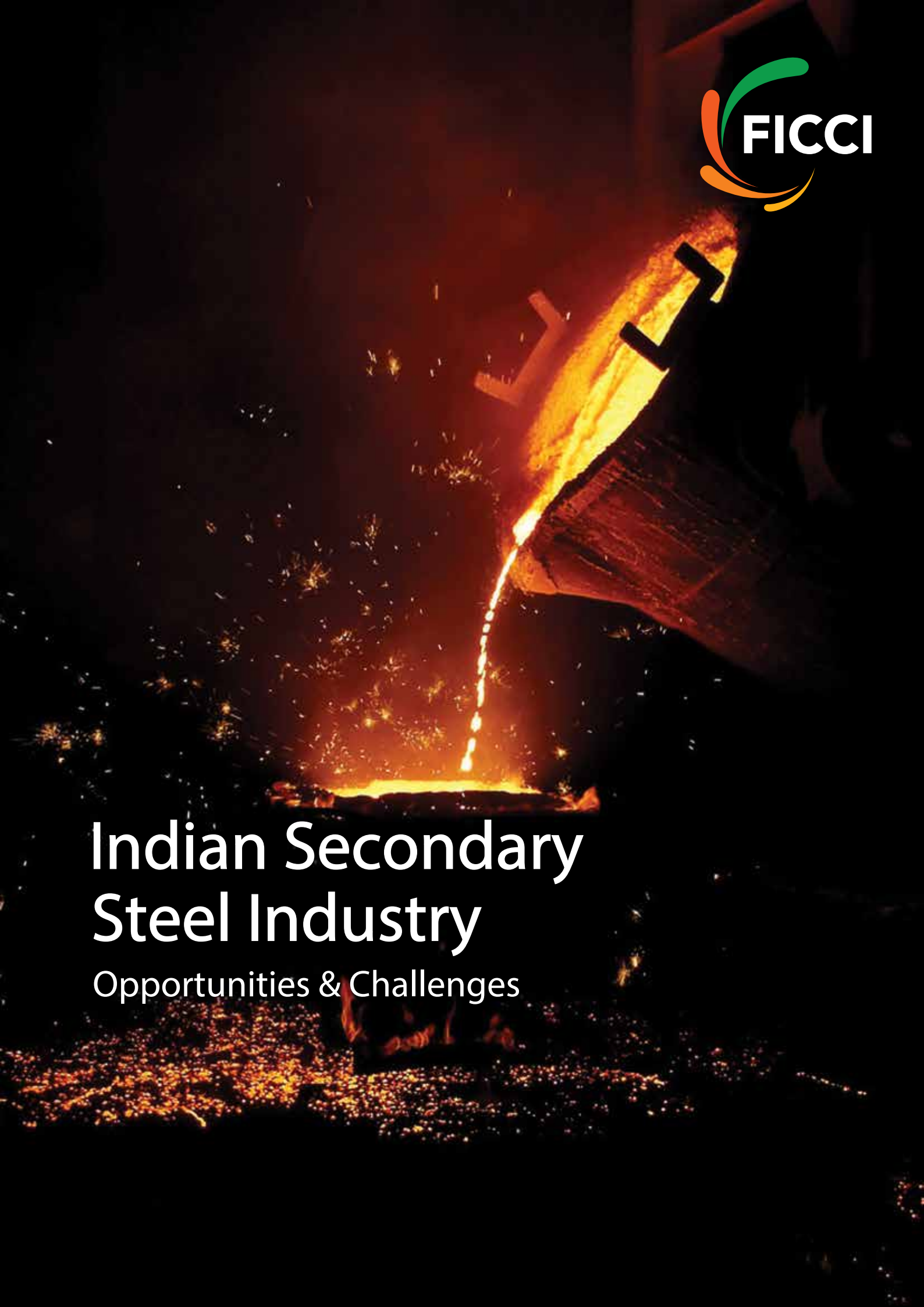


Indian Secondary Steel Industry

Opportunities & Challenges

नरेन्द्र सिंह तोमर
NARENDRA SINGH TOMAR

सत्यमेव जयते

इस्पात एवं खान मंत्री
भारत सरकार
उद्योग भवन,
नई दिल्ली-110107
MINISTER OF STEEL & MINES,
GOVERNMENT OF INDIA
UDYOG BHAWAN
NEW DELHI-110107



MESSAGE

Steel is crucial for growth of vibrant and developing economy of India. It contributes 2% to India's national GDP and provides ample opportunities for employment. It is a matter of pride that in 2015, we have become the 3rd largest crude steel producer in the world. India is the only country among major steel producing nations, which has registered positive growth in production and consumption of steel in recent months. However, we need to strive to become one of the most competitive countries producing quality steel to ensure sustainable growth.

A major segment of our industry is the secondary producers which contribute more than 55% to our total steel production. Considering the importance of the sector, the Ministry of Steel decided to organise a national level meeting with them. The Ministry, along with Federation of Indian Chambers of Commerce & Industry and Joint Plant Committee organized a Conference and a Round Table to understand and identify the solutions to the challenges faced by the sector. The Conference highlighted the strengths and opportunities for the sector.

I am happy to note that FICCI, as a follow up of this conference, has compiled all the deliberations and contributions into a comprehensive report. I must acknowledge the whole hearted participation of, each and every stakeholder in the secondary steel segment, in the conference, without which this would not have been possible.

I would like to take this opportunity to assure you that the Government is committed to give full support to the Steel Industry in general and the secondary steel sector in particular. I am sure that by working together, we can build upon our strength of being a major force in steel making in the world.

21/12/15

(Narendra Singh Tomar)



A Didar Singh



Federation of
Indian Chambers
of Commerce and Industry

Federation House
Tansen Marg
New Delhi 110001
T +91 11 23738760 (11 lines)
F +91 11 23320714 / 237215047
E ficci@ficci.com
www.ficci.com

MESSAGE

FICCI has always been ahead in providing thought leadership to key industry sectors. With immense pleasure, I introduce you to our comprehensive report on the secondary steel sector titled "Indian Secondary Steel Industry: Opportunities and Challenges". This report has been developed as a follow up to the conference titled "Roadmap to 300 Million Tonnes: Opportunities and Challenges", organized by Ministry of Steel, Government of India on August 22, 2015, along with the Federation of Indian Chambers of Commerce & Industry and Joint Plant Committee. This report summarizes the discussion points, key issues and remedial solutions deliberated during the conference.

Steel industry is one of the most crucial sectors and contributes significantly to our GDP. It derives its demand from other important sectors like infrastructure, aviation, engineering, construction, automobile, pipes and tubes etc. Thus its intense integration with other important industries makes it a strategic sector for the Government as well as the economy.

Though the secondary steel sector accounts for 55% of the overall Indian steel industry, it is undergoing tremendous stress due to non-availability of raw material, high cost of power, lack of financing options and surging imports of steel products into the country. This report therefore, is an initiative on the part of FICCI to identify the various solutions that are required to be taken up to ensure the survival and further growth of the secondary steel sector in India.

The report is also a ready compendium that gives a sector overview, production status of leading countries, steel making technologies and the future outlook for the sector. I am sure policy makers, steel manufacturers and academicians will all find this report to be useful.

I would like to thank the Ministry of Steel, Government of India for providing us with an opportunity to be a part of the conference and for producing this report.

(A Didar Singh)



Table of Contents

Background / Preface		3
Acknowledgement		5
I.	Introduction	7
II.	Global Steel Industry	15
	i. Leading Steel Producing Countries	16
III.	Overview of Indian Steel Industry	19
	i. Industry Structure	21
	ii. Secondary Steel Sector	22
IV.	Technology in Indian Steel	33
V.	Challenges of the Secondary Steel Sector	49
	i. Raw Material	51
	ii. Trade Issues	53
	iii. Transport and Logistics	54
	iv. Quality Order	55
	v. Operational Issues	56
	vi. Policy Issues	57
	vii. Financial Issues	58
VI.	Recommendations – Way Forward	59
	i. Raw Material	61
	ii. Trade	61
	iii. Operations	62
	iv. Transport and Logistics	62
	v. Finance	62
VII.	Sector Outlook	63



Background / Preface

Secondary steel accounts for 55 per cent of overall steel industry in the India through different technologies. Steel is the integral part of the growth of Indian economy. The per capita consumption of steel in India has been steadily increasing, and steel production has doubled in last ten years- from 43.44 million tonnes in 2004-05 to 88.12 million tonnes in 2014-15. The steel sector contributes nearly 2 per cent of country's GDP and the secondary steel sector is an important contributor to the vision of reaching the capacity of 300 million tpa.

India has become the third-largest steel producer in the world and envisions being the second largest producer soon. India is looking forward to triple its production capacity from 110 million tpa presently to about 300 million tpa in the next 10 years.

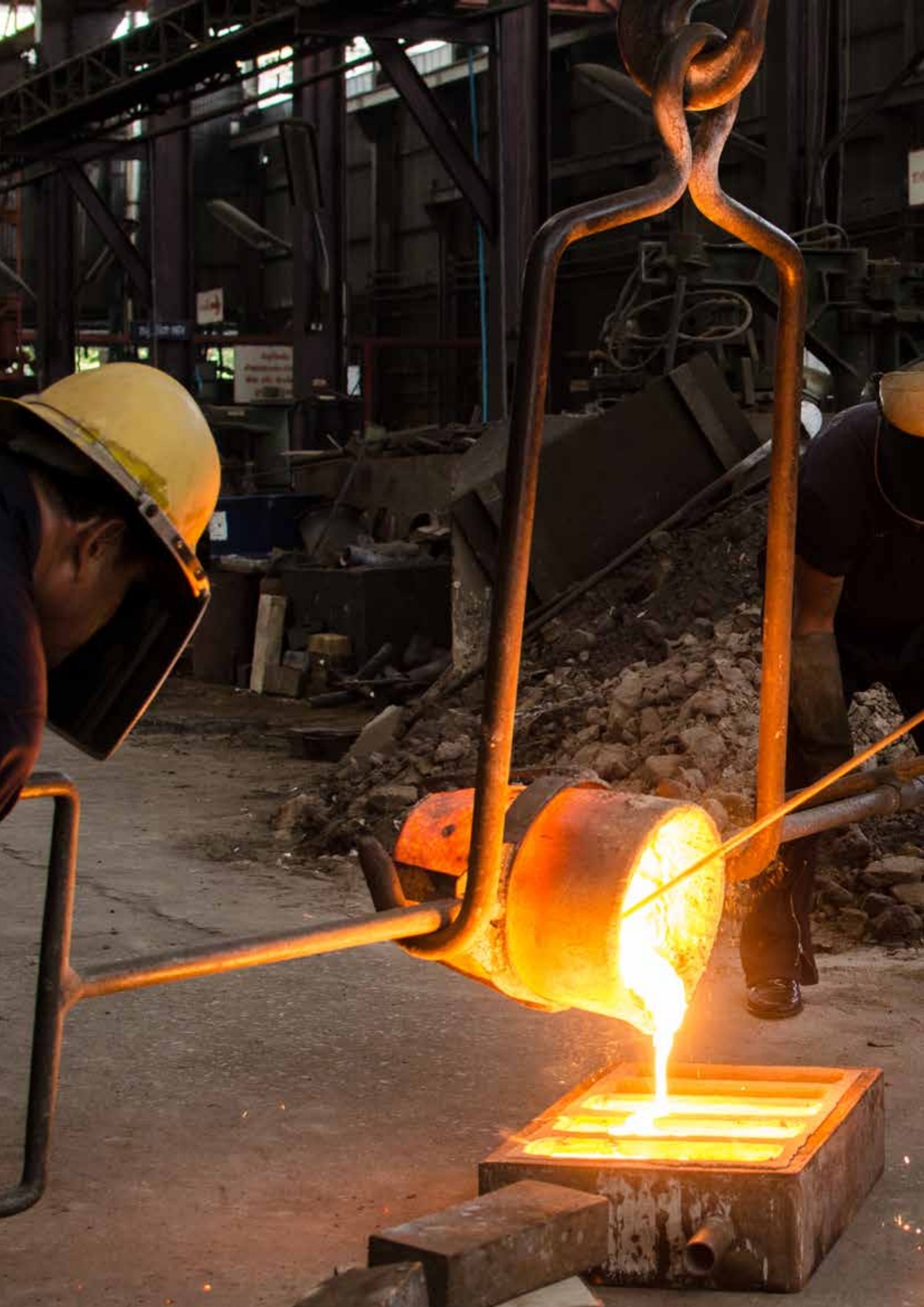
To achieve this vision of 300 Million Tonnes, Ministry of Steel, Government of India, organized a conference on **"Roadmap to 300 Million Tonnes: Opportunities & Challenges"** in August'15 for Secondary Steel Producers' in the presence of the Union Finance Minister, Mr Arun Jaitley, Union Minister of Steel and Mines, Mr Narendra Singh Tomar and Minister of State of Steel and Mines, Mr Vishnu Deo Sai in New Delhi.

The conference witnessed participation from all Secondary Steel industry stakeholders along with the representatives of the government. The objective of the conference was to discuss the challenges faced by the Secondary Steel Producers and projected contribution by them for achieving the target of 300 million tonnes by 2025

This report summarizes the discussion points of that conference, highlighting the importance of the secondary sector to India, various issues plaguing the sector and the remedial action points.

The government of India has taken up various measures to improve the steel sector in India such as opening up the sector for FDI, National Steel Policy etc. Earlier this year, India imposed anti-dumping duty of up to $316 per tonne on imports of certain steel products from three countries, including China, to protect domestic producers from below-cost inbound shipments.

The industry is still currently under stress and this reports identifies the various solution measures that are required to be taken up to ensure that the Indian Secondary Steel Industry stays competitive.



Acknowledgement

Federation of Indian Chambers of Commerce and Industry (FICCI) would extend its heartfelt thanks to the Ministry of Steel, Government of India for providing it with an opportunity to be a part of its conference on Secondary Steel Sector dated 22 August 2015 titled Roadmap to 300 Million Tonnes: Opportunities & Challenges. The conference provided great insights for furthering the growth of Indian secondary steel sector in India for the next decade

Basis the issues and opportunities discussed during the conference and various other information received by different associations in the secondary steel sector, FICCI has detailed out the challenges, opportunities and recommendations for the development of secondary steel sector in India

FICCI would like to convey its sincere thanks to the various organizations and associations in the secondary steel sector for sharing their insights and contributing to the development of the report

A special mention for M N Dastur & Company who have contributed for the chapter on technological perspective for the secondary steel sector. The information contained therein is all credit to them

The acknowledgement would be incomplete without a mention for the individual experts from the industry and the Ministry of Steel; whose views have contributed immensely in finalizing the report





I. Introduction

I. Introduction

Today's modern world and human existence revolves around steel. Take a closer perspective at the things, and you will find steel everywhere. There is no building in the world that has no component of steel in it nor there is any automobile that one drives which does not have steel. Moving on to the national horizon, steel industry is one of the basic industries of the country and plays an important role in strengthening the economy; providing boost to the national GDPs. Today the world moves with steel and globally it is one of the most important metals for human existence and national growth; as highlighted further

Top 5 crude steel producers (2014)



However, taking into perspective the latest production trends, especially the first six months of CY 2015, India has become the third largest steel producer in the world with 44.96 million tonnes (MT) of production.

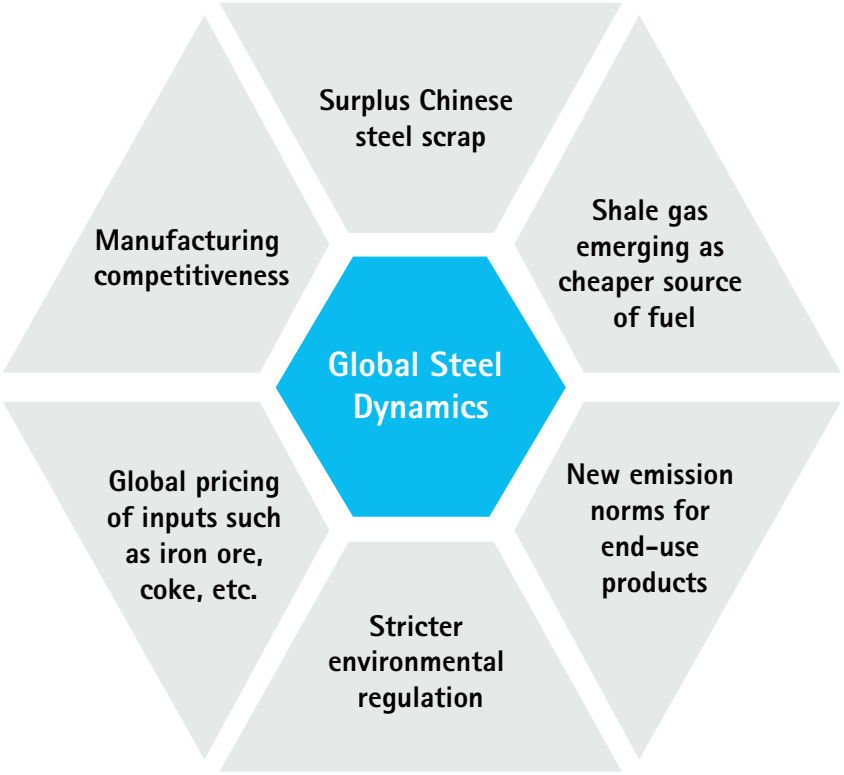
India is amongst the leading steel producing countries in the world. Steel is the integral part of the growth of Indian economy. The per capita consumption of steel in India has been steadily increasing, and steel production has doubled in last ten years- from 43.44 million tonnes in 2004-05 to 88.12 million tonnes in 2014-15. The steel sector contributes nearly 2 per cent of country's GDP and the secondary steel sector is an important contributor to this.

