8 mm)	Delhi	34792	40650	45900
MS Squares (8 mm)	“	34087	39828	44680
MS Angles (25 x 3 mm)	“	34874	40915	46350
Channels (75 x 40 mm)	“	36994	41078	46030
Joists (150 x 75 mm)	“	33304	40469	45380
Melting Scrap	“	22858	27936	30000
Induction Ingots	“	32608	33504	34240
TMT Bars (local 8 mm)	Mumbai	33442	39455	44800
MS Rounds (8 mm)	“	28601	37519	43200
MS Angles (40 x 6 mm)	“	33647	40425	45760
Joists (150 x 75 mm)	“	32813	39015	44270
Melting Scrap (Foundry G)	“	-	-	33400
Melting Scrap (Steel G)	“	23489	-	27520
Melting Scrap (CRCA)	“	-	-	33580
Induction ingots	“	31957	33691	34700
Arc Ingots	“	31675	33849	34800
Concast Billet ingots	“	32091	34061	35060
TMT Bars (ISI, 8 mm)	Kolkata	30092	38266	46340
MS Squares (8 mm)	“	28402	37235	45580
MS Angles (25 x 3 mm)	“	34692	38378	45800
Channels (75 x 40 mm)	“	29691	37966	44370
Joists (150 x 75 mm)	“	29513	33825	34640
Induction Ingots	“	32458	33841	34700
Arc Ingots	“	32617	34288	34960
Concast Billet Ingots	“	32740	34252	35060
Induction ingots (round)	Gobind	28464	33358	34320
Blooms (SAIL, 150 mm)	“	28817	33491	34420
Old Ship Breaking Scrap	“	23551	25551	30040
Melting Scrap (rolling)	“	24192	30970	31780
MS Rounds (10 mm)	“	30540	40052	45020
MS Squares (8 mm)	“	29840	40507	47240
MS Angles (25 x 3 mm)	“	33442	41125	45700
MS Sponge Iron	“	19968	23716	26520
MS Flat (3 x 20 mm)	“	30162	39843	44600
Pig Iron (Foundry Grade) –A*	Punjab	-	-	36140
Pig Iron (Foundry Grade) –B*	“	28517	-	35140
Pig Iron Steel Grade	“	-	-	30540

Source: Minerals & Metals Review.(Data taken from price Table reflected in IMYB- 2019 Review on ' Price')

Data for 2018-19 is not available hence data published in the March'19 edition is taken

A* Low Sulphur/Phosphorus, i.e., 0.09% max which is used in Critical automotive engine components & specialised casting.

B* : High Sulphur/Phosphorus, i.e., above 0.09% which is used in Non-critical castings.

1. Prices are inclusive of GST. 2. All rates are monthly averages and indicatives

3. Gobind = Mandi Gobindgarh in Punjab

Finished Steel/Crude Steel

Production of total finished steel (alloy + non-alloy) stood at 126.86 million tonnes during 2017-18, as against 104.58 million tonnes in 2014-15, an average annual (CAGR) growth of 6.4%. In the year 2018-19, the production of finished steel, measured in terms of crude steel equivalent, stood at 101.29 million tonnes. Finished Steel produced by the SAIL, TSL, RINL, ESL, JSWL, JSPL was 56.02 million tonnes while that produced by other producers was 45.27 million tonnes in the year 2018-19. Export of total finished steel (alloy/stainless + non-alloy) during 2018-19 stood at 6.36 million tonnes (5.59 million tonnes in 2014-15) while import of total finished steel (alloy/stainless + non-alloy) during the same year was 7.83 million tonnes (9.32 million tonnes in 2014-15). India was a net importer of total finished steel in 2018-19. Various Finished Steel products produced by principal steel plants are furnished in Table-7.

Crude steel production grew at 7.6% annually (CAGR) from 88.98 MTPA in 2014-15 to 110.92 MTPA in 2018-19. Such growth in production was driven by capacity expansion, from 109.85 Million Tonnes Per Annum (MTPA) in 2014-15 to 142.24 MTPA in 2018-19, a CAGR growth of 6.8% during this five year period. Crude Steel production has shown a sustained rise in last five years along with capacity. The Crude Steel working Capacity and Capacity Utilisation during the last five years are given below:

Production of Crude Steel and Working Capacity from 2014-15 to 2018-19

(Quantity in million tonnes)

Year	Working capacity	Production	% Utilisation
2014-15	109.851	88.979	81%
2015-16	121.970	89.790	74%
2016-17	128.277	97.936	76%
2017-18	137.975	103.132	75%
2018-19	142.236	110.922	78%

Figures rounded off.

The figures of production of finished steel related to the year 2018-19 are not comparable to other FY's, as they are reported in terms of Crude Steel Equivalent and this is different in concept from those reported for past FY's due to change in reporting system of JPC as approved by Ministry of Steel and Industry Experts.

In the year 2018-19 the contribution of Public and Private Sector was 21.496 million tonnes (81%) and 89.426 million tonnes (19%), respectively.

The following are the two primary routes of steel production:

- (i) BF/BOF route also called the Oxygen route.
- (ii) Electric route comprising of Electric Arc Furnace and Electric Induction Furnace.

As per 2018-19 data, about 55.4% steel is produced through the Electric Furnace route of which about 29.7% steel is produced through the Electric Induction Furnace (EIF) route and 25.7% from Electric Arc Furnace (EAF) route. About 44.6% steel is produced through the conventional integrated route of BF-BOF route as against the world average of around 70%.

Basic Oxygen Furnace (BOF)

Presently, there are around 18 Basic Oxygen Furnace units in the Indian Iron & Steel Sector. There are around 60 Blast Furnaces, 1,222 Rolling Mills and 312 Direct Reduced Iron units in the Indian Iron & Steel Sector.

Electric Arc Furnace (including corex & MBF/EOF)

Steel produced in the Electric Arc Furnace (including corex & MBF/EOF) is mostly by recycling of steel scrap using Electric Arc Furnace (EAF). Presently, there are around 50 nos. of EAF based steel plants in the Indian Iron & Steel Sector.

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

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

Plant	Products
Bokaro Steel Plant (Jharkhand)	Hr Coils, Slabs, HR Sheets. Plates, CR Coils. Sheets, GP Sheets. coils, GC Sheets, Galvanealed Steel, HRPO, Pig iron & Coal Chemicals.
Durgapur Steel Plant (West Bengal)	Blooms, Billets, Joists, Narrow Slabs, Channels, Angles, TMT Rebars, Wheels & Axles, Pig iron & Coal Chemicals.
Rourkela Steel Plant (Odisha)	Plate Mill Plates, HR Plates, HR Coils, Slabs, CR Sheet/ Coil, Galvanised Sheets (plain & Corrugated), ERW Pipes, Spiral Weld pipes, CRNO, Pig iron & Coal Chemicals.
Bhilai Steel Plant (Chhattisgarh)	Rails (13/26m), Long Rails, (65-260m), Blooms, Billets, Slabs, Channels, Joists, Angles, TMT Rebars, Wire Rods, Crane Rails, Plates, Pig iron & Coal Chemicals.
IISCO Steel Plant (West Bengal)	Wire rods, Bars & Rebars, Joists, Channels, Angles, Blooms, Billets, Universal & Special section (Z-bar, MS Arch), Pig iron & Coal Chemicals
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.
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: Ministry of Steel, Annual Report, 2017-18 and information from individual plants

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. There are around 999 electric induction furnaces in Indian Iron & Steel Sector.

Pig Iron

Pig Iron is a product in solid (lumpy) form obtained upon solidification of Hot Metal in Pig Casting Machine. It is called Pig or Pig Iron because of its typical humpy shape. It is produced in two broad categories/grades:

(i) Foundry Grade Pig Iron: Pig iron used in the Foundries for production of Cast Iron (CI) Castings using Cupola Furnace. This is the major use of pig iron.

(ii) Basic/ Steel Making Grade Pig Iron: Pig iron (including hot metal) used for production of Steel.