India envisions to be the second largest steel producer soon. It is looking forward to triple its production capacity from 110 million tpa presently to about 300 million tpa in the next 10 years.

Changes in the global market to shape the Indian steel Industry

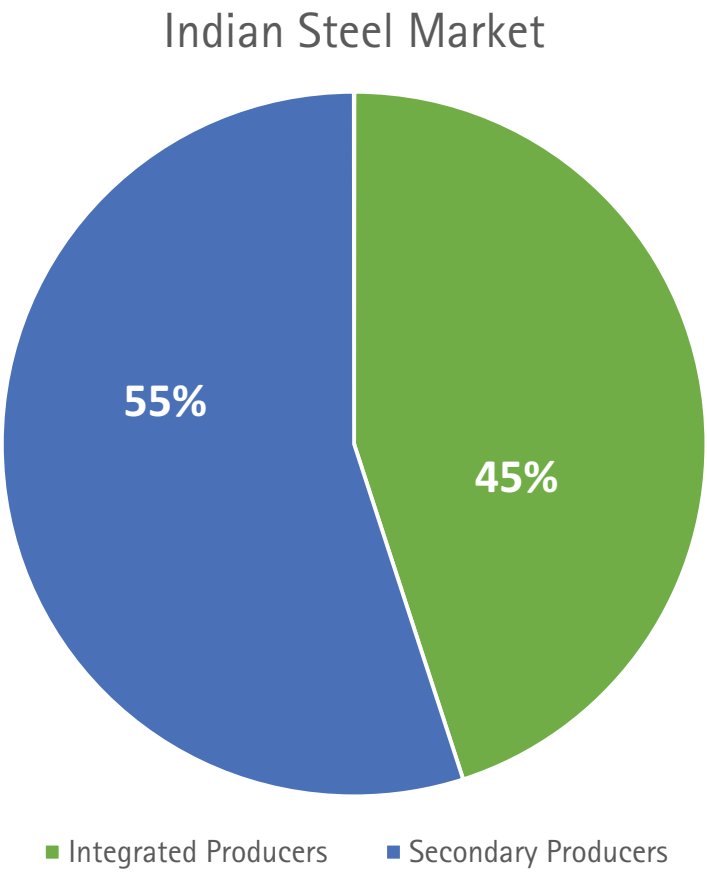
To date, the Indian steel sector has been relatively insular; however, it will increasingly be impacted by developments in global steel, raw material and energy spaces.

The sector is fraught with challenges in quality, environmental conformance, old technology, operational efficiency, under presence in flat steel segment etc.



Indian secondary steel sector

The secondary steel sector in the iron and steel industry is composed of production units which are a diverse lot with widely varying product range, technology and scale of operation and include major product/industry segments such as pig iron produced by mini blast furnaces (MBFs), sponge iron, steel produced in electric arc (EAFs) or Induction Furnaces (IFs), standalone cold rolled steel sheets and coils producers, re-rollers producing hot rolled long products such as rebars, wire rods and structurals, standalone GP/GC and color coated steel sheets/coil producers, wire drawing units, standalone tinplate producers etc. The units covered under the Secondary Sector produce either a product that serves a basic raw material to steel making such as pig iron or sponge iron or they use a semi finished or intermediate steel product to convert the same to another product of higher value. The sector also includes crude steel (semi finished products such as ingots, billets and blooms) produced using electric arc or induction furnaces using scrap or DRI in capacities less than one million tonne a year. These units are generally small in size compared to the integrated steel plants and are widely dispersed across the country.



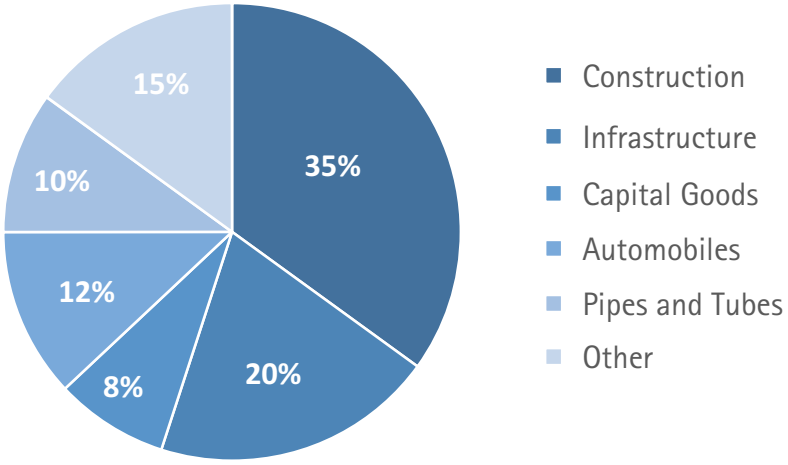
The prospects for the secondary steel sector lie in addressing the opportunity offered by the current (low) level of per capita finished steel consumption in India (60.8 kg) and gearing up to meet the local demand, specially required in rural and semi-urban areas of the country, thereby helping growth in rural steel consumption/offtake.

Indian growth story to be driven by the Secondary Steel sector

The steel sector in India contributes nearly two per cent of the country's gross domestic product (GDP) and employs over 600,000 people. The per capita consumption of total finished steel in the country has risen from 51 Kg in 2009-10 to about 59 Kg in 2014-15.

Steel is a critical input to the key industries in India

Steel consumption pattern in India



- There is enormous scope for increasing steel consumption in almost all sectors, e.g., infrastructure, automobiles, packaging, irrigation and water supply, engineering and capital goods, real estate and transportation.
- Manufacturing in India is driven by the key sectors such as Automobiles and Capital Goods.
- Steel – a key component for the success of "Make in India".

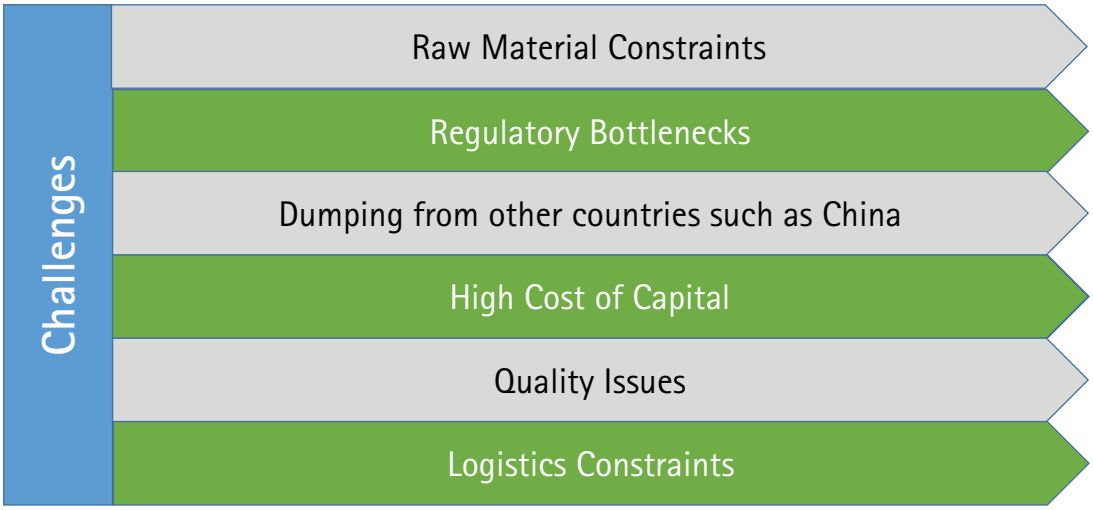
Source: "India Steel Asia Insight: Still in the Doldrums, But Tata Looks Sound," Morgan Stanley

Indian secondary steel industry is poised to play an important role for the success of "Make in India"

However, the industry needs to overcome few challenges to achieve this growth story

The outlook for the domestic steel industry remains robust and the prospect of capital investments are bright, subject to, however, the timely intervention by policy makers to remove the constraints faced by the industry. These include ease of doing business, land acquisition, environmental clearances, resource allocation, availability of finance at competitive rates and infrastructure bottlenecks, among others.

In India, the steel Industry is passing through a challenging phase. The demand for steel is at its lowest. Domestic consumption is severely affected due to lack of activity in infrastructure, as well as in the manufacturing space. The biggest challenge facing the domestic steel industry is to have the per capita steel consumption in India at par with the average global standards.



Interventions required rekindling the Industry growth

The new Government at the center has, however, rekindled hope in the industry. The ambitious infrastructure projects and the thrust in manufacturing through the "Make in India" campaign are steps in the right direction. The plan for smart cities, improved road and rail connectivity by building highways, bridges and dedicated freight and superfast rail corridors have huge potential to spur domestic steel demand.

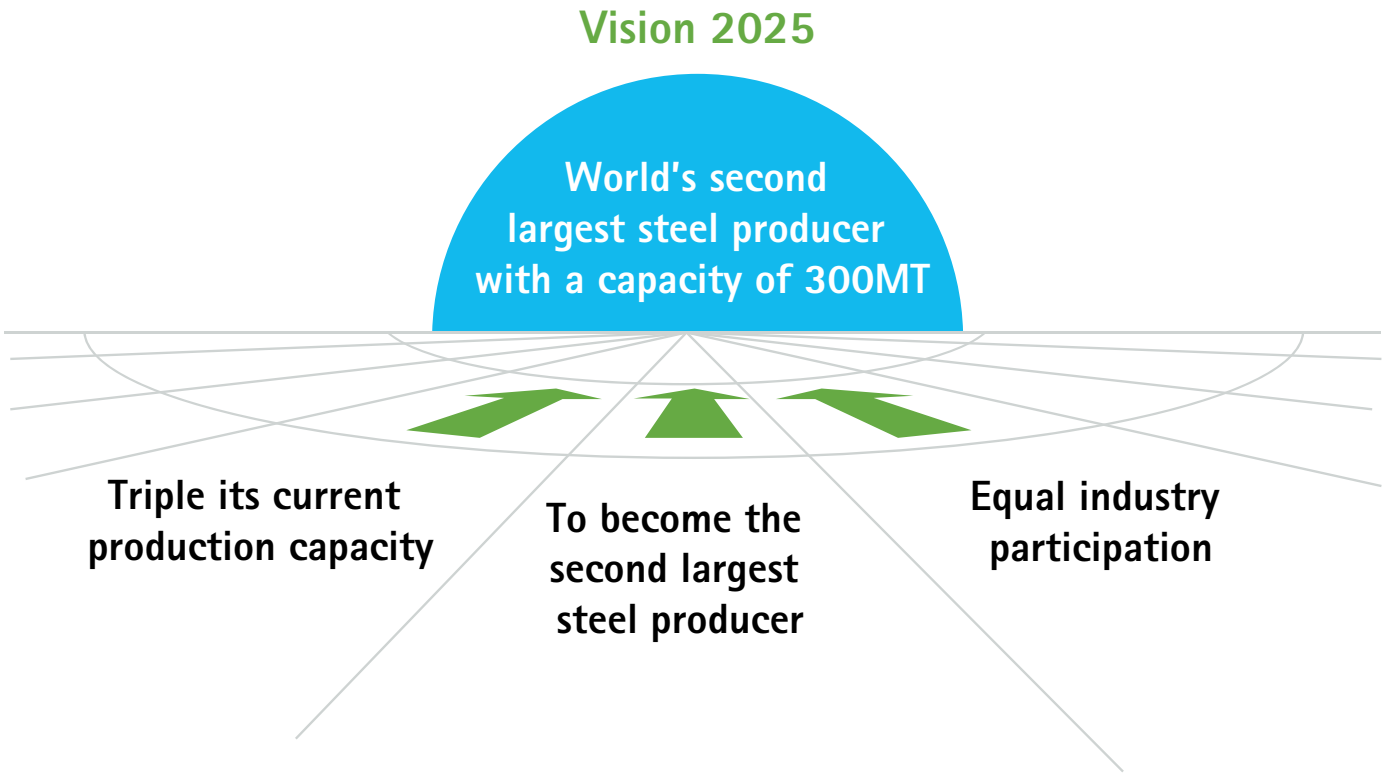
Key steps should be taken to ensure uninterrupted supply of raw material at economic prices to the end-use plants. More mines should be opened to make raw material available to industries. Other issues that require immediate attention are rationalisation of logistics as per international norms and incentive for the local industry.

Issue / Challenge	Suggested Measures	Time Duration
Raw Material Security	Sufficient allocation of coal and iron ore mines with eligibility of iron and steel producers for the auction process	Medium Term
	Process of price discovery of iron ore to be made transparent and scientific	Medium Term
Trade	Free Trade Agreements with Japan and South Korea to be revisited	Medium Term
	Import restrictions (anti-dumping) to safeguard the domestic players	Short Term
	Curtail import of sub-standard steel	Short Term
	Well defined Product Specific Rules (PSR) must be incorporated into the RCEP agreement	Short Term
	Imported steel to be quality compliant as per the BIS	Short Term
	Special package to be introduced under "Make in India" for Alloy steel to make it export competitive	Medium Term
Operations	Various government clearances for doing business to be made efficient and time bound	Short Term
	Land acquisition is still a significant challenge for the industry	Medium Term
	Environment Clearances not to apply for induction furnaces below 100,000 TPA	Medium Term
Transport & Logistics	Along with development of roadways, focus should be given on strengthening coastal/water ways for domestic transport, which is relatively cheaper	Long Term
	Railways to treat steel industry as a priority sector and consider setting up dedicated tracks	Long Term
	Setting up of inland container depots	Medium Term
Financing	Alternative credit arrangements like bonds should be facilitated and encouraged	Medium Term
	Concessions on interest rates for steel sector	Short Term
	Establishment of Steel Finance Corporation	Medium Term

Sector outlook

The Indian steel industry is expected to grow moderately in the near future as end-user demand starts to pick up. Domestic steel capacity is expected to correspondingly mirror the growth of end-user industries. The Government plans to unveil a policy that targets 300mtpa in a decade from now.

The target calls for a concerted effort from all stakeholders. This paper highlights the various interventions that are required in the industry from regulatory framework, financing, trade, infrastructure & logistics and environmental reforms.





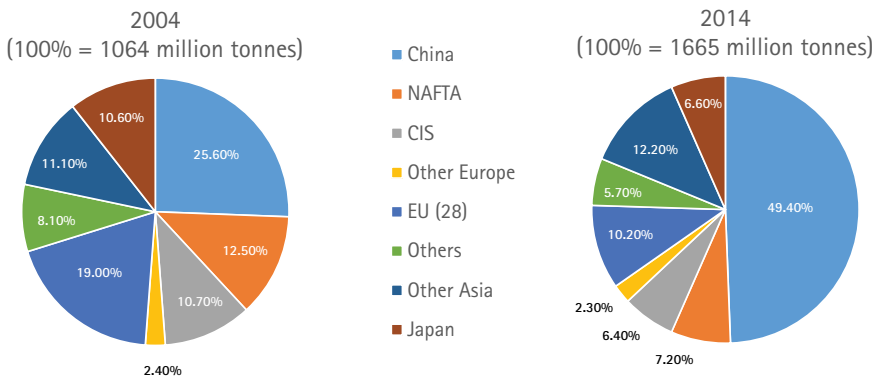


II. Global Steel Industry

II. Global Steel Industry

The global crude steel production stood at 1,665 million tonnes in 2014. China is the largest steel producer in the world. Its share has increased from 25.6% in 2004 to 49.4% in 2014. India contributes approximately 5% to the global crude steel production.