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 behind and is not in tandem with the demand. Efforts were, therefore, made to increase pig iron manufacturing facilities in the secondary sector. In 2018-19, about 6.414 million tonnes of pig iron was produced in the country. As a result of various policy initiatives taken by the Government, the 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 producers. In 2018-19, the total share of Private Sector in the production of pig iron was about 91% whereas the total share of Public Sector was only 9%. The production of pig iron by SAIL, TSL, RINL, ESL, JSWL, JSPL (combined) and other producers is furnished in Table-3. The total share of SAIL, TSL, RINL, ESL, JSWL and JSPL was 15%, whereas the total share of other producers was 85% in the financial year 2018-19. 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.	Srikalahasthi Pipes Ltd (formerly Lanco Industries Ltd)	Chittoor, Andhra Pradesh	2.75
2.	Sathavahana Ispat Ltd	Haresamudram, Andhra Pradesh	2.10
3.	Jayaswal NECO Industries Ltd	Raipur, Chhattisgarh	6.50
4.	Vedanta Ltd	Amona, Goa	7.42
5.	Usha Martin Industries	Jamshedpur, Jharkhand	6.00
6.	JSW Steel Ltd	Vijaynagar, Dolvi & Salem	180.00
7.	Kalyani Steels Ltd	Hospet, Karnataka	2.90
8.	Kirloskar Ferrous Industries Ltd	Koppal, Karnataka	3.60
9.	KIOCL Ltd	Mangaluru, Karnataka	2.16
10.	Tata Metaliks Ltd	Redi, Maharashtra	3.16
11.	IDCOL Kalinga Iron Works Ltd	Barbil, Kendujhar, Odisha	3.45
12.	Kajaria Iron Castings Ltd	Durgapur, West Bengal	1.10
13.	Electrosteel Castings Ltd	Khurdah, West Bengal	3.60
14.	Tata Metaliks Ltd	Kharagpur, West Bengal	3.45
15.	Sona Alloys Pvt. Ltd	Satara, Maharashtra	3.14
16.	Aparant Iron & Steel Pvt. Ltd	Sanguem, Goa	1.60
17.	Steel Authority of India Ltd	Bhilai, Bokaro, Durgapur, Burnpur, Rourkela, Bhadravati	235.00
18.	Rashtriya Ispat Nigam Ltd	Visakhapatnam, Andhra Pradesh	65.00
19.	Monnet Ispat Ltd	Raigarh, Chhattisgarh	7.00
20.	MESCO Steel Ltd	Kalinganagar, Odisha	4.50
21.	Jai Balaji Industries Ltd	Durgapur, West Bengal	5.09
22.	Kirloskar Ferrous Industries Ltd	Hospet, Karnataka	3.60
23.	KIC Metalliks Ltd	Durgapur, West Bengal	1.65
24.	JSPL	Raigarh, Chhattisgarh	20.00
25.	VSL Steels Ltd	Hiriyur, Karnataka	3.60
26.	Jindal Saw Pipes Ltd	Mundra, Gujarat	3.60
27.	Ramsarup Loha Udyog	Kharagpur, West Bengal	3.00
28.	Adhunik Metaliks Ltd	Sundargarh, Odisha	2.14
29.	SLR Steels Ltd	Hospet, Karnataka	2.10
30.	VISA Industries Ltd	Kalinganagar, Odisha	1.75
31.	Rashmai Metaliks Ltd	Kharagpur, West Bengal	1.75
32.	New Metaliks Ltd	Durgapur, West Bengal	1.75
33.	Neelachal Ispat Nigam Ltd	Kalinganagar, Odisha	11.00

Source: MCDR Returns (Form-O), Website of concerned company, Iron & Steel Review, JPC Bulletin and Ministry of Steel

Sponge Iron

India is the largest producer of sponge iron in the world. Sponge iron is produced by direct reduction method which may be either gas-based or coal-based. 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 provided in Table-2. The installed capacity of sponge iron has also increased over the

years from 1.52 million tonnes in 1990-91 to 46.56 million tonnes in 2018-19. Over the years, the coal-based route has emerged as a key contributor to overall production and its share increased from 63% in 2004-05 to about 80% of total sponge iron production in the country in 2018-19. In the year 2018-19, a total of 34.705 million tonnes of sponge iron was produced, which includes of sponge iron for own consumption. India has been the world's largest sponge iron producer every year since 2003.

Production of 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 furnished in Table-9.

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

(In lakh tonnes)

Unit	Location	Capacity
Gas-based		
Essar Steel Ltd	Hazira, Gujarat	68.0
JSW Steel Ltd (Salav) (formerly Welspun Maxsteel Ltd)	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, Sundargarh, Odisha	1.80
Alliance Integrated Metallics Ltd	Bemta, Raipur, Chhattisgarh	5.00
Anjani Steel Ltd	Ujalpur, Raigarh, Chhattisgarh	1.02
Anindita Steels Ltd	Rabodh, Jharkhand	1.46
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	2.80
Bihar Sponge Iron Ltd	Chandil, Singhbhum, Jharkhand	2.10
Crest Steel & Power Pvt. Ltd	Joratarai, Rajnandgaon, Chhattisgarh	2.10
Deepak Steel & Power Ltd	Topadihi, Kendujhar, Odisha	1.44
Gallant Metal Ltd	Samakhiali, Kachchh, Gujarat	1.70
Gallant Ispat Ltd	Sahjanwa, Gorakhpur, UP	1.00
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

(Contd)

Table - 9 (Concl'd)

Unit	Location	Capacity
Gopani Iron & Power Pvt. Ltd	Tadali, Chandrapur, Maharashtra	1.20
Goldstar Steel & Alloys Ltd	Srirampuram, Vizianagaram, Andhra Pradesh	2.20
Grewal Associates Pvt. Ltd	Matkambed, Kendujhar, Odisha	1.20
Haldia Steels Pvt. Ltd	Durgapur, West Bengal	1.20
Ind Synergy Ltd	Kotmar, Raigarh, Chhattisgarh	3.00
Jai Balaji Sponge Ltd	Baktarnagar, Raniganj, West Bengal	1.05
Jai Balaji Jyoti Steels Ltd	Sundargarh, Odisha	1.20
Jai Shri Balaji Steel Pvt. Ltd (HEG Ltd)	Borai, Durg, Chhattisgarh	1.20
Jaiswal Neco Ltd	IGC Siltara, Raipur, Chhattisgarh	2.55
Janki Corporation Ltd	Sidiginamola, Ballari, Karnataka	1.80
Jindal Steel & Power Ltd	Kharsia Road, Raigarh, Chhattisgarh	1.37
Lloyds Metals & Engineering Ltd	Ghuggus, Chandrapur, Maharashtra	2.70
Mastek Steels Pvt. Ltd	Holakundi, Ballari, Karnataka	1.05
MGM Steels Ltd	Chintapokhri, Dhenkanal, Odisha	1.05
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, Raigarh, Chhattisgarh	1.98
Nova Iron & Steel Ltd	Dagori, Bilaspur, Chhattisgarh	1.50
OCL Iron & Steel Ltd	Lamloi, Sundargarh, Odisha	1.20
Orissa Sponge Iron Ltd	Palaspanga, Kendujhar, Odisha	2.50
Prakash Industries Ltd	Champa, Janj-gir-Champa, Chhattisgarh	4.50
Rungta Mines Ltd	Karakola and Kamando, Sundargarh, Odisha	4.20
Rashmi Cement Ltd	Barbil, Kendujhar, Odisha	3.60
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
Shyam Sel Ltd	Dewabdihi, Burdwan, West Bengal	1.00
Singhal Enterprises Pvt. Ltd	Taraimal, Raigarh, Chhattisgarh	2.53
Sree Metaliks Ltd	Loidapada, Kendujhar, Odisha	1.74
Sri Venkatesh Iron & Alloys Ltd	Ramgarh, Jharkhand	1.20
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 Ltd	Joda, Kendujhar, Odisha	3.90
Vandana Global Ltd	IGC Siltara, Raipur, Chhattisgarh	2.16
Vallabh Steels Ltd	Sahnewal, 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

Consumption of Steel

Per capita finished steel consumption in the year 2018 was 224.5 kg for world and 590.1 kg for China (Source: World Steel Association). The same for India was 73.3 kg in 2018 (Source: JPC) and 75.7 kg (prov.) in 2019. The per capita consumption of India in 2018-19 was 74.1 kg (Source: JPC).

Apparent consumption of steel is calculated by taking into consideration with respect to export of steel, total domestic production and import of steel in the country. It is also treated as the actual domestic demand of steel in the country. The apparent consumption/ domestic consumption of finished steel in India from 2014-15 to 2018-19 is furnished in Table-10.

Table-10: Domestic Consumption of Finished Steel, 2014-15 to 2018-19

(In million tonnes)		
Year	Consumption	% increase
2014-15	76.99	3.91%
2015-16	81.52	5.88%
2016-17	84.04	3.09%
2017-18	90.71	7.94%
2018-19	98.71	8.82%

Source: Ministry of Steel, Annual Report, 2019-20 & An overview of Steel Sector as available on the website of Ministry of Steel.

Domestic consumption of total finished steel (alloy/stainless + non-alloy) which was at 98.71 million tonnes in 2018-19 as against 76.99 million tonnes in 2014-15 has been growing at a CAGR of 6% during the last five years.

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

Steel Authority of India Limited has undertaken modernisation and expansion of its integrated steel plants at Bhilai, Bokaro, Rourkela, Burnpur and special steel plant at Salem. In the current phase, the crude steel capacity is being enhance from 19.132 million

tonnes to 21.4 million tonnes per annum. The indicative investment for current phase is about ₹ 61,870 crore. The cumulative expenditure for various modernisation & expansion has been ₹ 69,255 crore including expenditure of ₹ 2,009 crore during the Financial Year 2018-19.

The plant-wise capacity enhancement details by 2017-18 are given below:

Hot Metal

(In million tonnes)		
Plant Name	Installed Capacity	Expansion Capacity
BSP	4.08	7.50
DSP	2.09	2.45
RSP	2.00	4.50
BSL	4.59	5.77
ISP	0.85	2.91
VISL	0.22	0.33
Total	13.82	23.46

Crude Steel

(In million tonnes)		
Plant Name	Installed Capacity	Expansion Capacity
BSP	3.93	7.00
DSP	1.80	2.20
RSP	4.40	4.20
BSL	4.36	4.61
ISP	2.50	2.50
ASP	0.23	0.48
SSP	0.18	0.18
VISL	0.12	0.23
Total	17.52	21.40

Note : The present installed capacity of SAIL for Hot Metal and crude steel is reportedly about 17.105 million tonnes and 19.132 million tonnes respectively.

The modernisation & expansion of Bokaro Steel Plant (BSL), Durgapur Steel Plant (DSP), Rourkela Steel Plant (RPS), IISCO Steel Plant (ISP) and Salem Steel Plant has been completed. The modernised Rourkela Steel Plant and IISCO Steel Plant have been dedicated to the Nation by the Hon'ble Prime Minister on 01.04.2018 and 10.05.2018 respectively. At IISCO Steel Plant, Burnpur, India's largest blast furnace (4,160 m³) has been installed.

At Bhilai Steel Plant, major facilities have been completed except one Caster and one Converter in SMS-III and the integrated process route has been

set into operation, stabilisation and ramp-up. Hon'ble Prime Minister of India dedicated the modernised and expanded Bhilai Steel Plant to the Nation on 14.6.2018. At Bhilai Steel Plant, Rail Welding Line, Ore Handling Plant Part-A, 2nd Sinter Machine in Sinter Plant-3, Coke Oven Battery-11 and Universal Rail Mill are in regular operation. Hot-trial of Bar Mill has started. Balance facilities of Steel Melting Shop-III are at advanced stages of completion.

SAIL is finalising its Vision-2025 document, proposals for innovation are expected to steer the Company to increase its production capacity of Hot Metal to 50 MTPA, along with related/enabling business activities in line with growing demand of steel in the country. This will not only enhance SAIL's contribution to nation building but will also place SAIL amongst the top steel companies globally.

Rashtriya Ispat Nigam Ltd (RINL)

Visakhapatnam Steel Plant (VSP) is a 7.3 MTPA plant located at Visakhapatnam in Andhra Pradesh. It was commissioned in 1992 with a capacity of 3.0 MTPA of liquid steel. The Company subsequently completed its capacity expansion to 6.3 MTPA in April, 2015 and to 7.3 MTPA in December, 2017. RINL is one of the major players in the country for Long Products.

The Company has one subsidiary, viz. Eastern Investment Limited (EIL) with 51% shareholding, which in turn has two subsidiaries, viz. M/s Orissa Mineral Development Company Ltd (OMDC) and M/s Bisra Stone Lime Company Ltd (BSLC). The Company has partnership in RINMOIL Ferro Alloys Private Limited and International Coal Ventures Limited in the form of Joint Ventures with 50% and 26.49 % shareholding respectively.

RINL, with an exclusive product mix of longs is the largest producer of "Bars and Rods" in the country with a market share of 9.5% in 2018-19. The products of RINL include Rebars, Wire Rods, Rounds, Structural, Blooms & Billets and Pig Iron and the Company also markets the resultant by-products like coal chemicals (Ammonium Sulphate, Benzol products etc.) and Slag. RINL products are known for its quality.

With the completion of modernisation of major Units, the focus during the year was on completion

of the various supporting/auxiliary facilities required for achieving 7.3 MTPA production and other projects.

National Mineral Development Corporation (NMDC)

NMDC is setting up a 3.0 MTPA Greenfield Integrated Steel Plant at Nagarnar, Bastar district in Chhattisgarh. Construction work for the project is in progress and about 93% of civil work, 90% structural erection, 76% equipment erection have been completed as on 31.3.2019.

NMDC is in process of developing 2.0 MTPA Pellet Plant at Nagarnar along with 2.0 MTPA Ore Processing Plant at Bacheli interconnected by a Slurry Pipeline System between Bacheli and Nagarnar in Chhattisgarh.

NMDC is also in the process of augmenting its production & evacuation capacities by installing the following additional infrastructure facilities:-

- ◆ Construction of 5th Screening line in existing Screening Plant-II and upgradation of downstream Conveyor at Kirandul Complex, Bailadila, Chhattisgarh.
- ◆ Construction of 5th Screening line in existing Screening Plant and upgradation of downhill conveyor system at Deposit-5, Bacheli Complex, Bailadila, Chhattisgarh.
- ◆ Installation of 12.0 MTPA Screening Plant-III at Kirandul Complex, Bailadila, Chhattisgarh.
- ◆ Installation of 7.0 MTPA Screening & Beneficiation Plant-II at Donimalai Complex, Karnataka.
- ◆ Doubling of Kirandul - Kothavalasa Rail line between Kirandul and Jagdalpur.

Tata Steel Ltd (TSL)

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 13.00 million tonnes and variety of finishing mills.

Tata Steel Group is among the top global steel companies with an annual crude steel capacity of 33 million tonnes per annum (MTPA). It is one of the world's most geographically-diversified steel producers, with operations in Europe, south east Asia

and India and commercial presence across the world. In 2018, Tata Steel acquired Bhushan Steel Ltd (now renamed as Tata Steel BSL Ltd). Currently, Tata Steel's Indian operations (Jamshedpur, Kalinganagar, Angul) has crude steel production capacity of 18.6 MTPA.

JSW Steel Ltd

JSW Steel Ltd is one of the foremost integrated steel company in India with an installed capacity of 18 MTPA, and has plans to scale it up in India and overseas. JSW Steel's manufacturing facility at Vijayanagar, Karnataka, is the largest single location steel-producing facility in India with a capacity of 12 MTPA. It is the first Company to manufacture high-strength and advanced high-end steel products for its automotive segments. Today, JSW Steel exports its products to over 100 countries across the globe.

Jindal Steel & Power Ltd (JSPL)

Jindal Steel & Power Limited (JSPL) is amongst India's fastest growing and leading business conglomerates with significant presence in core infrastructure sectors including steel, power, mining and infrastructure. JSPL's business operations span across the States of Chhattisgarh, Odisha and Jharkhand in India, where it operates some of India's most advanced steel manufacturing and power generation capacities of global scale. JSPL is India's first and only private manufacturer of rails. It is among the lowest cost producers of steel and power in India.

Jindal Stainless Ltd (JSL)

Jindal Stainless Limited (JSL) is one of the largest integrated manufacturers of stainless steel in India. The Odisha plant has world class technology and equipment sourced from Siemens VAI, SMS Siemag and Andritz Sundwig and the complex is equipped with a Ferro Alloys set up and captive power generation unit, the plant is capable of producing unique and wide range of products both in terms of grades and dimensions. Hot Rolled Plates and Coils of 1,650 mm width and minimum thickness of 2 mm in all grades of stainless steel can be produced as per the customers demand. Also, Cold Rolled Coils of minimum thickness of 0.3 mm with maximum width of 1,650 mm can be achieved based on customers' need.