Global Crude Steel Production

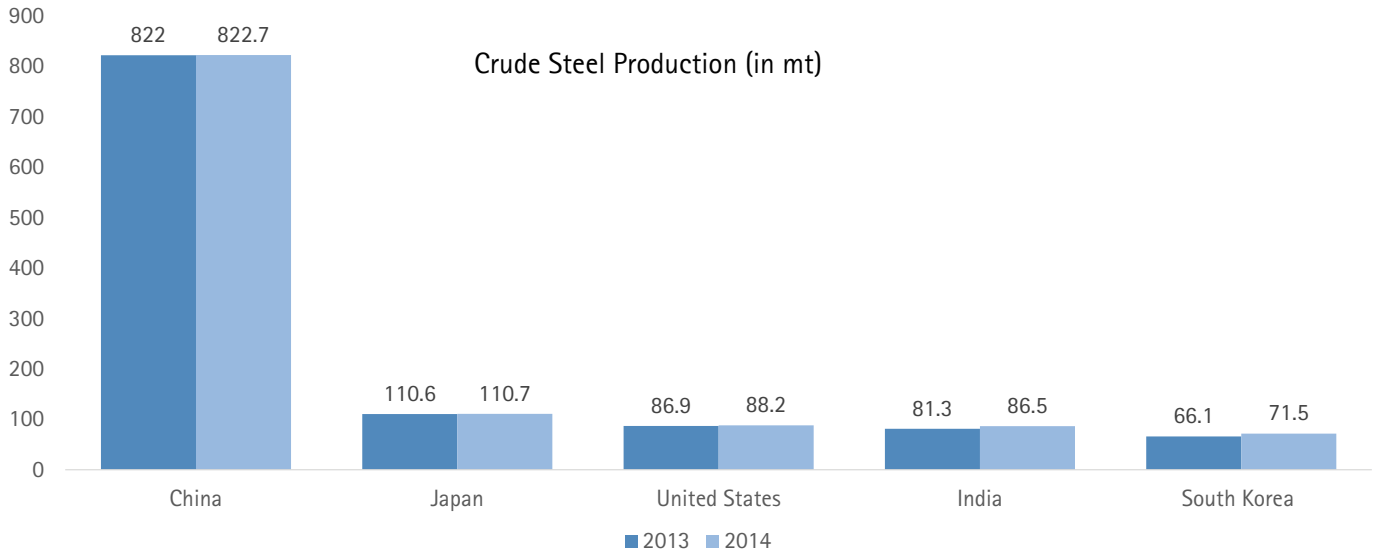


i. Leading Steel Producing countries

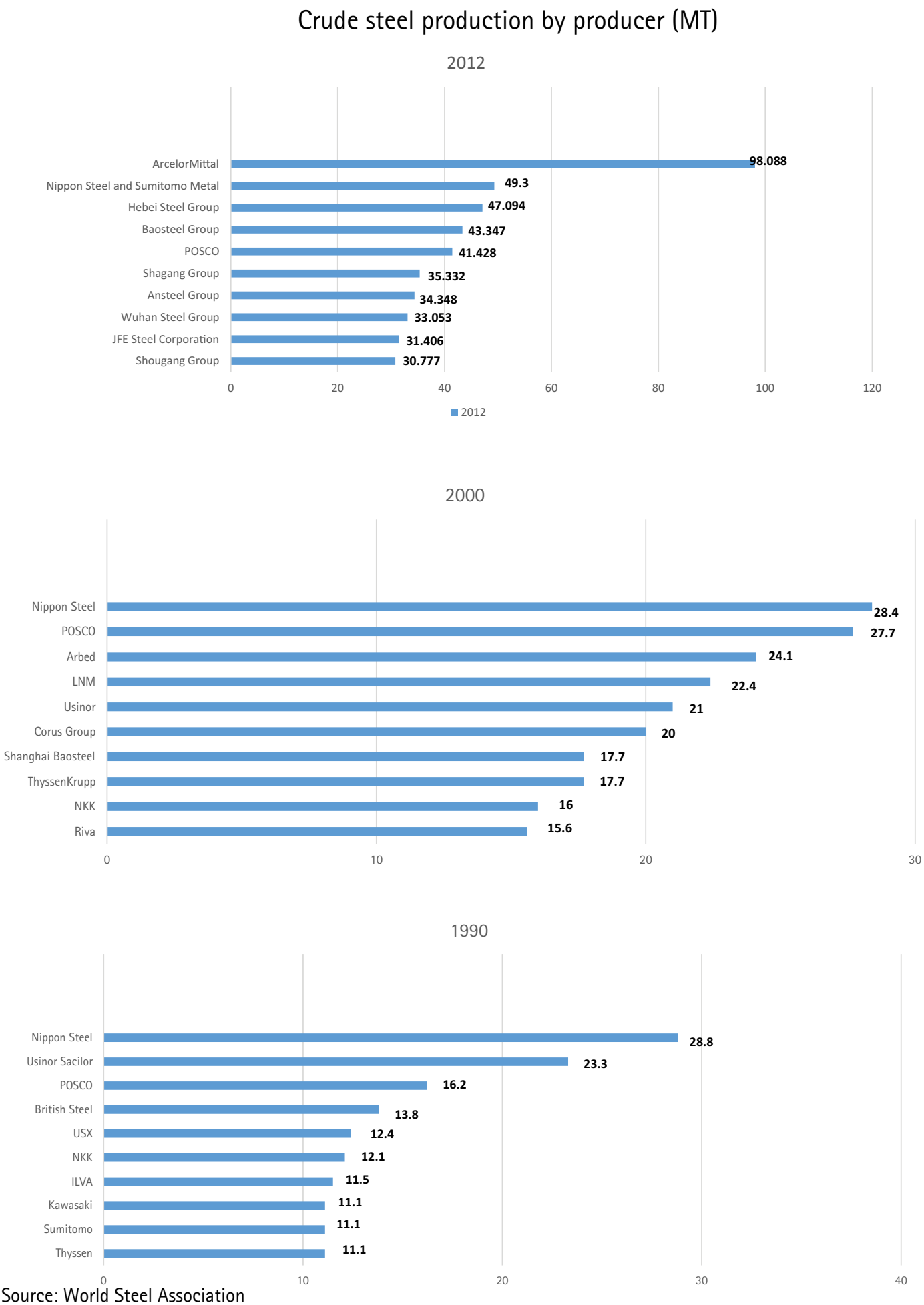
The top 5 countries (China, Japan, United States, India and South Korea) account for 70% of the global crude steel production. India's share in 2014 stood at approximately 5%.

India occupies a central position on the global steel map with the establishment of new state-of-the-art steel mills, acquisition of global scale capacities by players, continuous modernisation and up gradation of older plants, improving energy efficiency and backward integration into global raw material sources. India has overtaken the US to become the third-largest steel producer in the world with a production of 44.96 million tonnes (MT) in the first six months of the current calendar year, 2015

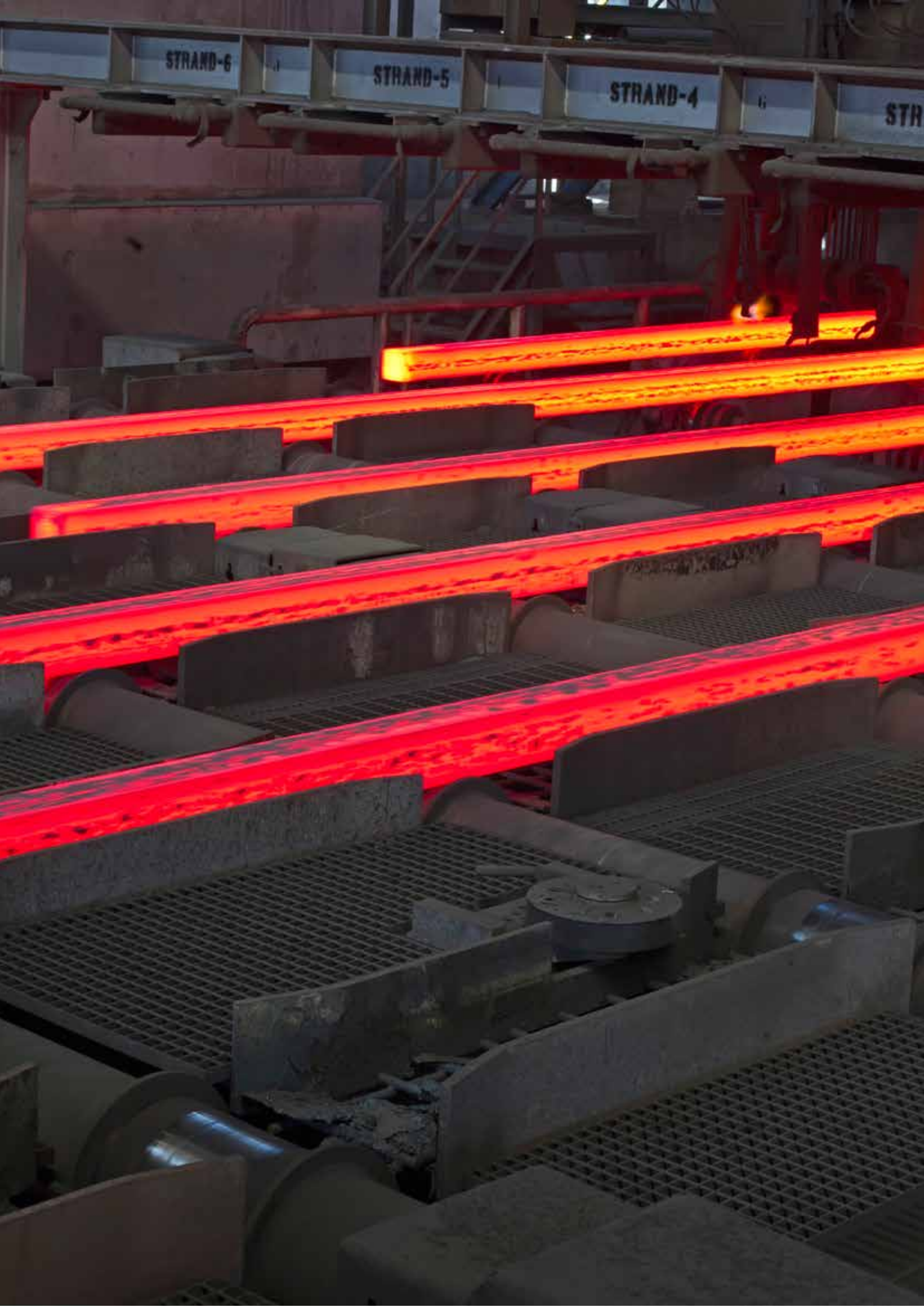
Crude Steel Production (in mt)

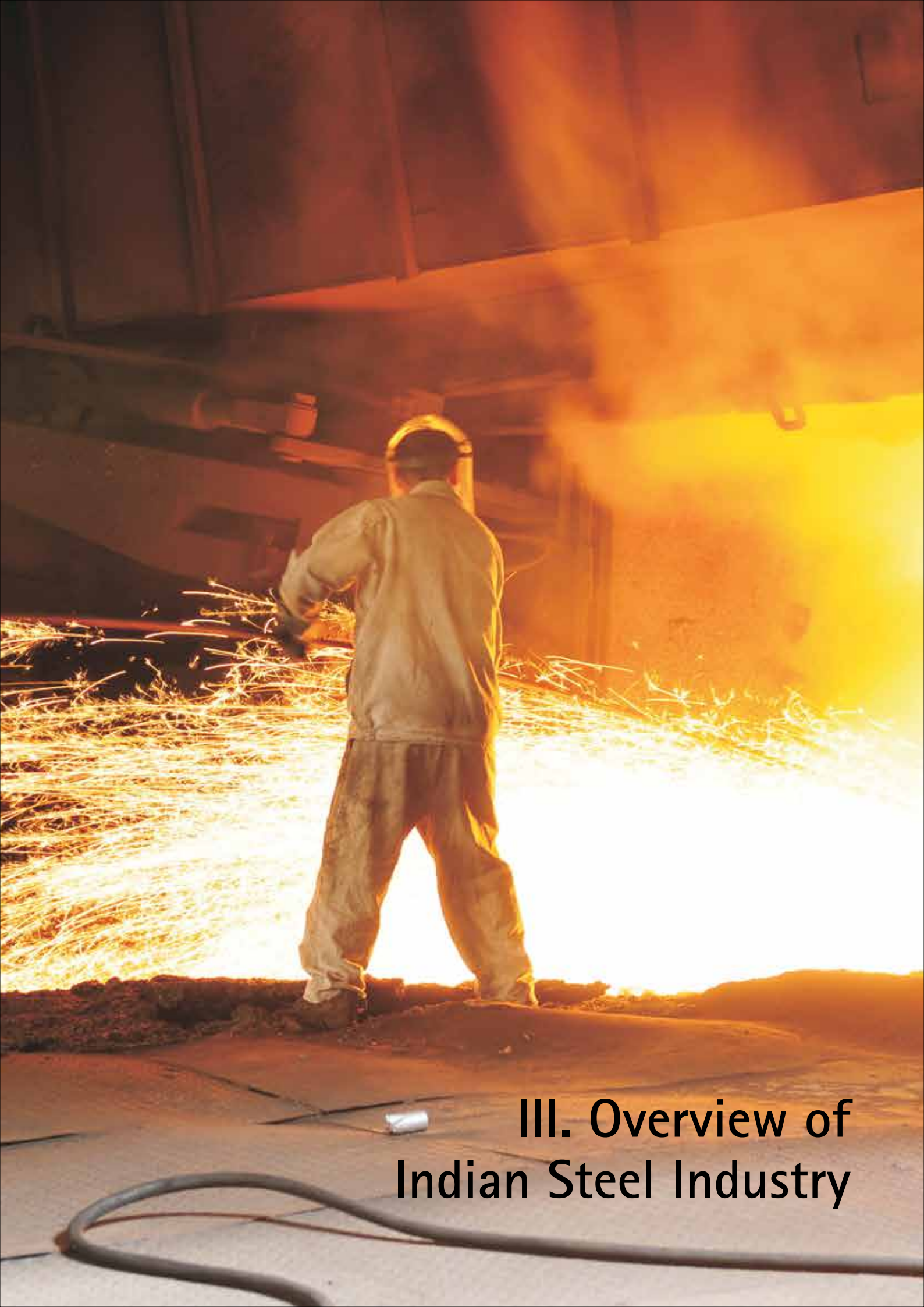


Luxemburg-based ArcelorMittal is the world's largest steel producer, with all other top 10 producers located in Asia, in particular China



Source: World Steel Association


STRAND-6
STRAND-5
STRAND-4



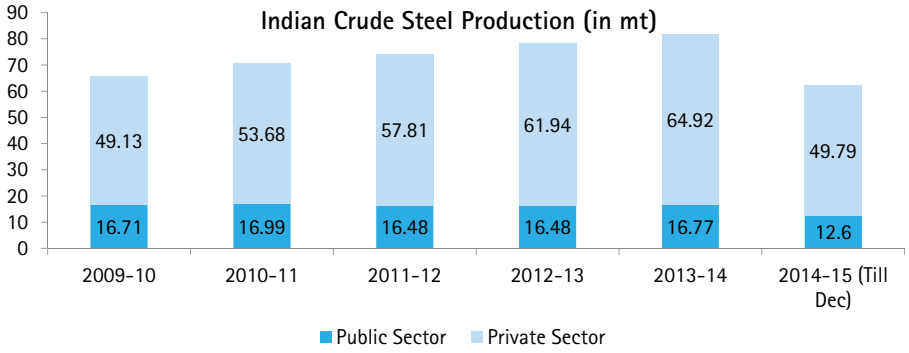
III. Overview of Indian Steel Industry

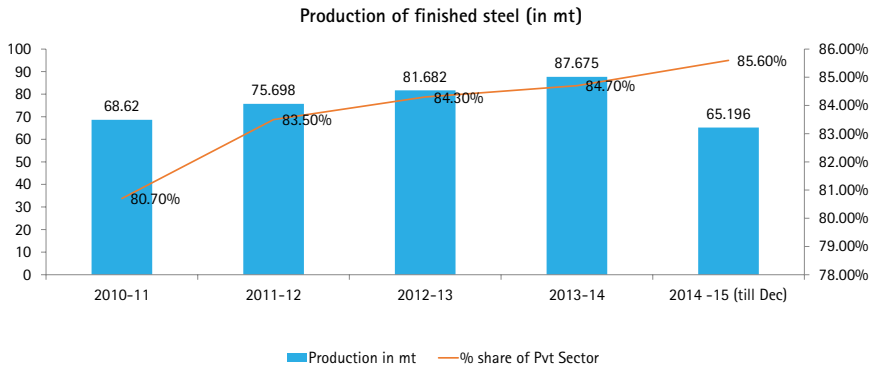
III. Overview of Indian Steel Industry

Steel is the backbone of any modern economy. The level of per capita consumption of steel is often considered an important index of the level of economic development.

During the period FY10 to FY14, the Indian crude steel production has increased at a CAGR of 5.54%. The share of the private sector has increased from 75% in FY10 to 80% in FY14.

The public sector crude steel production increased at a CAGR of 0.09% during FY10 – FY14, while the private sector production increased at a CAGR of 7.22% during the same period.





The production landscape is largely dominated by integrated steel producers who make steel from iron and by using the basic ore. These iron based producers usually make steel through the blast furnace (BF) route. Moreover, there are a significant number of smaller steel producers who make steel not using the blast furnace route and even not always using iron ore as the primary feed. These producers, who do not make steel from iron, can be put into three categories. The first is the 'Sponge Iron' producers which are produced using the 'Direct Reduced Iron' (DRI) route, and using iron ore. Steel is also produced using the 'Electric Arc Furnace' (EAF) route and the 'Induction Furnace' route where scrap replaces iron ore to a large extent as the primary raw material.

India is predicted to triple its production capacity from roughly 100 MT presently to about 300 MT in the next 10 years. As per the projections the Integrated Steel Producers are slated to reach a production capacity of roughly 210 MT while the remaining 30 percent or about 90 MT are to be contributed by the latter category, which we term as the **Secondary Steel Producers.**

i. Industry Structure

The Indian iron and steel industry can be divided into two main sectors Public sector and Private sector. Further on the basis of routes of production, Indian steel industry can be divided into two types of producers.

Integrated Producers:
Steel Producers starting their operation from iron making like production of hot metal or sponge iron using iron ore and producing crude steel of standard specifications, with processing facilities. They are the only one who converts ore to steel.

Secondary Producers:
These producers make use of steel scrap, sponge iron or hot briquetted iron (HBI). They mainly comprise of the Electric Arc Furnace (EAF) and Induction Furnace (IF). Apart from these two, other manufacturing units like independent hot and cold rolling units, re-rolling units, galvanizing and tin plating units, sponge iron producers and pig iron producers are covered under secondary producers or value adders. These largely produce long steel products.