Jindal Stainless (Hisar) Ltd

Jindal Stainless (Hisar) Limited (JSHL) has a fully integrated stainless steel plant with a capacity of

0.8 MTPA. It is also the world's largest producer of stainless steel strips for razor blades and India's largest producer of coin blanks, serving the needs of India and international mints.

The JSHL plant works on the strategy of both backward and forward integration, starting from melting, casting, hot rolling to cold rolling and other value additions. JSHL's speciality product division caters to the high-end precision and speciality stainless steel requirements of reputed Indian and International customers. The product range includes Slabs & Blooms, Hot Rolled Coils, Strips, Plates, Coin Blanks, Precision Strips and Cold Rolled Coils.

Essar Steel Limited (ESL)

Essar Steel is known for its high quality of flat steel products. The Company focuses on high value-added grade steels and has developed over 300 grades of flat steel for different applications. Essar Steel is a 10 MTPA integrated steel producer and has made many prudent investments by creating facilities to complete the value chain both upstream and downstream. Its investments in state-of-the-art facilities give it full control over its manufacturing process and ensures consistent quality of products.

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 as well as steel scrap for the Iron & Steel Industry and Secondary Sector, such as, Micro, Small & Medium Enterprises (MSME). Other form of scrap, i.e., end of life cycle scrap or obsolete scrap these get generated in large quantities and form substantial reserves of scrap that could be efficiently put to use. 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 & 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 & Electric Arc Furnace units, Integrated Steel Plants and Alloy Steel & Foundry industries. Scraps are used in the Steel Sector after recycling. Recycling of one tonne of steel scrap saves about 1.1 tonnes of iron ore, 0.6 to 0.7 tonnes of coking coal and around 0.2 to 0.3 tonnes of fluxes. Besides, saving of energy by about 16-17%. It also reduces the water consumption and GHG emission by 40% and 58% respectively. 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 landfill 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 a cost-efficient activity. Locations of present ship breaking activities are:

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

Alang & Sosiya yards account for 98% concentration of the Ship Breaking Industry in India. The yard has capacity to recycle about 450 ships per year generating re-rollable steel of > 4.5 million tonnes per annum. There are a total of 167 plots available for ship recycling spread over 10 km stretch along the coast of Alang.

The NGO Shipbreaking Platform is a global coalition of environmental, human and labour rights organisations working to promote safe and environmentally sound ship recycling practices. The

coalition quickly evolved from being a European Platform to a global one, including NGOs based in the major shipbreaking countries, such as, India, Bangladesh, Pakistan and Turkey. It now has 18 member organisations and six partners in 12 countries. The Platform is recognised by United Nations agencies, the European Union and leading media outlets as the preeminent international civil society advocacy organisation on ship recycling. In 2018 and 2019, 1,418 vessels were dismantled out of which 453 beached ships were dismantled in India. About 987 of these ships were sold for dirty and dangerous breaking on the beaches of South Asia.

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 25-30 years. About 40% of the ships broken are dry cargo ships, while the remaining 60% of the ships broken are wet cargo, tanker and specialised ships etc. 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, on the issue of handling & management of the hazardous industrial waste generated during ship breaking have been accepted by the Hon'ble Supreme Court on 06.09.2007. In pursuance of the directions of the Hon'ble Supreme Court in CWP 657 of 1995, Government of India through the Ministry of Steel had formulated and notified the comprehensive code for ship breaking and ship recycling, namely, Ship breaking Code, 2013, vide Notification dated 7th March, 2013.

MSTC Ltd

(Formerly Metal Scrap Trade Corp. Ltd)

MSTC Limited was incorporated as "Metal Scrap Trade Corporation Limited", under the provisions of the then Companies Act, 1956 on September 9, 1964 at Kolkata for regulating export of ferrous scrap from India. The status of the Company underwent a change in February 1974 when it was made a subsidiary of Steel Authority of India (SAIL). In the

year 1982-83, the Corporation was converted into an independent PSU under administrative control of Ministry of Steel. It was the canalising agency for import of carbon steel melting scrap, sponge iron, hot briquetted iron and re-rollable scrap till February 1992.

Presently, the Company has diversified mainly into providing e-auction /e-procurement services. Under this segment, the Company undertakes disposal of ferrous and non-ferrous scrap arisings, surplus stores, condemned plants, minerals, Agri & forest produce etc. from Public Sector Undertakings and Government Departments including private companies. The Trading Division is engaged in import as well as domestic sourcing of bulk industrial raw material for actual users as well as traders. This Division looks after sourcing, purchase and sale of industrial raw materials like low ash metallurgical coke, HR coil, naphtha, crude oil, coking coal, steam coal, line pipes etc. on behalf of customers across steel, oil & gas, power sectors under Private and Public Sector. It also undertakes trading of items within the country in competition with any other private trader.

Ferro Scrap Nigam Ltd (FSNL)

FSNL is a wholly owned subsidiary of MSTC Ltd under the Ministry of Steel. The Company undertakes the recovery and processing of scrap from slag and refuse dumps in the nine steel plants at Bhilai, Bokaro, Burnpur, Durgapur, Rourkela, Visakhapatnam, Dolvi, Duburi and Haridwar and also at Rail Wheel factory Bengaluru. The scrap so recovered is returned to the steel plants for recycling 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, handling of BOF slag, etc. During the year 2018-19, the Company recovered a scrap of 35.66 lakh tonnes.

SLAG & IRON AND STEEL

Slag is a by-product generated during manufacturing of pig iron and steel. It is produced by action of various fluxes upon gangue materials within the iron ore during the process of pig iron making in blast furnace and steel manufacturing in steel melting shop. Primarily, slag consists of calcium,

magnesium, manganese and aluminium silicates and oxides in various combinations. The cooling process of slag is responsible mainly for generating different types of slags required for various end-use consumers. Although the chemical composition of slag may remain unchanged, physical properties vary widely with the changing process of cooling.

In an integrated steel plant, 2-4 tonnes of wastes (including solid, liquid and gas) are generated for every tonne of steel produced. The major wastes produced in integrated steel plants (ISP) include BF iron slag. Steel slag accounting for nearly more than half a tonne gets generated for each tonne of steel produced in ISPs. Among all the solid/liquid wastes, slags generated at iron making and steel making units are in such a large quantities that management of slag has become a critical component of steel production. Over the last few years, with better understanding of slags, its functions and improvements in process technologies have led to a significant reduction in the volume of slag generated. At the same time, the re-use of iron and steel has led to a significant reduction in the environmental impact of these by-products.

Production of Slag

The slag produced at blast furnace during pig iron manufacturing is called blast furnace slag. The slag produced at steel melting shop is known as steel slag. Slag output obtained during pig iron and steel production is variable and depends mainly on composition of raw materials and type of furnace. Typically, for ore feed containing 60 to 65% iron, blast furnace (BF) slag production ranges from about 300 to 540 kg per tonne of pig or crude iron produced, whereas in steel making 150 to 200 kg per tonne of slag is generated per tonne of liquid steel. Lower grade ores yield much higher slag fractions, sometimes as high as one tonne of slag per tonne of pig iron produced. Steel slag output is approximately 20-30% by mass of the crude steel output in the country.

Ferro Scrap Nigam Ltd (FSNL), a wholly owned subsidiary of MSTC Ltd rendering its specialised services of scrap and slag management to plants at SAIL-Rourkela, Burnpur, Bhilai, Bokaro, Durgapur, Bhadravati, Salem, RINL-Visakhapatnam, NINL-Duburi, BHEL-Haridwar, RWF (Rail Wheel Factory) - Bengaluru, Air India- Mumbai and Essar- Hazira.

The information regarding plant-wise capacity of iron and steel slag in the country is reflected in Table- 11.