	2004-05 (MT) (A)	2013-14 (MT) (B)	2014-15 (MT) (C)	INCREASE (MT) (A&C)
Capacity	48.00	100	110	62.00
Production	43.44	81.69	88.12	44.68
Consumption	34.39	74.09	76.36	41.97
Exports	4.71	5.98	5.59	0.88
Imports	2.29	5.45	9.32	7.03
Capacity utilization (%)	90.50	81.69	80.10	-10.40

Source: Industry, 2014

Table 1.1 shows the various parameters of the Indian Steel Industry. The capacity level has increased to 110 MT in 2014-15 from 100 MT in 2013-14. The production has also increased from 81.69 MT in 2013-14 to 88.12 MT in 2014-15.

The production capacity in 2004-05 was 48.00 MT which increased by 62.00 MT to 110 MT in 2014-15. The production has also increased by 44.68 MT from 43.44 MT in 2004-05 to 88.12 MT in 2014-15.

The imports have risen from 2.29 MT in 2004-05 to 9.32 MT in 2014-15. There has been a huge increase in imports of 7.03 MT over the last ten years while, the exports have not increased in the same manner. There was only 0.88 MT increase in exports from 4.71 MT in 2004-05 to 5.59 MT in 2014-15.

Looking at the above table it is evident while the capacity has increased by 62 MT in the last decade; the production grew only by 45 MT (largely suffering due to the non-availability of the raw material). Also, the Free Trade Agreement with Japan and Korea have hurt the domestic steel industry in a big way; with the imports almost doubling in last one year and exports going down (though marginally). The surge in imports and production not able to match the capacity expansion has led to reduction in capacity utilization from 90% a decade back to current levels of 80%.

The Indian steel industry is currently working at a capacity level of 110 MT. The capacity utilization however is hovering around only 80%. Keeping in mind the current ratio, if the country projects to have a capacity of 300 MT by 2025, it will be able to produce only around 240 MT. In 2013-14, the ratio of the BF and EAF/IF route was 43%:57%. Assuming this ratio to be 70:30 in sync with the expansion planned by the integrated steel producers for the blast furnace route of production, the production of crude steel through BF and EAF/IF will be 168 MT and 70 MT respectively. Therefore from the current production of around 45 MT to 70MT by 2025, it is important that we understand the sector's dynamics and work together to achieve the said target.

ii. Secondary Steel sector

The secondary steel sector contributes around 57% of the total steel production in Indian Steel industry. This sector uses the production techniques that make use of the steel scrap or the sponge iron/DRI. The following techniques are used for production of steel.

1. Electric Arc Furnace:

The electric arc furnace operates as a batch melting process, producing batches of molten steel known as "heats". These furnaces exist in all sizes (1 ton to 400 tons approx.) and can have temperatures risen up to 1800 Celsius. The one used for steelmaking consists of a refractory-lined vessel, usually water-cooled in larger sizes, covered with a retractable roof, and through which one or more graphite electrodes enter the furnace. The electric arc furnace operating cycle is called the tap-to-tap cycle. The operations of the electric arc furnace are explained below:

Fig 1.1: Electric Arc Furnace Route

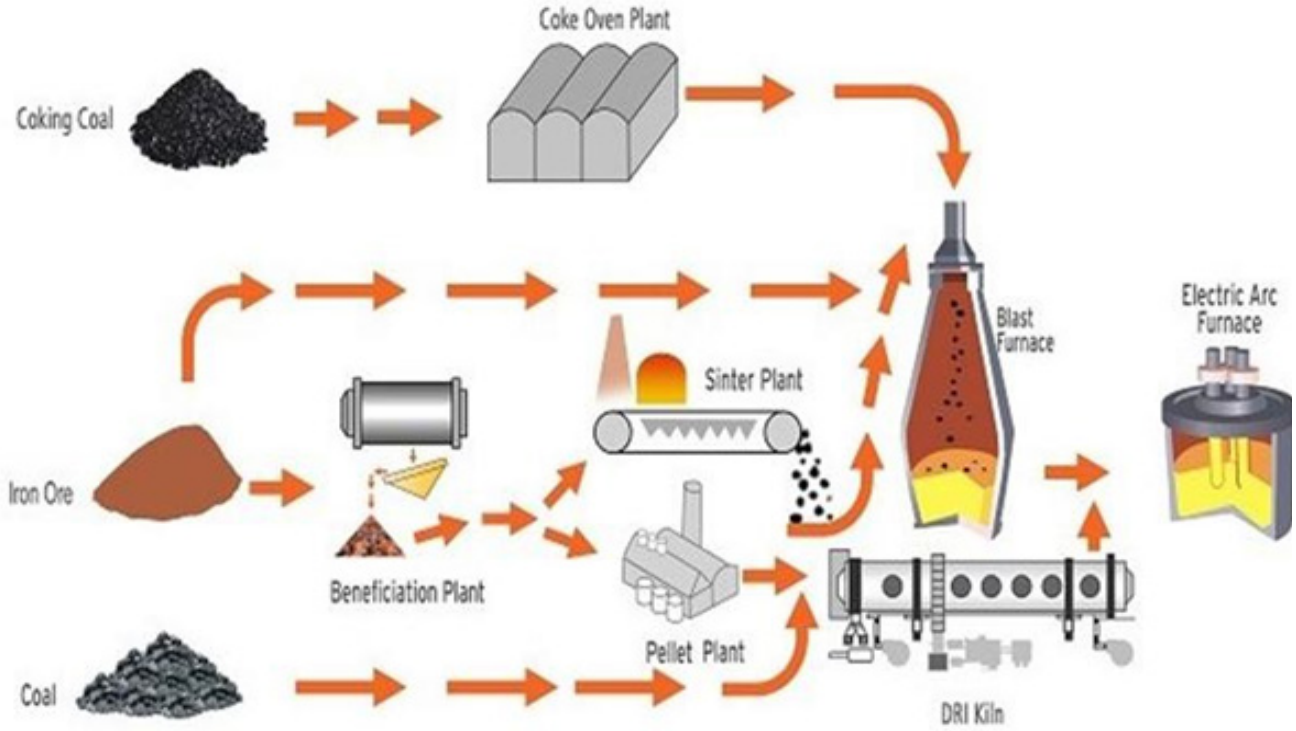


Fig. 1.2 Operation of Electric Arc Furnace

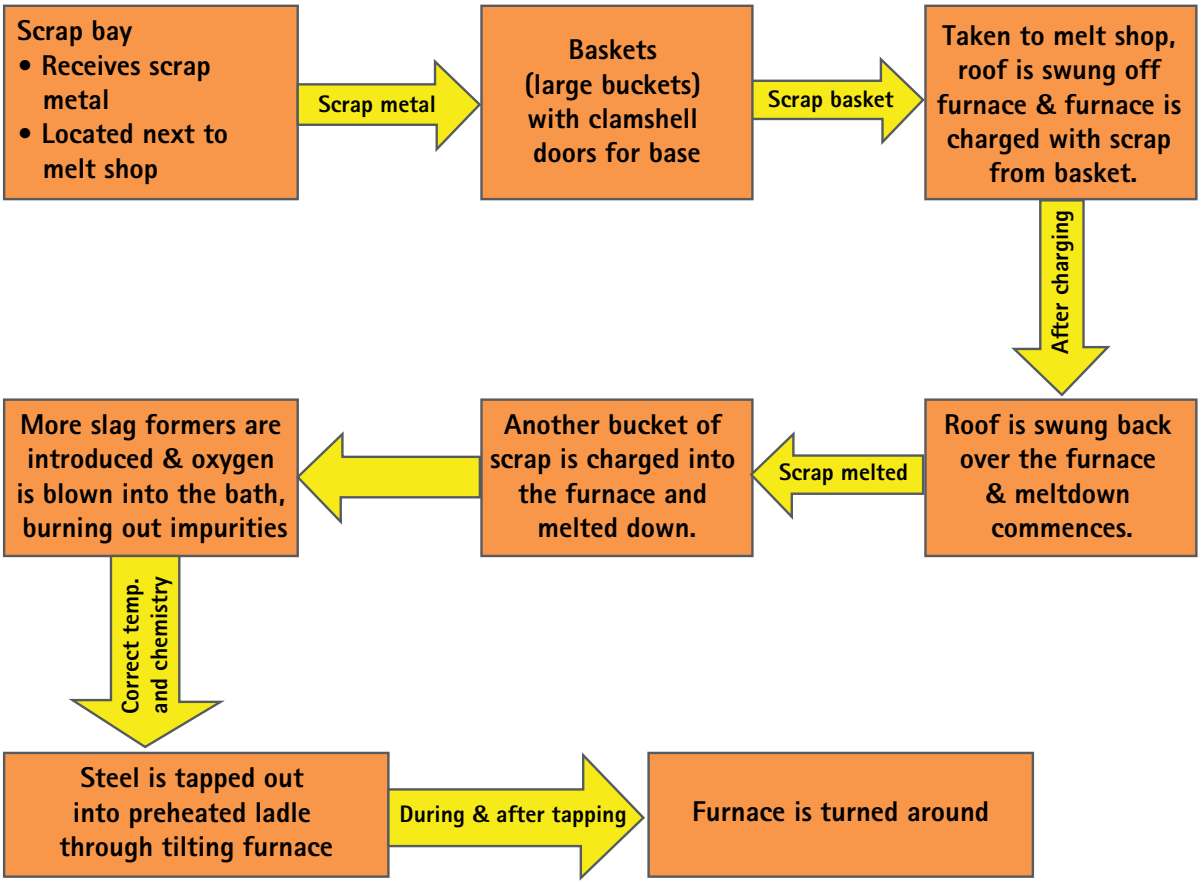


Table 1.2: Production and Capacity of EAF

Year	Capacity (MT)	Production (MT)	Capacity utilisation (%)
2004-05	11.13	10.23	92
2005-06	12.39	11.27	91
2006-07	12.40	10.16	82
2007-08	14.80	13.46	91
2008-09	16.32	14.61	90
2009-10	18.94	16.46	89
2010-11	19.63	17.67	90
2011-12	25.76	18.93	74
2012-13	26.19	19.25	74
2013-14	28.88	18.75	65
2014-15	29.90	19.44	65

Source: SFAI, 2015

The above table explains the production and capacity of Electric arc furnace route of production. As can be seen, the capacity utilization that was around 90% till 2010 has come down drastically to around 65%; largely due to the non-availability of raw materials and inputs.

The contribution of EAF sector in domestic steel industry is about 25%. Based on this target, the steel production through EAF route will be increased to 60 MT out of targeted production of 300 MT of crude steel by 2025-26. The targeted production also includes production by large integrated steel producers.

2. Electric Induction Furnace:

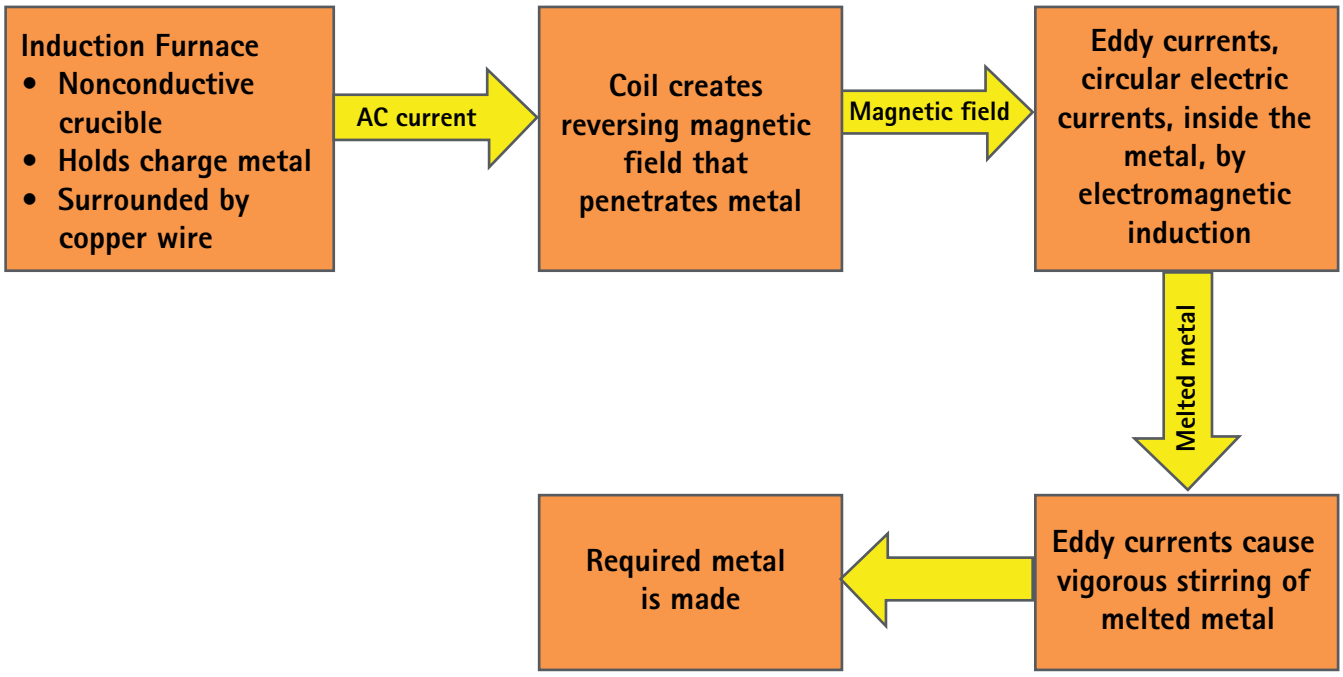
It is a type of melting furnace that uses electric currents to melt metal. These furnaces are ideal for melting and alloying a wide variety of metals with minimum melt losses, however, little refining of the metal is possible. It requires an electric coil to produce the charge which is eventually replaced. The crucible in which the metal is placed is made of stronger materials that can resist the required heat, and the electric coil gets cooled by a water system to avoid overheating or melting. It ranges in size, shape and design. Small furnaces are used for very precise alloys and large furnaces are used to produce clean metal for many different applications.

Construction of induction furnace:

The electrical coil is placed around or inside of the crucible, which holds the metal to be melted. Often this crucible is divided into two different parts. The lower section holds the melt in its purest form (the metal as the manufacturers desire it), while the higher section is used to remove the slag or the contaminants that rise to the surface of the melt. Crucibles may also be equipped with strong lids to lessen how much air has access to the melting metal until it is poured out, making a purer melt.



Fig. 1.4 Operation of Induction Furnace



The capacity and production of the electric induction furnace route has increased from 25.8 MT and 19.82 MT in 2009-10 to 36.49 MT and 27.29 MT in 2013-14 respectively, but the capacity utilisation has remained the same around 75%-77% for the same period.

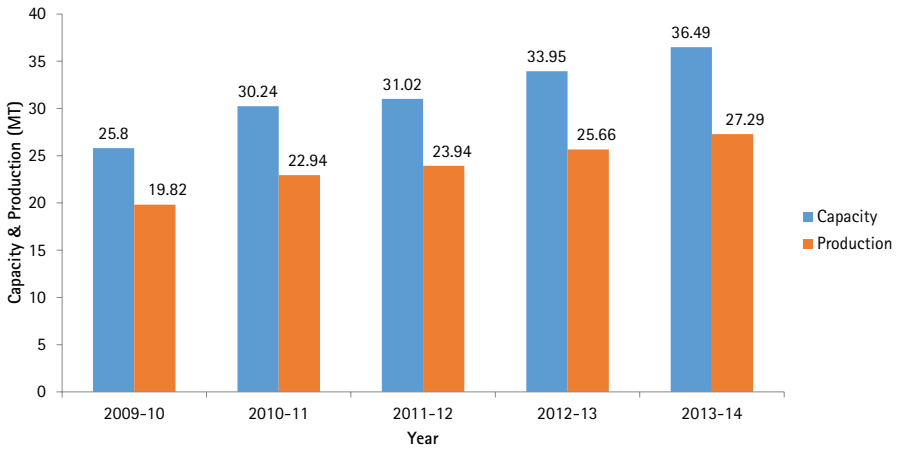


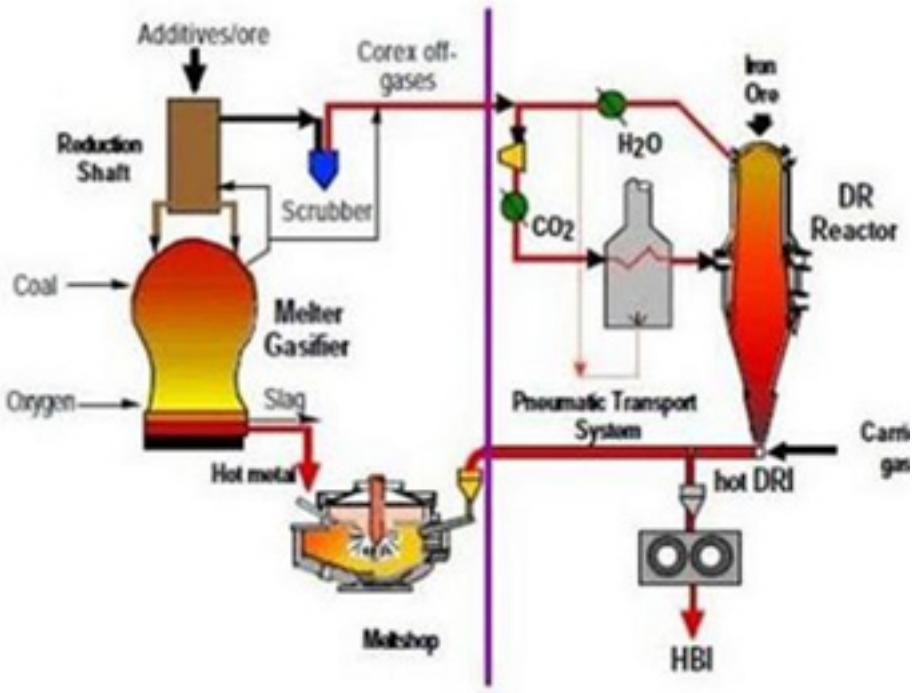
Fig 1.5: Capacity and Production of Electric Induction Furnace

3. Direct Reduced Iron:

India is the largest producer of sponge iron or DRI. It is produced from direct reduction of iron ore (in the form of lumps, pellets and fines) by a reducing gas produced from natural gas or coal. The reducing gas is a mixture of hydrogen and carbon monoxide which are the reducing agents of this technique. The process of reducing the iron ore in solid form by reducing gases is called the 'direct reduction'. It is a manufactured metallic material produced by the reduction of iron oxide at temperatures below the melting point iron (1536 degree Celsius). The iron oxide in either lump or pellet form is reduced at (800-1050 degree Celsius) by interaction with reducing agents. The methods of production include the following three types:

A. MIDREX direct reduction
B. HYL direct reduction
C. SL/RN direct reduction

Fig 1.6: Direct Reduced Iron Route



Source: Industry, 2015

The MIDREX and HYL direct reduction make use of the natural gases while the SL/RN direct reduction makes use of the coal for the production processes. India currently has 5 gas based plants and 369 coal based plants.