Table – 11 : Plant-wise Capacity of Iron and Steel Slag in the Country

Steel Plant	Capacity ('000 tpy)
Bhilai Steel Plant, Durg, Chhattisgarh	2675
Bokaro Steel Plant, Bokaro, Jharkhand	7884
Rourkela Steel Plant, Rourkela, Odisha	1570
Durgapur Steel Plant, Durgapur, West Bengal	566
IISCO Steel Plant, Burnpur, West Bengal	400
	kg/THM*
Visvesvaraya Iron & Steel Plant, Bhadravati, Karnataka	400
	kg/THM*
Rashtriya Ispat Nigam Ltd, Visakhapatnam, Andhra Pradesh	1440
IDCOL Kalinga Iron Works Ltd, Barbil, Odisha	53
JSW Steel Ltd, Ballari, Karnataka	NA
Tata Steel Ltd, Jamshedpur, Jharkhand	2100
Visa Steel Ltd, Kalinganagar, Odisha	175
Neelachal Ispat Nigam Ltd, Kalinganagar, Odisha	-

*THM : Tonne Hot Metal

Blast Furnace Slag

In the blast furnace, the slag floating over molten pig iron (hot metal) is flushed out in slag pot and then sent to slag granulating plant or to cooling pits.

Depending upon the cooling process, three types of slags are generated, namely, air-cooled slag, granulated slag and expanded slag.

Air-cooled slag is produced by allowing the molten slag to cool under atmospheric conditions in a pit. Under slow cooling conditions, escaping gases leave behind porous and low-density aggregates with special physical properties, making it suitable for many applications. When formed under controlled cooling, the slag tends to be hard and dense, making it especially suitable for use in ready-mixed concrete, concrete products, road bases and similar applications in construction.

Granulated slag is produced by quenching the molten slag by means of high-pressure water jets. Quenching prevents crystallisation, thus resulting in granular, glassy aggregates. This slag is crushed, pulverised and screened for use in various

applications, particularly in cement production because of its pozzolanic characteristics.

Steel plants utilise cold slag for internal consumption and also for outside sale. The slag after cooling is crushed and used as road metal and railway ballast. Granulated slag produced in steel plants is also sold outside to cement plants. Slag application also reduces the overall cost of production of cement.

Expanded slag is formed through controlled cooling of molten slag in water or water with combination of steam and compressed air. Formation of steam and other gases enhances the porosity and vesicular nature of slag, resulting in light weight aggregate suitable for use in concrete. However, expanded slag is not produced at any domestic iron and steel plant.

A fourth product made from blast furnace slag is mineral wool/slag wool. Cooled slag for this purpose is melted and poured through an air stream or a jet of dried stream of other gases to produce a spray of molten droplets or the same is also formed by passing the melt through a perforated or fast-spinning disc. The droplets, elongate to long fibres, are collected mechanically and layered. The material has excellent thermal insulation properties.

The five different slags generated at various points of the steel making process are described below:

HMT Slag: This slag is primarily generated after de-silicisation or de-phosphorisation treatment. It has high content of silica and lime. Sometimes it also contains BF slag.

HMDS Slag: This is the raked slag at the de-sulfurisation station. These slags are poorly mixed composites of spilled BF slag, spent and/or unreacted de-sulphurisation agents, lime fines and trapped droplet of hot metal and raked iron.

LD Slag: These slags are a well mixed aggregate of FeO, lime, silica and MgO generated at the LD converter. They are in the form of di-calcium and tri-calcium silicates. These slags also contain free lime and metal, which create problems due to expansion characteristics.

Steel Slag: These slags vary in composition with respect to the varied treatment. The common steel slags are fused calcium aluminates with less than

2% (FeO + MnO). These readily crumble to dust due to allotropic phase transformation at lower temperatures and are difficult to manage.

SGP Slag: LD slag is subjected to granulation through a quenching technology adopted at JSW, which houses the first of its kind in India. Due to sudden quenching of the molten slag, contraction of metal and slag occurs and results in good separation of metal and slag. Adequate granulation takes place and leads to good stability of the final slag. Process can be described as an accelerated ageing process that reduces the free lime content. As a result of rapid cooling, it generates more glassy structure than the BOF slag. Removal of free lime also confirms its volumetric stability.

Steel Slag

BOF slag, commonly known as steel slag, is another waste from Iron & Steel Industry. It has shown potential for use as a raw mix component up to 10% in the manufacture of cement clinker. Steel slag can also replace granulated blast furnace slag up to 10% in the manufacture of Portland Slag Cement. Steel slags are produced at steel melting shop during steel manufacturing. To produce steel, removal of excess silicon and carbon from iron is achieved through oxidation by adding limestone and coke. The steel slag contains higher amount of iron and its physical characteristics are similar to air-cooled iron slag. The LD slag is cooled, crushed and screened. The fines are utilised in sinter making and lumps are charged in the blast furnace.

The iron content is the major basic difference between BF slag and steel slag. In BF slag, FeO is around 0.70%, whereas in case of steel slag, the total iron content varies from 16 to 25%.

JSW Steel has set up a unique BOF slag granulation plant, producing slag with lower free lime content and is vigorously pursuing the matter with BIS. JSPL has set up a plant to produce around 4.0 lakh brick products/day by utilising fly ash and slag generated from integrated steel plant.

Uses of Slag

Slag, based on their types, has different uses. The air-cooled BF slag is crushed, screened and used mainly as road metal and bases, asphalt paving, track ballast, landfills and concrete aggregate. The expanded or foamed slag binds well with cement and is used mainly as aggregate for light weight concrete. However, it is not produced by domestic steel plants.

Granulated BF slag is used as a pozzolanic material for producing portland slag cement. It is also used for soil conditioning. BF slag is used in making mineral wool for insulation purposes.

Steel slag has found use as a barrier material remedy for waste sites where heavy metals tend to leach into the surrounding environment. Steel slag forces the heavy metals to drop out of solution in water run off because of its high oxide mineral content. Steel slag has been used successfully to treat acidic water discharges from abandoned mines.

Slags are useful alternative raw material for clinker production and such use can reduce a cement plant's fuel consumption and overall emission of carbon dioxide per tonne of cement. The granulated slag obtained from various steel plants is dried in slag dryer. The clinker is ground in ball mill with 40-50% dry slag and 6% gypsum. The resultant product is portland slag cement. Portland blast furnace slag cement contains up to 60% ground granulated slag from steel production processes.

Slag cement has low heat of hydration, low alkali aggregate reaction, high resistance to chlorides and sulphate and it can substitute the use of 43 and 53 grades of ordinary Portland Cement. For other consuming sectors like road making, landfilling and ballasting, the cooled slag is crushed by machines or broken manually by hammers into smaller pieces and supplied to the various end-use consumers. The utilisation of SMS (particularly LD) slag is limited due to its (i) Phosphorous content (ii) high free lime content and (iii) higher specific-weight.

Consumption of Slag

The Steel Industry in India is producing about 24 million tonnes of blast furnace slag and 12 million tonnes of steel slag annually. It is expected that the BF slag generation may reach around 45 to 50 million tonnes and BOF slag around 15-20 million tonnes per year by 2030. Besides, EAF and IF slag generation will also increase to more than 10 million tonnes per year from the present level of around 5 million tonnes per year by 2030. The BF slag in India is used mainly in the cement manufacture and in other unorganised work, such as, landfills and railway ballast. A small quantity is also used by the Glass Industry for making slag wool fibres. Cement plants in the country producing slag cement require BF slag in granulated form.

TRADE POLICY

As per the notified Export-Import Policy incorporated under the Foreign Trade Policy (FTP) for 2015-20, the imports of primary forms of pig iron, spiegeleisen, sponge iron, ferroalloys, 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.

WORLD REVIEW

The world production of pig iron in 2018 was about 1,340 million tonnes as against 1,265 million

tonnes in 2017. China (58%), India (8%), Japan (6%), Russia (4%), Rep. of Korea (3%), and Brazil, Iran, Germany & USA (2% each), were the main producers. Countries, namely, Ukraine, Taiwan, Turkey, France and Mexico too featured in the list as principal producers (Table-12).

The world crude steel production in 2018 increased by 5% to 1,812 million tonnes from 1,731 million tonnes in 2017. China was the top producer accounting for 51% of world's crude steel production, followed by India & Japan (6% each), USA (5%) and Russia & Rep. of Korea (4% each), and Germany, Turkey & Brazil (2% each). Other important producers were Italy, Iran, Taiwan, Ukraine, Mexico and France (Table-13).

**Table – 12 : World Production of Pig Iron
(By Principal Countries)**

Country	(In tonnes)		
	2016	2017	2018
World	1227000000	1265000000	1340000000
China	702273300	713619300	771054400
India*	77254000	96313000	106823000
Japan	80186246	78329729	77327888
Russia	51900000	52200000	51800000
Korea, Rep of	46336000	47100000	47124000
Brazil	29680000	32151000	32500000
Iran	18264000	21694000	28100000
Germany	27269000	27816000	27271000
USA	22293000	22395000	24058000
Ukraine	23560000	19797900	20531200
Taiwan	14890000	14361000	14841000
Turkey	10304000	10589000	10536000
France	9724062	10677830	10529559
Mexico	9782000	10256000	10373000 ^e
Other countries	103120615	107785155	106854527

Figures rounded off

Source: BGS, World Mineral Production, 2014-2018,

* India's production of Pig Iron during 2016-17, 2017-18 and 2018-19 was 1,03,42,000 tonnes, 57,28,000 tonnes and 64,14,000 tonnes respectively.

Note: The data in this table include sponge iron and direct reduced iron (DRI) where these have been separately identified ; e : estimated

**Table – 13 : World Production of Crude Steel
(By Principal Countries)**

Country	(In tonnes)		
	2016	2017	2018
World Total	1627000000	1731000000	1812000000
China	807609400	870740900	928009000
India*(b)	97443000	102338000	110920000
Japan	104775329	104661087	104318836
USA	78475000	81612000	86607400
Russia	69600000	72968168	74144495
Korea, Rep. of	68575000	71080000	72464000
Germany	42081000	43297000	42435000
Turkey	33163000	37524000	37311700
Brazil	31275000	34350000	34900000
Italy	23372000	24069000	24532000
Iran (c)	18466000	21840000	24500000
Taiwan	20858000	21370000	23200000
Ukraine	24218000	21334000	21100000
Mexico	18811000	19924000	20694000
France	14412574	15504683	15387355
Other countries	174242839	188450235	191581173

Figures rounded off

Source: BGS, World Mineral Production, 2014-2018,

* India's production of crude steel during 2016-17, 2017-18 and 2018-19 was 9,79,36,000 tonnes, 10,31,32,000 tonnes and 11,09,21,000 tonnes, respectively.

(b) : Years ended 31st March following that stated.

(c) : Years ended 20th March following that stated.

Exports

In terms of value, exports of iron and steel (total) increased slightly by 2.54% in the year 2018-19 to ` 1,02,276 crore from ` 99,738 crore in the previous year. Iron and Steel exports in 2018-19 comprised mainly of Other Finished Steel, NES with ` 35,153 crore (34%), Finished Steel Including Cold Rolled Sheet with ` 32,612 crore (32%) and Semi-finished Steel (including Steel Ingots) with ` 29,365 crore (29%). Other items together accounted for the remaining 5% exports. In terms of value, exports of iron and steel in the year 2018-19 were mainly to USA (13%), Nepal (9%), Italy (7%), UAE (6%), Belgium (5%) and Germany (4%) (Tables- 14 to 24).

In terms of quantity, the exports of Pig and Cast Iron including Spiegeleisen decreased drastically by 38% to 347 thousand tonnes in 2018-19 from 558 thousand tonnes in the previous year. Exports were mainly to Bangladesh (40%), Thailand (28%) followed by Japan & Malaysia (5% each) and UAE (4%) (Table-25).

In terms of quantity, the exports of slag (dross, etc.) in 2018-19 sharply decreased by 47% to about 149 thousand tonnes from 279 thousand tonnes in the previous year. Exports were mainly to Japan (40%), Nepal (29%), Philippines (26%) and Bhutan (3%) (Table-26).

Imports

In terms of value, imports of iron and steel (total) in 2018-19 increased by 32% to ` 1,14,788 crore from ` 86,887 crore in the previous year. Iron and steel imports in 2018-19 comprised mainly of Finished Steel Including Cold Rolled Sheet with ` 37,720 crore (33%), Scrap with ` 25,669 crore (22%), Other Finished Steel, NES with ` 22,680 crore (20%) and Semi-finished Steel including Ingots with ` 20,546 crore (18%). Other items together accounted for the remaining 7% imports. In terms of value, the imports in 2018-19 were mainly from China & Republic of Korea (18% each), Japan (10%), UAE (6%), USA (5%), Germany (4%) and Singapore, UK & Vietnam (3% each) (Tables- 27 to 37).

In terms of quantity, the imports of Pig and Cast Iron (including Spiegeleisen) increased by 14% to 73 thousand tonnes in 2018-19 from 64 thousand tonnes in the previous year. Imports were mainly from China (21%), Germany (15%),

Russia (12%), South Africa (11%), Thailand (6%) and France (5%) (Table-38).

In terms of quantity, the imports of slag decreased by 20% to 136 thousand tonnes in 2018-19 from 171 thousand tonnes in the previous year. Imports were mainly from Japan (62%), Rep. of Korea (36%) and Hong Kong (2%) (Table-39).

**Table – 14 : Exports of Iron & Steel (Total)
(By Countries)**

	2017-18 (R)		2018-19 (P)	
	Qty (**)	Value (` '000)	Qty (**)	Value (` '000)
All Countries	**	997377251	**	1022758509
USA	**	120532620	**	130668959
Nepal	**	61911447	**	87745087
Italy	**	70762885	**	69623930
UAE	**	59377823	**	66396628
Belgium	**	56327058	**	49166143
Germany	**	33467588	**	40943191
Vietnam	**	37627796	**	35576543
UK	**	25226261	**	28703189
Spain	**	32325604	**	28472860
Netherlands	**	19212796	**	23252187
Other countries**	**	480605372	**	462209792

Figures rounded off

**Table – 15 : Exports of Iron & Steel (Finished
Steel Including CR Sheet)
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (` '000)	Qty (t)	Value (` '000)
All Countries	5940761	340298284	4523368	326116006
Nepal	966786	28057407	1140049	40181240
USA	456555	39750216	252491	36841362
Belgium	404796	27069221	358288	27109255
UAE	326346	18272648	226195	17545822
Italy	254501	16868254	192468	16497767
Indonesia	450174	21505513	206856	12917541
Spain	169102	12112259	121853	10747343
Canada	92316	7677768	85459	8403654
UK	90993	6186774	90467	7060719
Chile	8325	594177	97823	6958411
Other countries	2720867	162204047	1751418	141852893

Figures rounded off

**Table – 16 : Exports of Iron & Steel
(Steel wire)
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (` '000)	Qty (t)	Value (` '000)
All Countries	174735	21901011	152597	25449317
USA	25747	4336867	22596	4916455
Netherlands	21959	3313493	21733	3600484
Russia	4647	806136	6676	1412720
Turkey	7701	1198853	7572	1338156
Germany	3512	700136	3862	845151
UK	3550	566326	5121	838182
Korea, Rep. of	3420	655943	3384	753264
Italy	4375	736582	3656	751320
UAE	8688	671672	7461	700503
Brazil	3708	565261	3390	669483
Other countries	87429	8349741	67145	9623599

*Figure rounded off***Table – 17 : Exports of Iron & Steel
(Other Finished Steel, NES)
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (**)	Value (` '000)	Qty (**)	Value (` '000)
All Countries	**	296503963	**	351532808
USA	**	66364629	**	81202450
Germany	**	22050914	**	25609517
UAE	**	19443351	**	22924458
UK	**	15545948	**	18575853
Netherlands	**	8363013	**	10166011
Canada	**	6289121	**	9077816
Italy	**	8413491	**	8873095
Nepal	**	3949893	**	7223303
Saudi Arabia	**	7228406	**	7196841
France	**	6532053	**	6964907
Other countries	**	132323144	**	153718557

*Figure rounded off***Table – 18 : Exports of Iron & Steel
(Semi-finished Steel Including Steel Ingot)
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (` '000)	Qty (t)	Value (` '000)
All Countries	8115641	317011255	5979824	293653659
Italy	1080836	41557309	938912	41453916
Nepal	824458	27855205	930030	37486919
Vietnam	1036353	33896649	837121	31718647
UAE	590788	20610816	580408	24834089
Belgium	619034	24859559	341092	17196766
Spain	433887	16396971	258724	12599921
Malaysia	402643	13958658	229764	10082489
Germany	37122	5856542	48783	9108323
Saudi Arabia	217545	8306285	190521	8948591
Turkey	173060	7612421	102130	7248211
Other countries	2699915	116100838	1522341	92975787