Year	Gas Based (MT)	Coal Based (MT)	Total (MT)
2004-05	4.6	5.42	10.06
2005-06	4.54	7.27	11.82
2006-07	5.26	11.01	16.27
2007-08	5.85	14.14	19.99
2008-09	5.28	16.05	21.33
2009-10	6.17	16.82	22.99
2010-11	6.19	17.06	23.25
2011-12	5.15	15.41	20.56
2012-13	3.93	14.74	18.67
2013-14	2.61	15.49	18.10
2014-15	3.14	14.32	17.46

Table 1.4: Production of DRI

Source: SIMA, 2015

Table 1.4 shows the production of direct reduced iron for 2004-05 to 2014-15. The total production, by gas based and coal based, in 2004-05 was 10.06 MT which steadily increased to 23.25 MT by 2010-11. However, since then there has been a gradual reduction in the production largely due to the non- availability of raw materials.

As mentioned earlier, with a targeted production of 240 MT by 2025 with secondary sector to produce around 72 MT, the requirement for sponge iron at 1.2 input ratios is 85 MT by 2025.

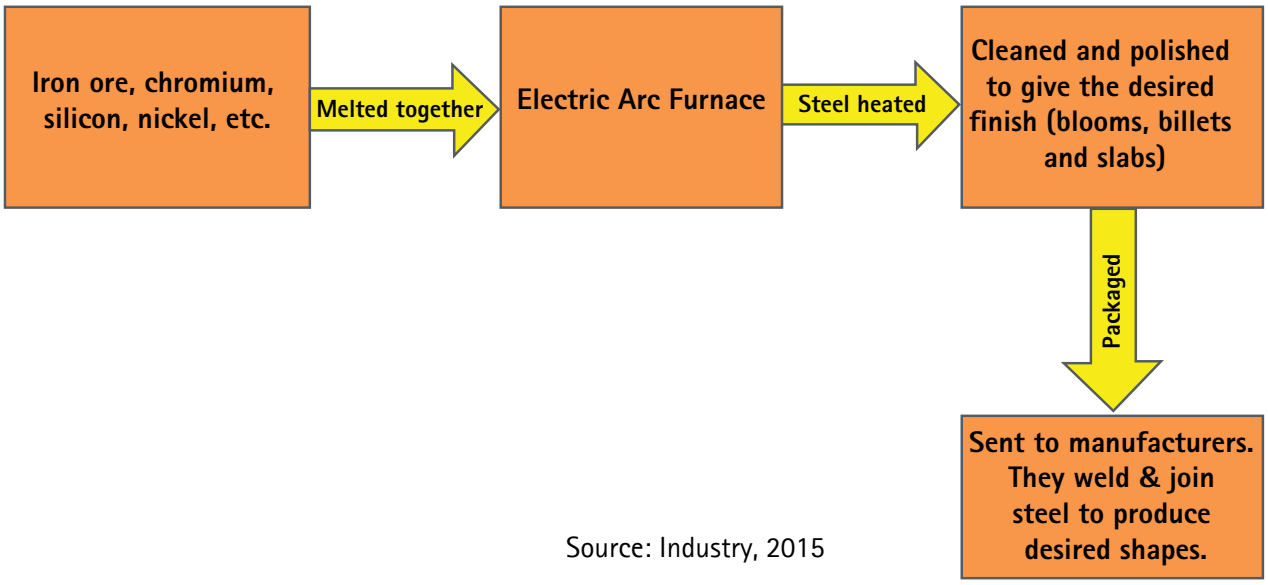
4. Stainless steel:

Stainless steel is a steel alloy with a minimum of 10.5% chromium content by mass which does not readily corrode, rust or stain with water as ordinary steel does. However, it is not fully stain-proof in low-oxygen, high-salinity, or poor air-circulation environments. There are different grades and surface finishes of stainless steel to suit the environment that the alloy must endure. It is used where both the properties of steel and corrosion resistance are required. It differs from carbon steel by the amount of chromium present. Unprotected carbon steel rusts readily when exposed to air and moisture. Stainless steel contains sufficient chromium to form a passive film of chromium oxide, which prevents further surface corrosion by blocking oxygen diffusion to the steel surface and blocks corrosion from spreading into the metal's internal structure. Due to the similar size of the steel and oxide ions, they bond very strongly and remain attached to the surface.

Stainless steels are made of some of the basic elements found in the earth: iron ore, chromium, silicon, nickel, carbon, nitrogen, and manganese. Properties of the final alloy are tailored by varying the amounts of these elements. Nitrogen improves tensile properties like ductility. It also improves corrosion resistance, which makes it valuable for use in duplex stainless steels.

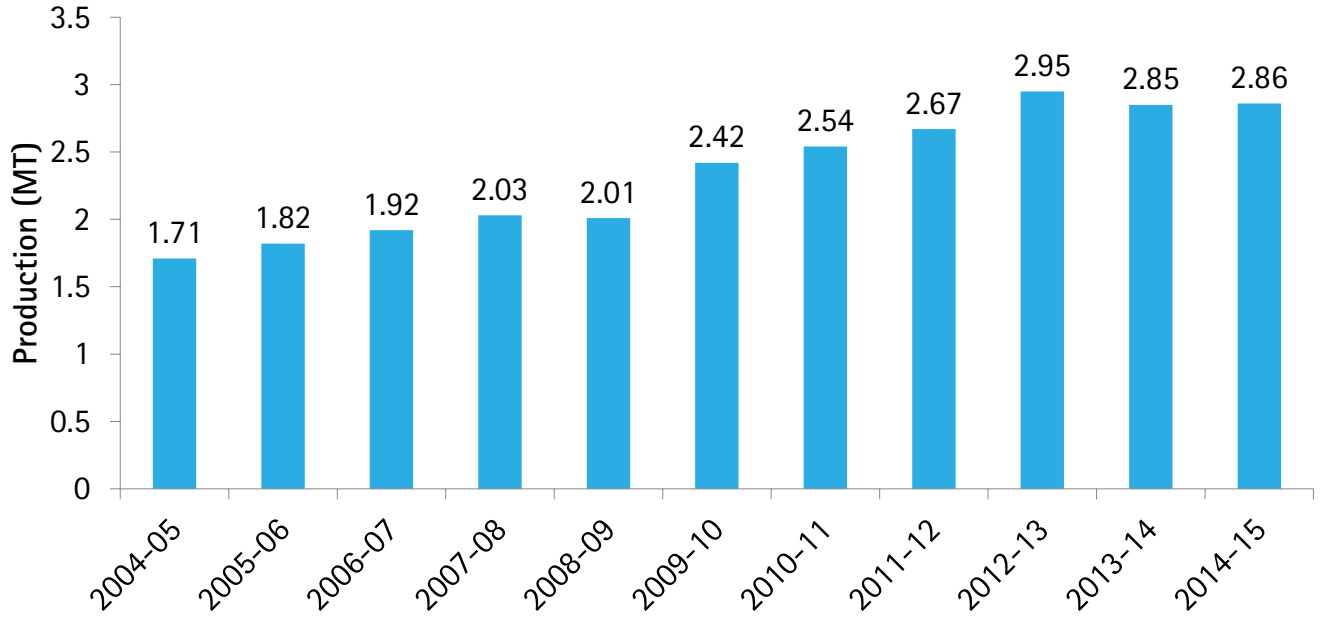
Figure 1.7 below represents the production of stainless steel from the 2004-05 to 2014-15. While the growth in production during 2009-2013 was steady, the same has come down in the last 2-3 years

Fig. 1.7 Production Process



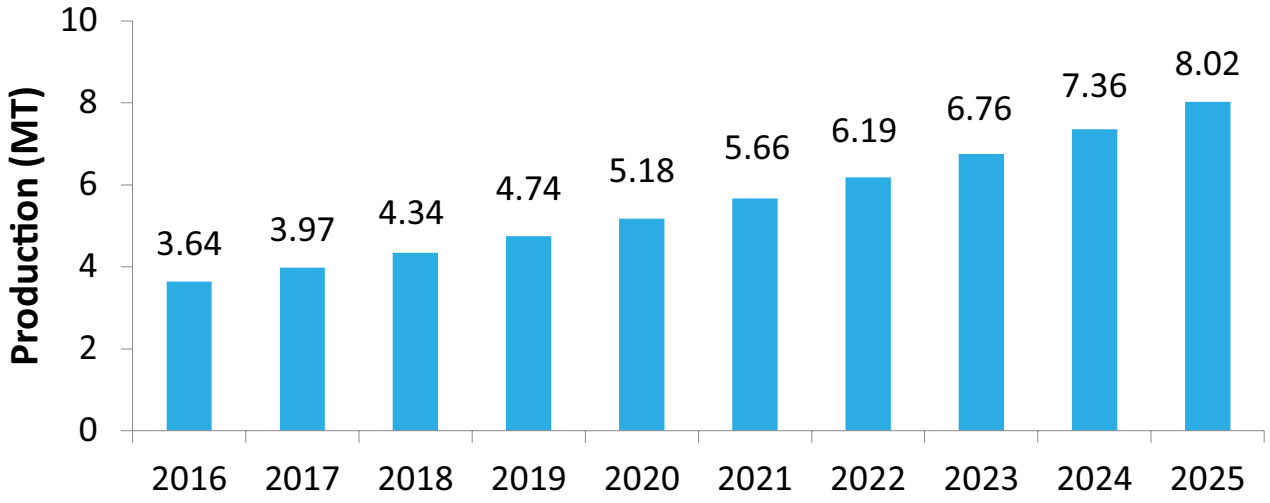
Source: Industry, 2015

Fig 1.8: Production of Stainless Steel



Source: ISSDA, 2015

Fig 1.9: Forecasted Production of Stainless Steel



Source: ISSDA, 2015

The figure above shows the forecast of the stainless steel production for the next 10 years. The production is expected to grow to 3.64 MT in 2016, further increasing to 8.02 MT in 2025.

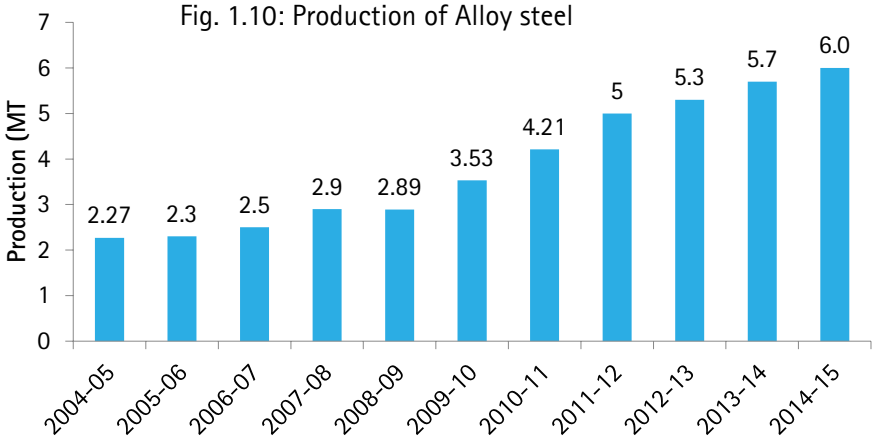
5. Alloy Steel:

Under this, the steel is alloyed with a variety of elements in total amounts between 1.0% and 50% by weight to improve its mechanical properties. Alloy steels are broken down into two groups: low-alloy steels and high-alloy steels.

The simplest steels are iron (Fe) alloyed with carbon (C) (about 0.1% to 1%, depending on type). However, the term alloy steel is the standard term referring to steels with other alloying elements added deliberately in addition to the carbon. Common alloyants include manganese (the most common one),nickel, chromium, molybdenum, vanadium, silicon and boron. Less common alloyants include aluminum, cobalt, copper, cerium,niobium, titanium, tungsten, tin, zinc, lead, and zirconium.

There has been a gradual rise in the alloy steel production since 2004-05. The production has risen to 6 MT in 2014-15 from 2.27 million tonnes in 2004-05. Figure 1.6 below shows the production level of the alloy steel industry.

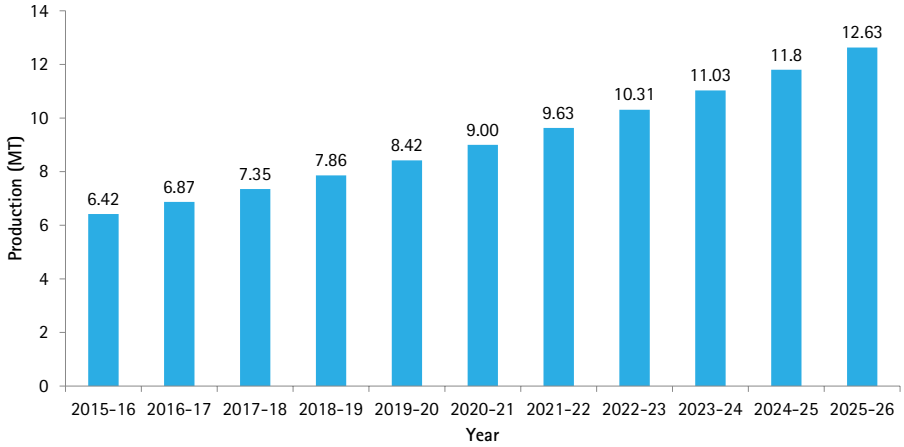
Fig. 1.10: Production of Alloy steel



Source: ASPA, 2015

Keeping the current growth trend of alloy steel production in mind, a healthy growth can be predicted for the industry. The production is expected to double by 2025 from 6.0 MT in 2014-15 to 12.63 MT. The following graph shows the forecast of the alloy steel production from 2015 to 2025.