Figures rounded off

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

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹ '000)	Qty (t)	Value (₹ '000)
All Countries	183	18118	312	21811
USA	65	10891	61	12785
Saudi Arabia	8	619	44	2151
Bangladesh	17	892	26	1691
Nigeria	-	-	28	1595
Kuwait	-	-	20	1073
Nepal	12	641	116	939
China	-	-	3	509
Sri Lanka	-	-	3	357
UAE	19	1216	2	233
Jordan	6	287	5	216
Other countries	56	3572	4	264

*Figures rounded off***Table – 20 : Exports of Iron & Steel: Alloy Steel (Powder) (By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹ '000)	Qty (t)	Value (₹ '000)
All Countries	19	3711	128	36775
UK	-	-	34	25356
China	++	18	92	9629
Brazil	-	-	1	811
Turkey	1	617	1	751
Indonesia	-	-	++	123
Singapore	++	109	++	99
Thailand	-	-	++	6
Korea, Rep. of	10	1379	-	-
Bangladesh	2	765	-	-
Nepal	5	759	-	-
Other countries	1	64	++	++

*Figures rounded off***Table – 21 : Exports of Iron & Steel (Scrap) (By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹ '000)	Qty (t)	Value (₹ '000)
All Countries	6813	567051	8490	648537
Sweden	2102	287086	2069	329860
Bhutan	82	4635	1326	38828
Germany	251	62426	253	36405
Belgium	76	53745	92	30207
Brazil	109	9016	276	24444
Thailand	++	51	474	24342
USA	198	13219	327	21635
Singapore	914	28838	656	14377
Ukraine	346	12231	209	13621
France	18	4797	44	13523
Other countries	2718	91008	2763	101295

*Figures rounded off***Table–22 : Exports of Iron & Steel (Sponge iron) (By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹ '000)	Qty (t)	Value (₹ '000)
All Countries	588622	11054668	686152	15725353
Bangladesh	278707	5606866	406970	9541147
Nepal	83068	1516092	110678	2339719
Bhutan	84887	1518248	107588	2305903
Malaysia	30119	508311	40181	936732
Kenya	1399	25682	7437	177751
Madagascar	2581	53457	3943	94038
USA	437	68631	755	94015
Sudan	1377	25159	2545	59177
Indonesia	21976	360146	1414	41650
Sri Lanka	552	10638	1543	35496
Other countries	83519	1361438	3097	99725

Figures rounded off

**Table – 23 : Exports of Iron & Steel (Stainless Steel)
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹ '000)	Qty (t)	Value (₹ '000)
All Countries	9691	2838292	12146	4356976
France	295	791128	226	696396
USA	863	217554	2346	617261
Italy	447	147121	747	265933
Nigeria	230	67646	510	243262
Saudi Arabia	304	86589	562	231282
UAE	731	165996	648	195039
Bahrain	121	39453	256	193885
Kuwait	980	136382	583	155482
Brazil	192	32433	708	139210
Thailand	47	71968	61	112985
Other countries	5481	1082022	5500	1506243

*Figures rounded off***Table–24 : Exports of Iron & Steel Material
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹ '000)	Qty (t)	Value (₹ '000)
All Countries	149171	7180898	88157	5217266
Italy	64855	3040035	34398	1781896
USA	8220	543648	12332	779544
Turkey	20488	919856	8658	465752
Belgium	9256	458095	5074	324287
Taiwan	8756	420439	6117	318351
UAE	5355	205649	3704	188877
Puerto Rico	1589	76534	3392	185068
Sri Lanka	2613	117305	1930	122944
Bahrain	129	5927	288	109954
Indonesia	245	38623	375	109002
Other countries	27665	1354788	11890	831591

*Figures rounded off***Table – 25 : Exports of Pig & Cast Iron (Including Speigeliessen)
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (₹ '000)	Qty (t)	Value (₹ '000)
All Countries	557635	12533399	346760	10053240
Bangladesh	84197	1782131	140296	3703675
Thailand	138066	2933353	96262	2577678
Japan	10520	368800	18873	1020308
Malaysia	26515	643325	18074	459372
UAE	10108	257554	14555	432182
Indonesia	41707	988090	11185	308719
Pakistan	25596	627887	9811	295326
USA	26281	647843	1763	223655
Taiwan	68268	1428299	6473	207392
Nepal	6426	133817	6609	177600
Other countries	119950	2722301	22859	647333

Figures rounded off

**Table – 26 : Exports of Slag (Dross etc. from Iron and Steel Exc. Granulated)
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (` '000)	Qty (t)	Value (` '000)
All Countries	279098	1032991	148859	507380
Japan	12500	43622	59800	203392
Philippines	89149	345053	38500	144283
Nepal	12312	38445	43722	126307
Bhutan	25590	118095	4529	21195
Angola	158	1016	638	4568
Qatar	840	2428	593	3879
Malaysia	10013	32607	1008	3477
Bangladesh	-	-	56	192
Singapore	28	402	2	35
Fiji	-	-	6	27
Other countries	128508	451323	5	25

*Figures rounded off***Table - 27 : Imports of Iron & Steel (Total)
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (**)	Value (` '000)	Qty (**)	Value (` '000)
All Countries	**	868869799	**	1147881234
China	**	191911242	**	207362514
Korea, Rep. of	**	162629487	**	207345636
Japan	**	92227346	**	112951674
UAE	**	36753860	**	70424153
USA	**	45559035	**	52541917
Germany	**	36275884	**	44579325
Singapore	**	13321375	**	39147750
UK	**	19745715	**	34796549
Vietnam	**	27809976	**	31402541
Malaysia	**	15497077	**	23885535
Other countries	**	227138802	**	323443640

Figures rounded off

**Table – 28 : Imports of Iron & Steel
(Finished Steel Including CR Sheet)
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (` '000)	Qty (t)	Value (` '000)
All Countries	4164483	298309409	4246628	377203641
China	1627140	97286705	1205729	101167628
Korea, Rep. of	841948	59638098	918541	73234874
Japan	653046	49696211	756543	65238876
Vietnam	162781	9311467	186725	13006157
Germany	99753	10846546	75000	12425271
Indonesia	10964	1305735	79335	10784255
Belgium	77426	4847607	127900	10111899
USA	111342	11759392	80401	9254405
Malaysia	27885	1839400	63211	6100709
Russia	75395	6628595	51071	5894569
Other countries	476804	45149653	702172	69984997

Figures rounded off

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

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (` '000)	Qty (t)	Value (` '000)
All Countries	230482	19567609	267802	25937468
China	102884	7862526	100126	8667378
Korea, Rep. of	27279	2121852	36697	3299266
Malaysia	25785	1654134	34761	2628228
Japan	10299	2288751	9618	2591839
Nepal	19860	1131389	22733	1476290
Thailand	8132	507980	15093	1124289
France	6702	612281	7976	886596
Italy	1947	251431	3153	874846
Germany	1352	575784	1701	849783
Vietnam	8192	572815	10407	816087
Other countries	18048	1988666	25535	2722866

Figures rounded off

**Table – 30 : Imports of Iron & Steel
(Other Finished Steel, NES)
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (**)	Value (` '000)	Qty (**)	Value (` '000)
All Countries	**	192386612	**	226803143
China	**	55756105	**	63612948
Germany	**	18519652	**	20338781
Korea, Rep. of	**	14987088	**	17887701
Japan	**	15491077	**	16403665
UAE	**	7164321	**	16099513
USA	**	12892615	**	12643771
Italy	**	6338492	**	10083666
Thailand	**	9229649	**	9090653
Singapore	**	1688991	**	8883055
UK	**	4635546	**	5458312
Other countries	**	45683078	**	46301077

Figures rounded off

**Table – 31 : Imports of Iron & Steel
(Semi-finished Steel Including Steel Ingots)
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (` '000)	Qty (t)	Value (` '000)
All Countries	3781928	153318568	4130622	205456000
Korea, Rep. of	1746366	71443426	1995588	97040567
Japan	597624	23473236	474130	24098091
China	453350	16559401	431553	22059883
UAE	107301	3500810	209848	8138690
Ukraine	85353	2804378	167972	6848104
Indonesia	213367	7074342	150040	6812717
Russia	78167	2703662	120107	4783488
Singapore	57144	1992493	91910	4045671
Italy	33308	2281782	47842	3605787
Sweden	11621	2270920	13505	3428382
Other countries	398327	19214118	428127	24594620