Fig 1.11: Forecasted Production of Alloy Steel

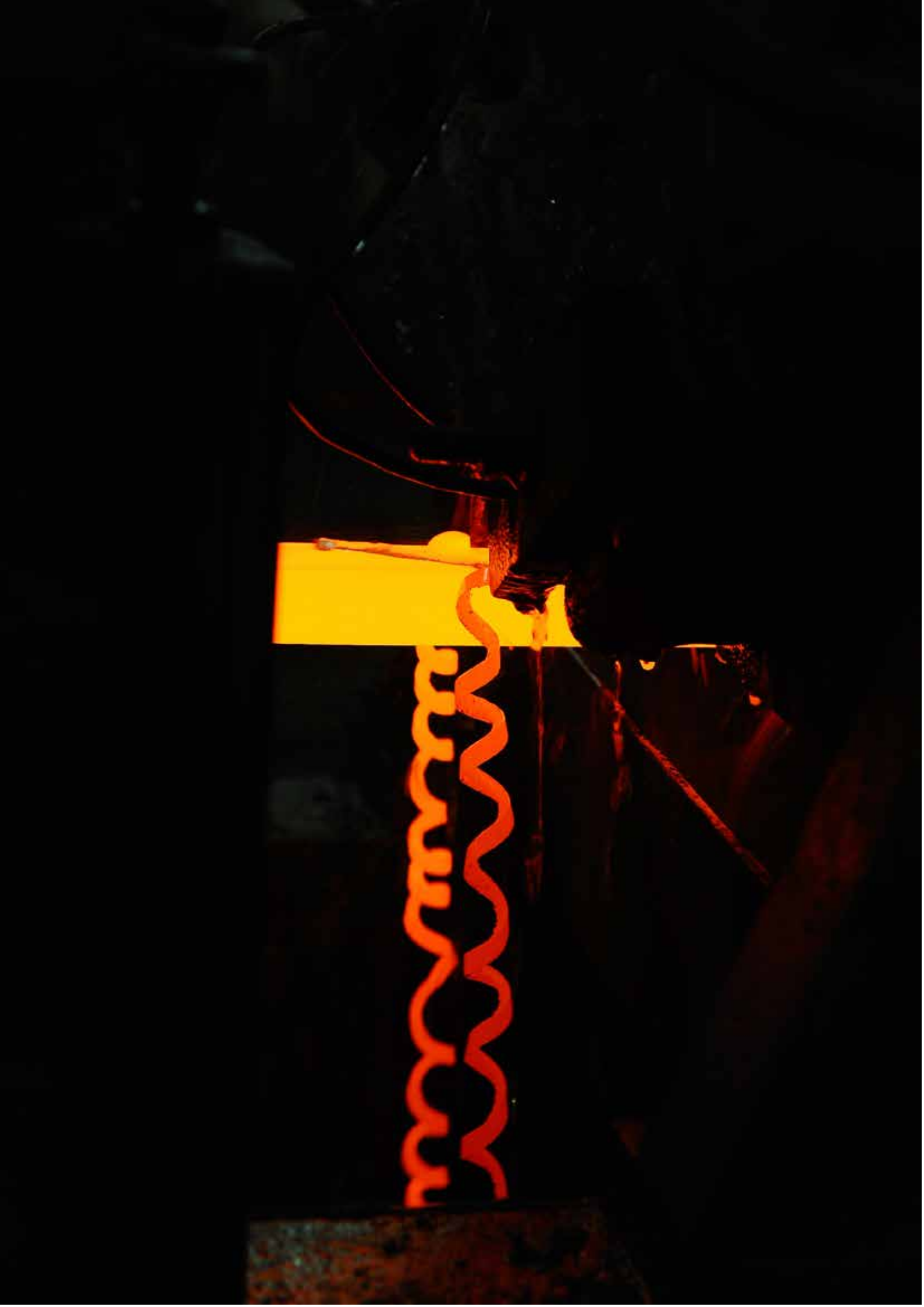


Source: AIIFA, 2015

The segment-wise production of the Indian secondary steel sector is given below:

Segment-wise Production of Secondary Steel Sector during 2014 – 15

Sl. No.	Type of Industry	No. of Units	Annual Capacity ('000 tonnes)	Production ('000 tonnes)	Capacity Utilisation (%age)
1	Mini Blast Furnace - Hot Metal	43	13909	7238	52.0
	- Pig Iron			7809	
2	Sponge Iron	360	30265	17861	59.0
3	Electric Arc Furnace	39	9531	10259	107.6
4	Induction Furnace	1244	36561	27769	76.0
5	MBF (Steel)	3	2733	961	35.2
6	Re-rolling Mill	1628	43107	35088	81.4
7	Wire Drawing	50	1330	986	74.1
8	HR Product	15	3517	2319	65.9
9	CR Product	144	5695	4604	80.8
10	GP/GC Sheets	14	2362	1735	73.5
11	Colour Coated	3	380	398	104.7





IV. Technology in Indian Steel

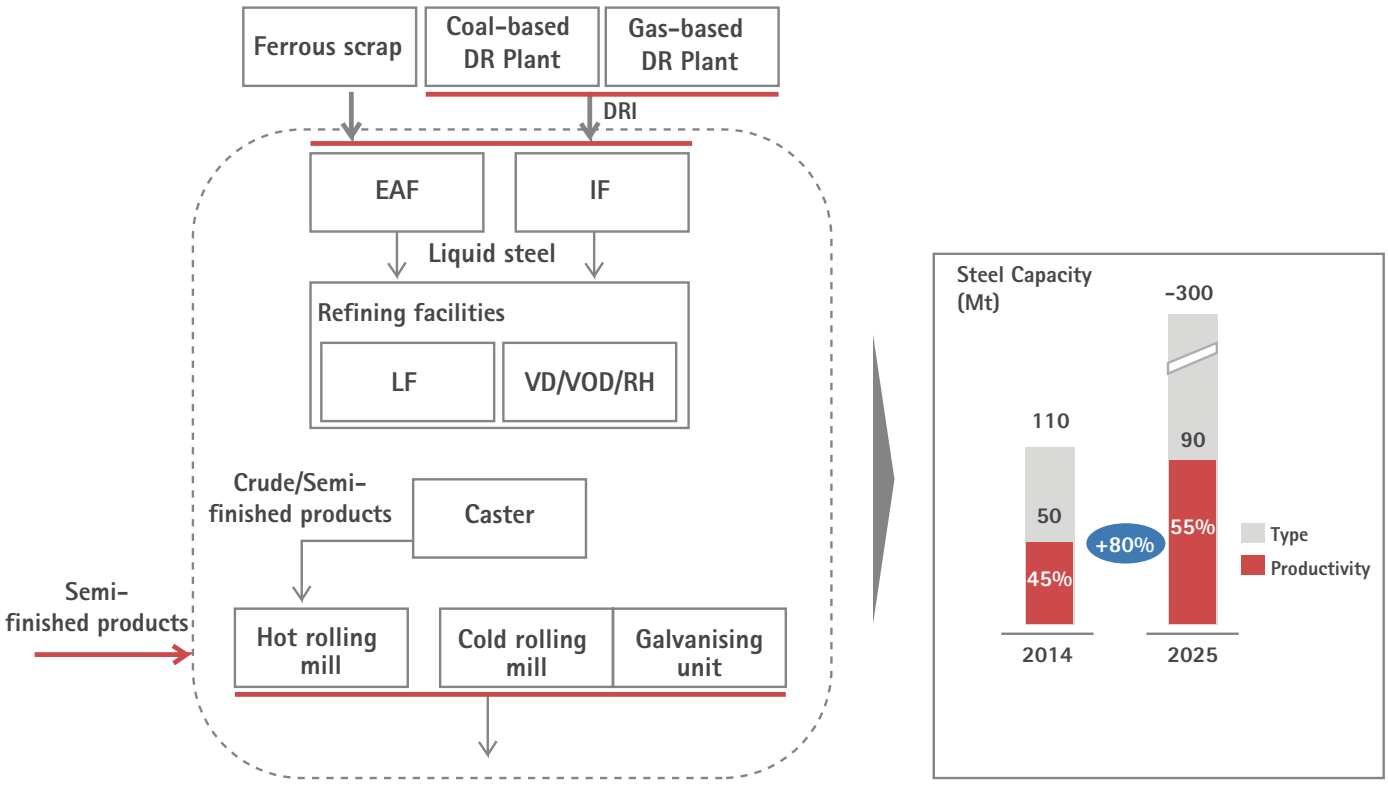
IV. Technology in Indian Steel

Productivity, Efficiency and sustainable production through technology, Innovation & R&D

With a substantial portion of India's steel capacity attributed to the secondary steel sector, the performance of the secondary steel sector assumes significance in the context of the country's target to achieve a domestic steel capacity of 300 million tons. Accordingly, the deficiencies, drawbacks and limitations that have long plagued the sector and prevented it from achieving global standards of efficiency, need to be addressed on an urgent basis.

A majority of the secondary steel units in the country, especially those based on induction furnace, are in some cases small-or medium-sized family-run units having lack of cohesive and forward-looking corporate vision. A large number are still struggling with obsolete and inefficient technologies and processes, leading to poor product quality. As the UNDP report observes, this is symptomatic of a wider malaise affecting the secondary steel sector – the lack of incentives, awareness and motivation to upgrade and innovate for enhanced productivity and profitability. Without adequate perspective on technical innovations in the sector, there is reluctance to disturb the status quo approach to production, inhibiting the sector from achieving its full potential. Attendant to the issue of incentives is the lack of adequate technical and managerial capability to operate and maintain modern technology and processes. Exhibit 2-1 on gives the present capacity and future projections for secondary steel sector:

Exhibit 2-1 – Secondary Steel Sector: Present and Future Capacity Projections



Source JPC, Dastur

Further, in terms of performance, pollution abatement and emissions control, the lack of exposure to modern technology has reduced the secondary sector to one of the most modestly performing industrial sectors in the country with average margins. Limited awareness of sustainable business practices at the managerial level, and the absence of workable regulatory frameworks compound the issues further. These issues directly impact bottom lines, and as a result, the sector ends up being flagged as having poor investment potential. This, in turn, reduces access to credit, inhibiting the secondary steel sector from modernizing or upgrading.

It is in this context that technology, innovation, R&D, sustainable and efficient methods of production with minimum economies of scale assume greater importance.

When compared with global small scale steel industry benchmarks, it is found that re-rolling mills in India tend to consume up to 1.8 times more fuel oil. When coal is used instead of fuel oil, the difference is as much as three times. While this disparity directly affects the competitiveness of Indian re-rollers, the implications of this excessive energy consumption go beyond the balance sheet. With coal being the preferred fuel of most re-rollers, the Indian secondary steel sector is saddled with a huge emission load – a burden that can be easily avoided by implementing energy-efficient technologies (EETs) and processes. Similarly, quality issues plague a majority of the secondary steel producers adopting the IF route, especially in terms of refining capability which helps in expanding the product basket in the form of alloy and special steels. Investments in technologies are not small, and the lack of workable incentive regimes for adopting technology and processes for energy efficiency, quality and productivity enhancements makes re-rollers all the more reluctant to invest in technologies. Exhibit 2-2 presents comparison of present indices with best-in-class (BIC).

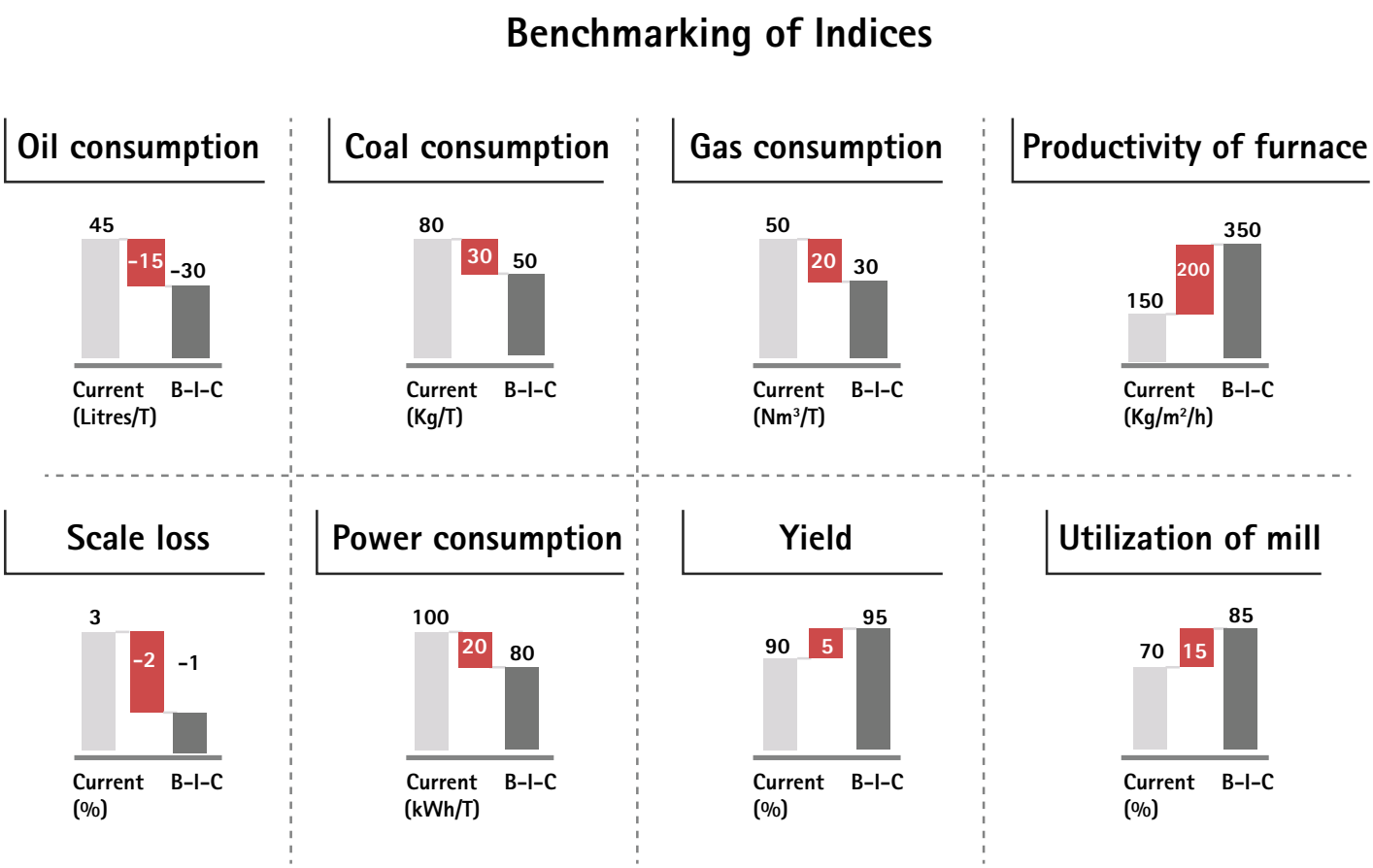


Exhibit 2-2 – Comparison of present indices with Best-In-Class

Therefore, a combination of low awareness, lack of technical capacity, and absence of incentives and government support is preventing the Indian secondary steel sector from achieving its full potential, both as a globally competitive powerhouse of finished steel products, as well as a sustainable environmentally conscious industry.

Sponge Iron Sector

Sponge Iron, or Direct Reduced Iron (DRI), is obtained from direct reduction of iron oxide, and has iron content in the range of 80-90%. Oxygen in the iron oxide is removed during the process of reduction, leaving void space which results in a spongy internal structure. Hence the term 'sponge iron'.

Sponge iron is an important raw material (substituting or supplementing scrap) for steel making through the electric arc furnace (EAF) or electric induction furnace (IF) route of secondary steel production. It is an ideal substitute with its higher metallization, balanced carbon content, low sulphur and phosphorous levels, but has the limitation of higher power consumption compared to scrap based process and longer processing time in EAF/IF.

The two typical reducing agents utilised in direct reduction are non-coking coal and natural gas, based on which either coal-based or gas-based DR plants are installed. Share of coal-based DR plants in India is more than 80% of total installed direct reduction capacity. Inadequate availability of natural gas from domestic sources and low priority to this sector is affecting gas-based production of sponge iron. Recent discoveries of shale gas in US has shown great potential for gas-based DR plants, and with further advancement in drilling and extraction techniques, this appears to be a promising energy source for sponge iron industry in future. Exhibit 2-3 on the next page shows the production of direct reduced iron for the period 2004-05 to 2014-15.



Year	Gas Based (MT)	Coal Based (MT)	Total (MT)
2004-05	4.64	5.42	10.06
2005-06	4.54	7.27	11.82
2006-07	5.26	11.01	16.27
2007-08	5.85	14.14	19.99
2008-09	5.28	16.05	21.33
2009-10	6.17	16.82	22.99
2010-11	6.19	17.06	23.25
2011-12	5.15	15.41	20.56
2012-13	3.93	14.74	18.67
2013-14	2.61	15.49	18.10
2014-15	3.14	14.32	17.46

Exhibit 2-3 - Production of direct reduced iron for the period 2004-05 to 2014-15

Source: SIMA, 2015

Worldwide gas-based DR plants are based mainly on use of reducing gas generated by reforming natural gas. The two processes in industrial operation are the Midrex process and the Energiron process. Efforts are on to utilise coke oven gas as the reductant. A recent development is the world's first MIDREX plant set up by JSPL at Angul, Odisha, based on reducing gas generated through gasification of local high ash non-coking coal. If this plant is able to establish its commercial viability through sustained operation, it will significantly impact the direct reduction industry in India.

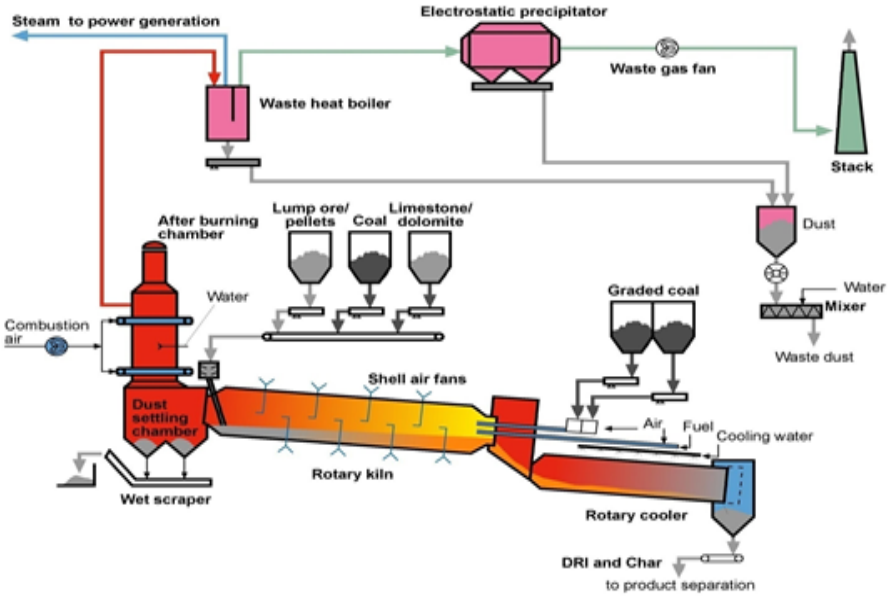


Exhibit 2-4 - Production of direct reduced iron

Coal based sponge iron industry in India has adopted both imported and indigenous technologies. Coal based DR plants are generally using iron ore lumps as raw material and non-coking coal as reductant, and the product is in lump or granular form. The reduction is carried out in rotary kiln and this route requires low capital investment compared to gas based route since the unit size of a rotary kiln module is comparatively much smaller.

It is essential for downstream secondary steel producers to install refining facilities to produce quality steel. The DR industry in India faces the twin problem of limited availability of hard ore with high Fe content, and high ash in Indian coals. The limited availability of high grade hard ore has resulted in some plants switching to use of pellets. The problem of high ash in Indian coals is being circumvented either by washing the coal, or by using imported low ash coals in blend with local coals.

Electric Arc Furnace

With the rapid growth in electric steelmaking, a significant evolution has emerged in the EAF technology and the way steel is produced through it. EAF based steel plants have so far responded very positively to adopting new environment friendly technologies . Sustained efforts are being made at reducing waste generation, and effective utilisation of the generated wastes, with a view to improving the overall economics of the EAF steel industry. Exhibit 2-5 gives the geographical concentration of Electric Arc Furnaces in India.

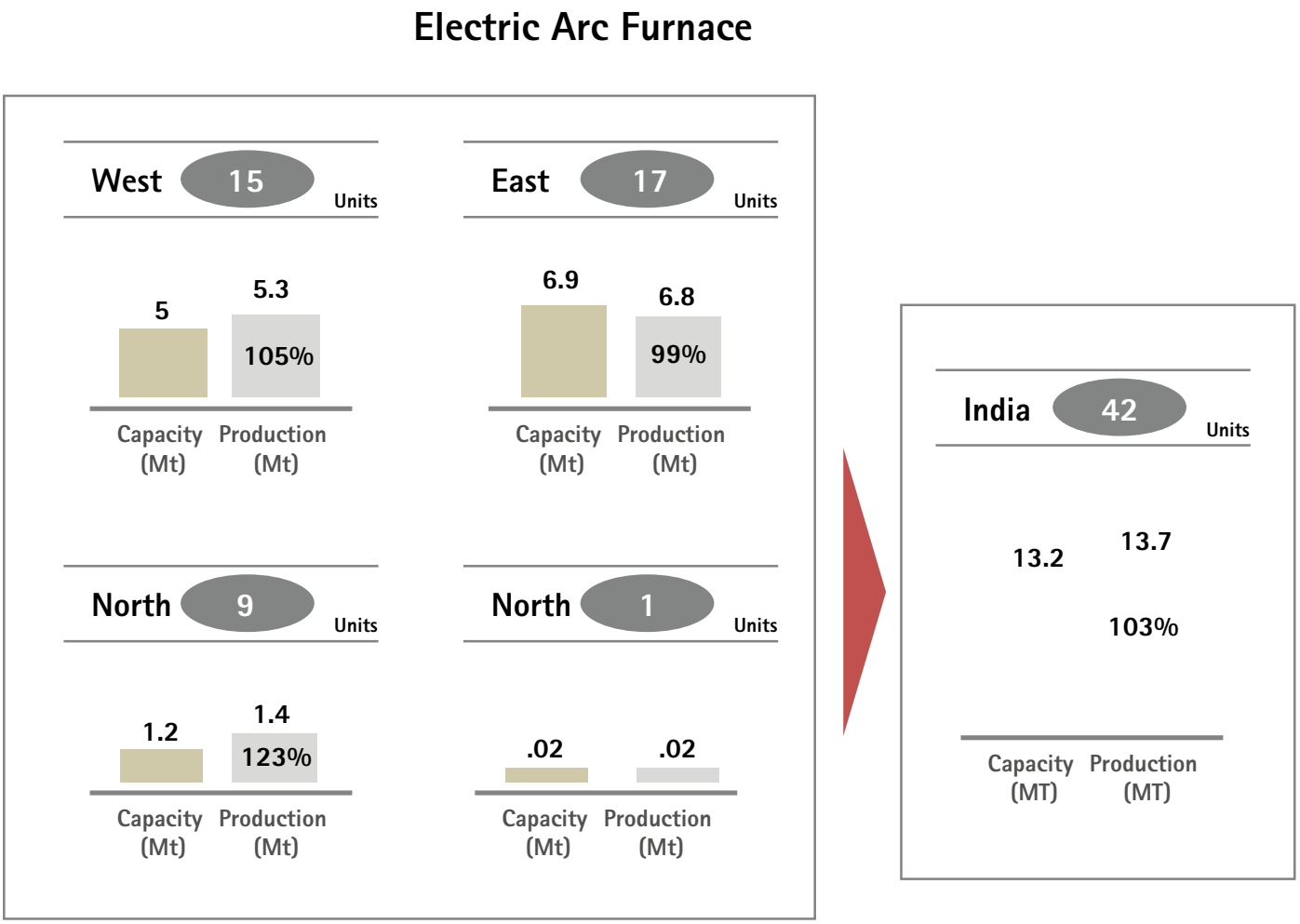


Exhibit 2-5 – Geographical concentration of Electric Arc Furnaces in India.

Exhibit 2-6 and Exhibit 2-7 gives a pictorial representation of the Electric Steel Making route and typical AC Electric Arc Furnace respectively.

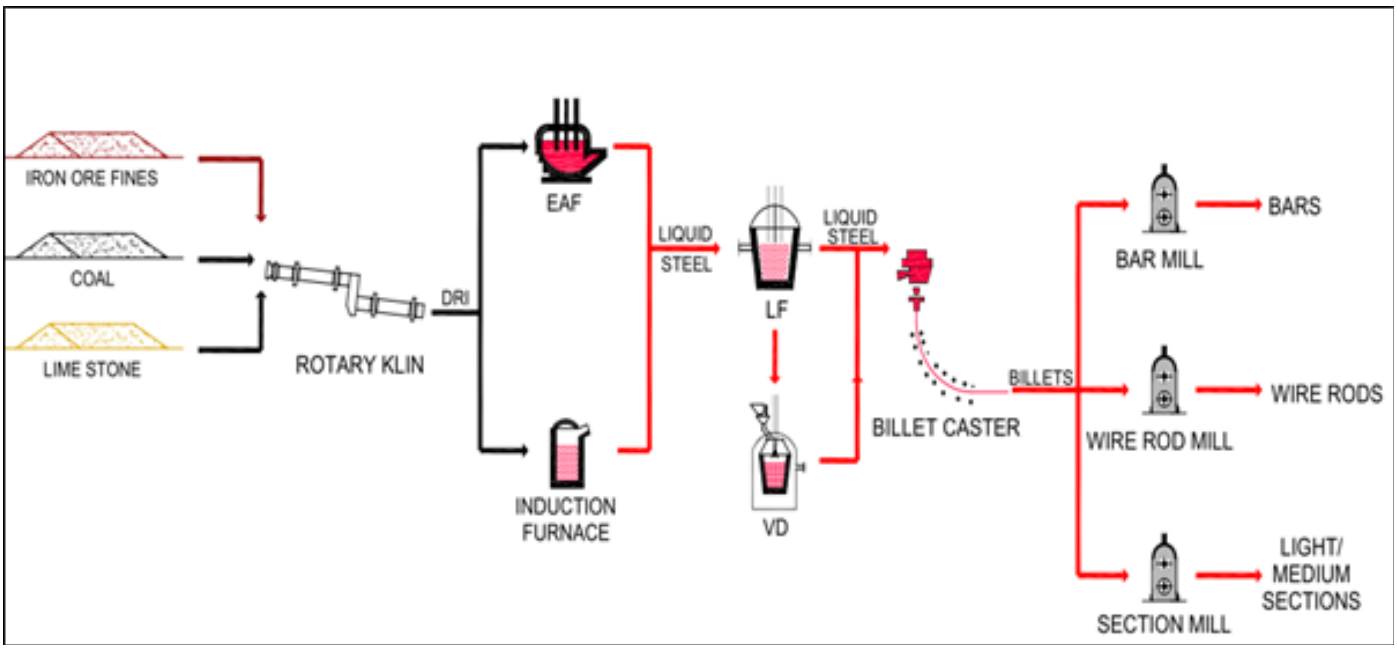


Exhibit 2-6 - Electric Steel Making route

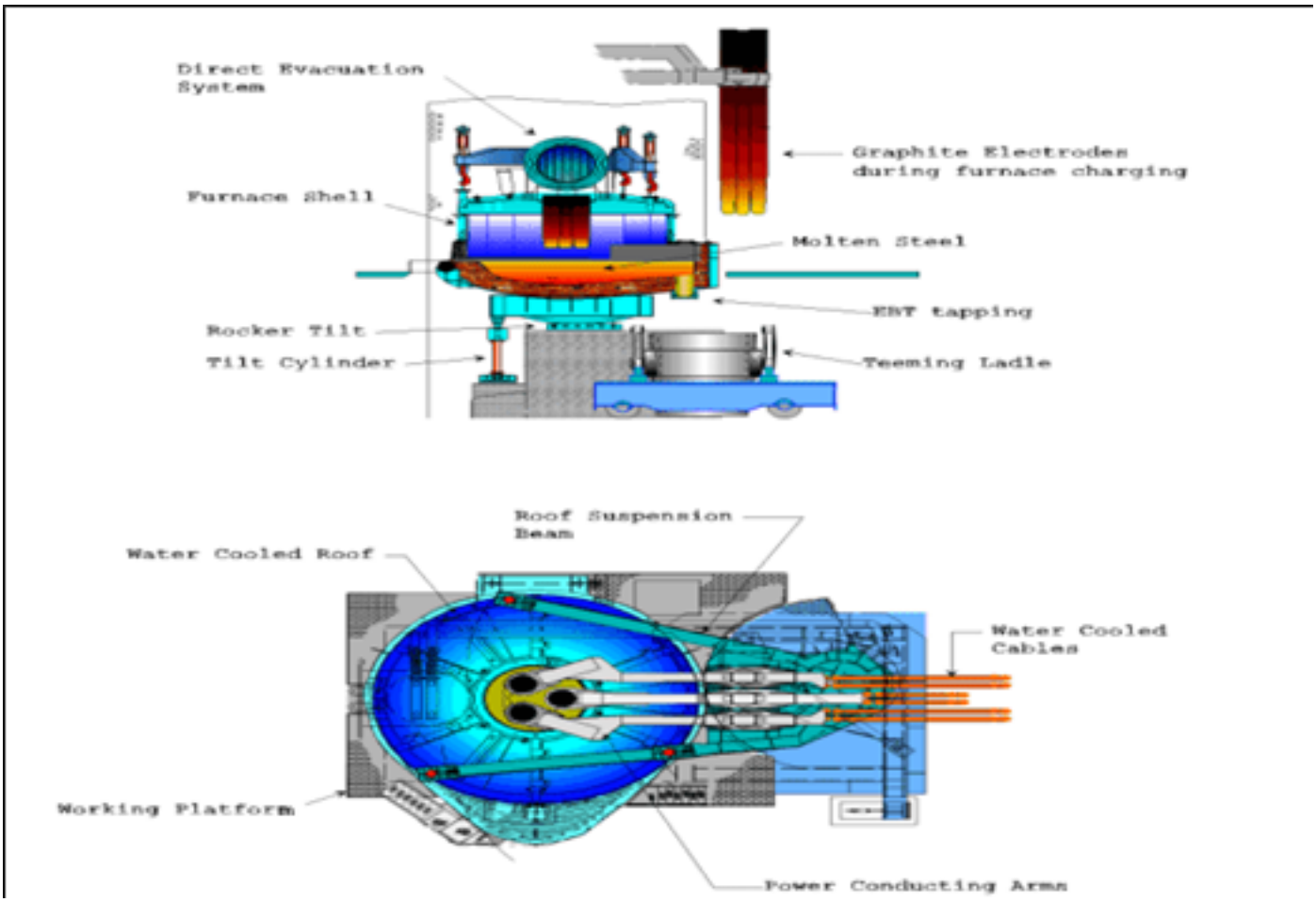


Exhibit 2-7 – Schematic of a typical AC Electric Arc Furnace

The technological developments in EAF steelmaking are discussed in Exhibit 2-8 below:

Period	Technological Development	Techno-Economic Parameters		
		Tap-to-Tap Time (Minutes)	Electricity Consumption, kWh/t	Electrode Consumption, kg/t
1965-70	Oxygen lancing	180	630	6.5
1970-80	- Water cooled panels - High power operation (UHP)	105	490	3.5
1980-85	- Ladle furnace - Foamy slag - Eccentric bottom tapping - Scrap pre-heating	80	450	2.5
1985-95	- Oxygen carbon injection (lance manipulator) - Pneumatic bath stirring	60	410	2.0
1995-2005	- Oxygen carbon/ oxyfuel side wall injection - Use of hot metal as charge material	55	280-320	1.6
2005- date	- Improvement of above operating parameters	40-45	280-300	1.2

Exhibit 2-8 - Technological developments in EAF

All the above technologies have led to decrease in energy consumption, resulting in resource savings, lower costs and reduction of carbon footprints/greenhouse gas emissions.

About 20% of the energy input to EAF is lost in the form of off gas. Scrap preheating technology helps in reducing the power consumption in the EAF by making use of the waste heat in the furnace off gas.

Oxygen injection technologies contribute to increased energy efficiency in the melting and heating processes, and reduce the fuel consumption and CO2 emissions. Also, with oxygen combustion, the low calorific gases which are generated can be effectively used to further improve the overall energy efficiency.

Foamy slag practice also helps in reducing energy by covering the arc in a layer of slag. Since the arc is hielded, more energy is transferred to the bath instead of being radiated to the side walls.

If the produced CO is burnt in the EAF, it is possible to recover the heat, thereby reducing the heat load on the off-gas system.

Adoption of EAF bottom stirring, hot-heel practice and slag-free tapping result in higher operating efficiency and lower operating costs. Similarly, process automation and optimisation maximises utilisation of power, increases productivity and reduces production cost.

The major wastes generated during steelmaking through EAF route may be broadly classified as solid waste, gaseous waste and liquid waste. The solid waste includes slag, dust, sludge, refractories, oil and skull. The gaseous emissions contain carbon monoxide (CO), carbon dioxide (CO2), sulphur dioxide (SO2), oxides of nitrogen (NOx) and particulate matter. The liquid waste generated is mainly the polluted water. The typical EAF slag composition is given in the Exhibit 2-9 below:

Component	%
CaO	47.38
Free lime	1.14
MgO	11.83
MnO	7.50
Total Fe	55.00
Metal Fe	11.40
SiO2	20.00
Al2O3	13.90

Exhibit 2-9 - Typical EAF slag composition

The emissions from EAF can be reduced by employing improved and well maintained fume extraction system and control technologies. This includes installation of equipment like secondary fume collection system, dog house enclosure, electrostatic precipitator and suitable furnace off gas analysis system. The analysis of the furnace off-gas provides insight into the combustion processes in EAF for ensuring optimised practices and dynamic energy control. The contents of harmful gaseous products in process gases exhausted from EAF are presented in Exhibit 2-10 below.