Figures rounded off

**Table – 32 : Imports of Iron & Steel: Alloy Steel
(Granules)
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (` '000)	Qty (t)	Value (` '000)
All Countries	21117	987971	23479	1268100
France	4847	237111	6610	377777
China	5646	201268	8222	364754
Germany	2769	156658	2268	158323
South Africa	2112	91007	2475	121404
Spain	3537	178290	1404	81773
Taiwan	954	38462	1065	61119
Belgium	14	1147	332	24348
Korea, Rep. of	236	9200	286	13600
Japan	177	26287	37	12407
UK	184	8371	131	12364
Other countries	641	40170	649	40231

Figures rounded off

**Table-33: Imports of Iron & Steel: Alloy Steel
(Powder)
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (` '000)	Qty (t)	Value (` '000)
All Countries	3028	464228	4664	840713
UK	257	146972	334	247743
Canada	813	44036	2453	185877
USA	172	52230	408	131058
Germany	2	9314	1024	118419
China	648	71406	313	66019
Japan	7	10829	8	35208
Singapore	3	10171	9	34651
Belgium	53	24312	14	9164
Sweden	1036	89649	70	8336
South Africa	8	808	20	2312
Other countries	29	4501	11	1926

Figures rounded off

**Table-34 : Imports of Iron & Steel (Scrap)
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (` '000)	Qty (t)	Value (` '000)
All Countries	5427661	165878997	6883778	256694752
UAE	845850	23336819	1252946	40293608
USA	690893	19396398	717645	28342970
UK	471748	12044587	869574	25779560
Singapore	224174	7188580	538931	20596588
Netherlands	95435	7406315	209663	11922946
South Africa	279289	5840338	409174	10576666
Malaysia	224415	8896305	168163	9851637
Canada	95576	2967091	136731	7774453
Thailand	113424	6269245	100548	7674128
Australia	253824	6796190	208553	7630190
Other countries	2133033	65737129	2271850	86252006

*Figures rounded off***Table-35 : Imports of Iron & Steel
(Sponge Iron)
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (` '000)	Qty (t)	Value (` '000)
All Countries	79329	1329360	49063	1000242
UAE	52611	986541	26014	589952
South Africa	20330	236970	15182	249715
Egypt	-	-	4265	70467
Bahrain	-	-	2530	63920
Oman	-	-	1017	22349
Norway	-	-	15	2993
UK	-	-	40	749
Japan	1	8	++	76
Italy	-	-	++	18
USA	++	11	++	3
Other countries	6387	105830	-	-

Figures rounded off

**Table – 36 : Imports of Iron & Steel
(Stainless Steel)
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (` '000)	Qty (t)	Value (` '000)
All Countries	79479	11251090	97278	15618954
China	42213	6034277	44604	6749947
Vietnam	17837	2789663	17408	3118710
Japan	1365	239873	3292	1301460
Brazil	1	587	12304	1240318
Italy	5657	808453	4395	712725
USA	1677	207455	1857	326709
UAE	347	33819	2558	326014
Korea, Rep. of	6573	481903	2011	319796
Singapore	64	9388	1548	267649
Germany	144	28896	572	205074
Other countries	3601	616776	6729	1050552

*Figures rounded off***Table-37: Imports of Iron & Steel Material
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (` '000)	Qty (t)	Value (` '000)
All Countries	583091	25375960	639656	37058227
Korea, Rep. of	199270	8527955	194437	9877500
Taiwan	217388	7720934	190374	8019105
Vietnam	17303	1124654	95959	5854324
China	92500	4560500	58370	4498865
Germany	32691	1587043	44374	2745681
Japan	2069	144178	7732	1774646
France	7290	546498	10760	942112
Belgium	964	50784	10504	842802
Singapore	2688	156086	4644	331644
Russia	1564	76745	5023	314344
Other countries	9364	880583	17479	1857204

*Figures rounded off***Table-38 : Imports of Pig & Cast Iron
(Incl. Speigeliessen)
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (` '000)	Qty (t)	Value (` '000)
All Countries	64223	4325786	73261	5175320
Germany	1860	482600	10684	1105065
China	10392	592948	15174	912906
Russia	6525	245238	8778	350554
South Africa	6766	212344	8270	304050
Thailand	3910	189286	4666	277111
Italy	1298	135244	1851	271733
Japan	513	306659	464	253533
France	2064	137914	3497	244903
UK	963	341690	361	230008
USA	1028	161398	1557	226963
Other countries	28904	1520465	17959	998494

Figures rounded off

**Table – 39 : Imports of Slag
(Dross etc. from Iron and Steel exc. Granulated)
(Steel Wire)
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (` '000)	Qty (t)	Value (` '000)
All Countries	171472	1026483	136421	1131820
Japan	47210	345684	84143	749041
Korea, Rep. of	32275	182471	49812	367066
Hong Kong	-	-	2350	14568
Bhutan	-	-	116	1145
France	91970	496507	-	-
Spain	17	1818	-	-
China	++	3	-	-

Figures rounded off

FUTURE OUTLOOK

Steel is one of the most important products of the modern world and of strategic importance to any industrial nation from construction, industrial machinery to consumer products; steel finds its way into a wide variety of applications. The Indian steel industry has entered into a new development stage, post de-regulation, riding high on the resurgent economy and rising demand for steel. Rapid rise in production has resulted in India becoming the 2nd largest producer of crude steel during 2018, from its 3rd largest status in 2017. The country is also the largest producer of sponge iron or DRI in the world and the 3rd largest finished steel consumer in the world after China & USA. In a de-regulated, liberalised economic/market scenario like India the Government's role is that of a facilitator which lays down the policy guidelines and establishes the institutional mechanism/structure for creating conducive environment for improving efficiency and performance of the Steel Sector. In this role, the Government has released the National Steel Policy 2017, which has laid down the broad roadmap for encouraging long-term growth for the Indian Steel

Industry, both on demand and supply sides, by 2030-31. The Government has also announced a policy for providing preference to domestically manufactured Iron & Steel products in Government procurements. As per NSP, 2017, Indian Steel Industry has an output multiplier effect of nearly 1.4X on GDP and employment multiplier factor of 6.8X.

There is significant potential for growth given the low per capita finished steel consumption of 74.1 kg in 2018 (Source : JPC) in India, as compared to world average of 224.5 kg (Source: World Steel Association). The National Steel Policy aims at achieving per capita steel consumption to 160 kg by 2030-31, with an aim to domestically meet entire demand of high grade automotive steel, electrical steel, special steels and alloys for strategic applications.

Industry dynamics including demand-availability of iron and steel in the country are largely determined by market forces and gaps in demand-availability are met mostly through imports.

Domestic steel prices are influenced by trends in raw material prices, demand-supply conditions in the market, international price trends among others.

As a facilitator, the Government monitors the steel market conditions and adopts fiscal and other policy measures based on its assessment. Currently, GST of 18% is applicable on steel and there is no export duty on steel items. A Steel Price Monitoring Committee has been constituted by the Government with the aim to monitor price rationalisation, analyse price fluctuations and advise all concerned regarding any irrational price behaviour of steel commodity. To avoid any distortion in prices in view of ad-hoc and rising imports, the Government had taken several steps including raising import duty and imposed a gamut of measures including anti-dumping and safeguard duties on a host of applicable iron and steel items. In a further move to curb steel imports, Government of India banned the production and sale of steel products that does not meet Bureau of Indian Standard (BIS) approval and to check the sale of defective and sub-standard stainless steel products used for making utensils and various kitchen appliances, it issued the Stainless Steel (Quality Control) Order, 2016 for products used in making

utensils and kitchen appliances, that will help filter imports of the metal.

Further, while the main focus of the industry is on the domestic market, being in close vicinity of the developed west and developing east, provides it a strategic location that augurs well for the industry seeking opportunities for exports of finished goods and imports of some scarcely available raw materials.

As per NSP, 2017, it is expected that at the current rate of GDP growth, i.e. 7.5% (Average GDP growth rate of India was 7.5% during 2010 – 2015; World Bank), the steel demand would grow threefold in the next 15 years to reach a demand of 230 million tonnes by 2030-31. Demand for pig iron for merchant use, such as, for castings and supplementary metallic in the electric arc or induction furnaces, is projected to increase to 17 million tonnes by 2030-31. Similarly, demand for sponge iron is projected to increase to 80 million tonnes by 2030-31. It is projected that the sponge iron capacity may increase to 114 million tonnes by 2030-31 with around 30% share of gas-based capacities under increased environmental considerations and long-term availability of gas.