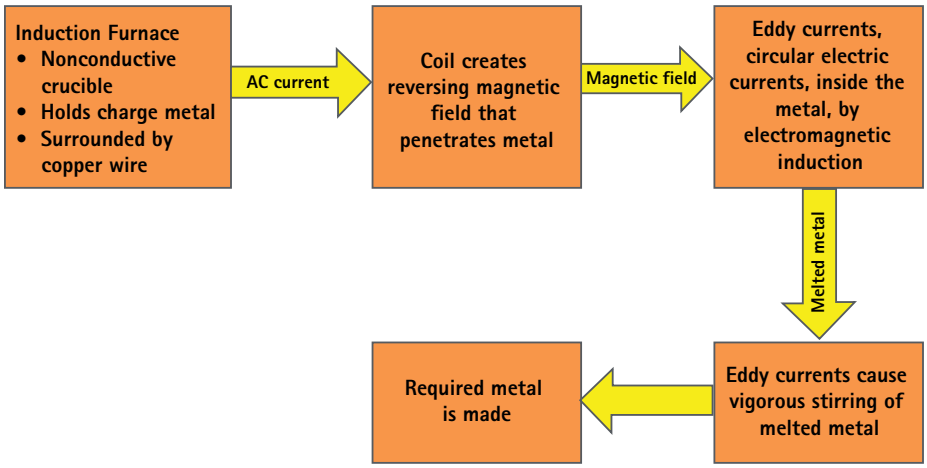
Harmful Substances	Average Concentration, mg/m3	Amount of Products Exhausted, g per ton of Steel
Oxides of carbon	13.5x 103	1350.0
Oxides of nitrogen	550.0	270.0
Oxides of sulphur	5.0	1.60
Cyanides	60.0	28.40
Fluorides	1.2	0.56

Exhibit 2-10 - Harmful gaseous products in process gases exhausted from EAF

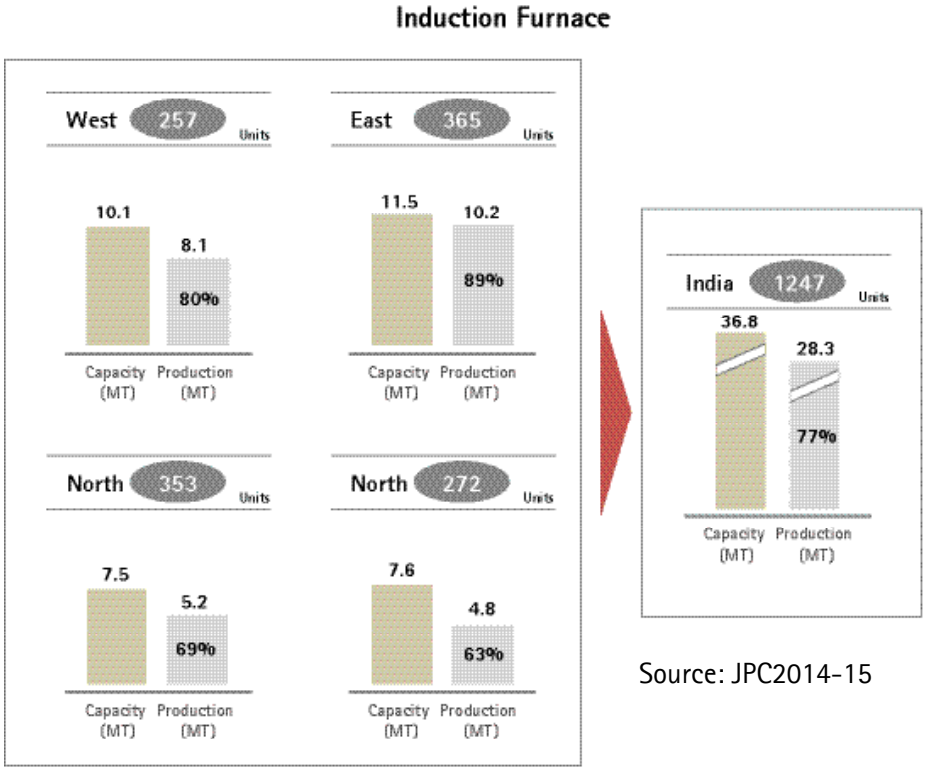
Induction Furnace

Induction Furnace (IF) is ideal for melting and alloying a wide variety of metals with minimum melt losses, while, limited refining of the metal is possible. Small furnaces are used for very precise alloy composition and large furnaces are used to produce clean metal for many different applications. Exhibit 2-11 presents process flow for IF.

Exhibit 2-11 – Process flow for IF



There are more than 1,200 units of induction furnace in small and medium steel sectors. With constant improvements in energy efficiency, substantial growth is being experienced for melting in Induction furnace, triggered by demands for further reduction of CO2 levels. Exhibit 2-12 below presents the geographical concentration of IF in India.



Source: JPC2014-15

Exhibit 2-12 – Geographical concentration of IF in India

IF plants require less capital and lower space requirement. Induction furnace is generally used as a melting unit and very limited refining is accomplished. So it becomes imperative that the charge material for the furnace should have low impurity. In general, scrap is melted in these furnaces. Nowadays, DRI has proved to be a potential substitute for scrap. India being the leading DRI producing country in the world, many units operate with high percentage of DRI in the charge mix.

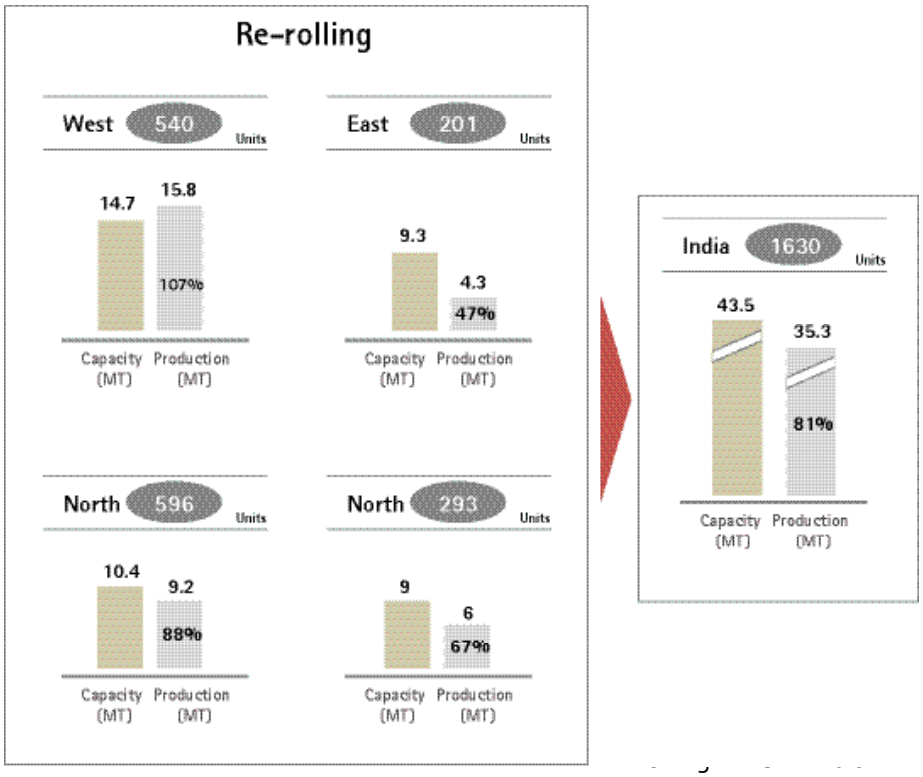
Presently, induction furnace units are meeting the demand of ordinary grade mild steels. However, for more stringent quality requirement for producing special or alloy grades, appropriate secondary metallurgy facilities will be required.

For improving efficiency of IFs, it will be necessary to have in place proper energy management system aimed at managing energy consumption at peak efficiency. This can be done by development of energy policy and engagement of an energy management system, regular energy audits and implementation of the recommendations made. This can also be done by optimization of induction furnace operation, management of maximum demand and management of power factor. Improvement in the performance of the auxiliary systems will also contribute to energy efficiency.

Re-Rolling Sector

At present, the total share of secondary steel producers in the long product segment is more than 70%. Role of re-rolling sector is thus very vital in overall growth of secondary steel sector for providing finished goods. Exhibit 2-13 on the next page presents geographical concentration of Re-rolling Mills in India.





Source: JPC2014-15

Re-rolling industry in India started in 1928 at Kanpur, and since then no major remarkable technology improvement took place in majority of the units. As a result, re-rolling industry in India is not quite energy efficient, and is marked by high emissions. Re-rolling mills contribute more than 10% of the total emissions from steel sector.

Although technology assimilation by re-rolling sector has been a slow process initially, new technology in the field of reheating furnace and rolling mill are now being implemented.

Ministry of Steel, Government of India, along with its technology partner, has taken steps to identify and implement Energy Efficient Technologies (EET) and bring down specific energy consumption and improve CO2 emission. "Energy Efficiency Improvement in Steel Re-rolling Mill Sector in India" Project of UNDP/GEF (Steel) Project of Ministry of Steel, Government of India has been launched with the following objectives - reduction of Greenhouse Gas (GHG) emissions, technology upgradation, accelerated adoption of Energy Efficient Technologies (EET), removal of key barriers to Energy Efficiency measures in the sector. Steel re-rolling sector has gained a lot from this Project and continuation of such Projects will go a long way in growth of this sector. The targets of the Project are given in Exhibit 2-14 below:

Consumption of energy & other important performance parameters of re-rolling mills (Model Units)	Unit	Status in the beginning of the Project	Target / Expected Outcome after project completion
Oil consumption in the reheating furnace	Lit/T	42-45	<30
Coal consumption (Pulverized)	Kg/T	80-120	45-65
Gas consumption	Nm3/T	48	30
Productivity of furnace	Kg/m2/h	120-220	300-350
Scale Loss	%	2.5-3.5	<1
Power consumption	kWh/T	90-120	60-80
Yield	%	89-93	94-95
Utilization of mill	%	65-70	80-85

Exhibit 2-14 - Performance parameter targets of Re-rolling mills

Production of steel at competitive cost is vital for sustenance of re-rolling industry and hence, the requirement of setting up of new energy efficient rolling mills. Cost of production in the rolling sector can be reduced by direct rolling of hot continuous cast semis wherein the electric induction furnace/electric arc furnace and continuous casting machine and rolling mill are located at one place. Direct rolling of hot billets eliminates reheating furnaces and reduced oil and coal consumption, thereby making them more efficient and profitable by way of increase in yield and improvement in quality and reduction of emission. The present trend world over is near net shape casting and rolling i.e. to cast a profile, set up by the steel plants, and others are in the which is very near to the final product in size and process of acquisition of such mills. Micro-mills of 300,000-400,000 tpa capacity of long products are now being built with such technologies by various plant builders.

Selection of a suitable billet reheating furnace for the specific application is one of the most important aspect in implementation of EET in rerolling industry. Presently, pusher type furnaces using coal as fuel are predominant in the industry. This has resulted in very low thermal efficiency and energy wastage. It is expected that walking hearth type furnaces using pulverized coal will be implemented in future. Use of coal gasification units, in which coal is gasified and used in reheating furnaces, will ensure cleaner operation of reheating furnaces. Renewable energy like biomass may also be used in future to improve techno-economic parameters. Use of low cost non-conventional fuels like biomass should therefore be promoted in the sector. Scientifically designed reheating furnaces (without over capability or under capability), automation and control system and availability of skilled manpower are prerequisites for an energy efficient operation of re-rolling mill furnaces.

In rolling mill proper, improvement in drives, transmission system, rolls and bearings, roll pass design, etc. are now taking place in some of the mills. Use of AC motors with variable frequency drives, reduction gear system (in lieu of erstwhile pulley system), improvement in roll pass design, improved cooling technologies, roller bearings and fibre-bearing (in place of earlier used gun metal bushes), better selection of rolls, etc. are some of the technological developments which needs to be adopted in the industry.

These measures are likely to not only improve the energy efficiency but also will help in improving yield by reducing wastes (furnace scale, mis-rolls and cutting losses).

Re-rolling industry is mainly operated by unskilled/semi-skilled personnel. While these personnel have gained experience, adequate training programmes need to be organized for them specifically designed training modules need to be applied to increase awareness and thereby adoption of energy efficient technologies.

Energy audits for the sector should be made mandatory which will enable this sector to reap the benefits of available knowledge in energy conservation opportunities and corresponding savings.

There are no laboratories in most re-rolling mills for testing of material. Those which have small laboratories are either ill-equipped or skilled personnel are unavailable for operation of these laboratories. Wherever feasible, common testing facilities may be provided to the re-rolling sector for quality improvement.

Innovative technologies as mentioned above, suitable to Indian re-rolling industry, will enable this sector to reach the goals of energy conservation, emissions and low cost production as the sector emerges as one of the key drivers of growth of Indian Steel Industry.

Stainless Steels Sector

Stainless steel is essentially low carbon steel containing 10% or more chromium. Though there are over 60 grades of stainless steel, they are broadly classified into 5 major categories viz. austenitic, ferritic, martensitic, precipitation hardening and duplex stainless steels.

Properties of the final alloy are tailored by varying the amounts of the constituent elements. Addition of molybdenum, nickel, titanium, etc. enhances the corrosion resistance and other properties of stainless steel. Nitrogen improves tensile properties like ductility. It also improves working properties.

In the electric arc furnace, which produces the input material for the refining converter (also known as Argon Oxygen Decarburisation) or the vacuum plant, the share of virgin scrap varies, depending on steel grade to be produced. The molten metal is refined in a refining converter where carbon level is reduced by blowing



oxygen and argon and final chemistry of stainless steel is made. Stainless steel is then cast into continuous cast slabs or billets, which are then rolled or forged to their final forms. Stainless steel is also produced in an electric induction furnace (IF) where electric current is used to melt recycled stainless scrap and additions of chromium, nickel and molybdenum is made to reach desired chemistry. In stainless steel production, the range of charge materials is constantly growing. Depending on the applications, stainless steel is further processed in cold rolling mills where it is annealed and pickled, tension levelled, mirror polished, slit or cut into sheets, depending on requirement.

Per capita consumption of stainless steel in India is about 2 kg. as against world overage of approx. 7 kg. The forecast of stainless steel production in India is about 3.6 mtpy by 2016 and 8 mtpy by 2025. Stainless steel is finding many applications due to its superior properties and aesthetic looks. Major areas of application are automotive, railway and transport (ART), architecture, building and construction (ABC), process industry, consumer durables, etc. Stainless steel is shaped into sheets, plates, bars, wire and tubing to be used in cookware, cutlery, hardware, surgical instruments, appliances, industrial equipment.





Stainless steel Industry in India is fully geared to meet the challenges in respect of newer applications. However, it is constrained by non-availability of nickel in India and its high price volatility, high price of ferro-chrome, high tariff and unreliable power supply, lack of indigenous melting scrap, very low price of imported stainless steel from China, reluctance of industry to use stainless steel due to high initial cost etc. Awareness about life cycle analysis will go a long way in promoting use of stainless steel in India.

Research and Development

The first R&D Laboratory in the steel sector in India was set up by Tata Steel in 1936. Steel Authority of India Limited (SAIL) set up their R&D Centre in 1972 at Ranchi. R&D facilities in relatively new plants came into being in last couple of decades, but such facilities are lacking in other plants, especially those in secondary sector. The steel companies in India invest considerably less on R&D and actual investment even in large steel companies varies in the range of 0.15-0.30% of their turnover as against 1-2% in leading overseas steel companies.

Ministry of Steel (MOS) is encouraging Research and Development activities both in public and private steel sectors. At present Ministry of Steel is operating the following two schemes for promotion of R&D in Iron and Steel Sector:

i) R&D with Financial assistance from Steel Development Fund (SDF).

ii) R&D with Financial assistance from Plan Fund.

Ministry of Steel is facilitating setting up of an innovative institutional mechanism, namely, Steel Research & Technology Mission of India (SRTMI), to spearhead R&D activities of national importance through joint collaborative research programmes in steel sector on a large scale. The SRTMI is proposed to be set up with an initial corpus of Rs. 200 crore proposed to be contributed by Ministry of Steel and by participating steel companies. Rs. 100 crore will be given by Steel Development Fund (SDF), Government of India and Rs. 100 crore will be contributed by private and government companies.

Secondary steel sector also needs to increase its contribution towards research and development, which will be beneficial in the long run for sustenance.

Areas which need special attention for research and development are listed below:

i) Continuous/mechanised feeding of scrap/DRI
ii) Briquetting of DRI fines
iii) Dephosphorisation of liquid steel
iv) Preheating of scrap
v) Slag processing
vi) Energy efficient reheating furnaces/induction heating in re-rolling mills
viii) Hot charging of billets to re-rolling mills

Energy

As per the 2001 Energy Conservation Act of Govt. of India, Govt. of India has the right to instruct the industry to implement energy conservation measures. Designated consumers may perform energy conservation activities, achieve specified levels of energy consideration and trade Energy Savings (ES) certificates commercially. This is the basis of PAT Scheme (Perform, Achieve and Trade), modified by Govt. of India in 2012, 22% of energy saving under PAT scheme is expected to come from Iron & Steel Industry. Maximum energy conservation potential exists in iron making.

Every sector in secondary steel production is unique and offers opportunities for energy conservation in unique ways. For example in sponge iron, maximum energy saving is possible from waste heat recovery from kiln operations. Combustion air preheating or raw materials preheating may be one way of using this energy. Electric power generation is another way to utilise the energy. Similarly energy efficiency in electric arc furnace operation may be brought through scrap preheating, and automation and controls.

Use of regenerative burners for reheating furnaces saves fuel by about 0.1 GJ/ton of steel. Similarly, up to 0.5 GJ/ton of steel energy can be saved by use of hot charging of billets in billet reheating furnace of rerolling mills.

Environment

DRI, sourced from sponge iron plants, serve as a metallic input for secondary steelmaking units based on EAF & IF. Environmental sustainability issues with respect to air pollution, solid waste generation & quality of input raw materials need to be looked into, in order to reduce the overall impact on the environment.

Due to paucity of scrap, many electric furnace based units use DRI/HBI as a substitute of steel scrap, which consequently increases the energy consumption during the melting operation, thereby also increasing the overall CO2 emission.

Scrap which is mainly sourced from Ship breaking along with other sources such as cycle industry, sewing machines, SSI engineering and other SSI units making steel based products, serves as the primary input to IF & one of the inputs to EAF. The scrap may contain contaminants like hazardous chemicals, paints, radioactive elements, oil & grease, etc. In absence of suitable control measures for input scrap quality, these contaminants may lead to emissions in form of poly nuclear-aromatic hydrocarbons (PAH), dioxin & furans, heavy metals, etc., which are carcinogenic in nature. Proper quality control procedures need to be implemented in order to reduce negative impacts on environment from melting of scraps.

Rolling as a process in secondary steelmaking consumes a significant quantum of energy during re-heating and rolling operations. Various energy efficient technologies like High-efficiency recuperators, Regenerative burner system, employment of low-NOx burner, Walking hearth/beam furnace, Oxy-fuel combustion system, etc., may be adopted to optimize energy consumption & cut air emissions. Process variations like use of coal-based producer gas, pulverized coal, biomass gas as fuel; hot charging of continuous cast billets, direct rolling of continuous cast billets, etc. also helps in reducing the energy consumption and reduce air pollution.

As per CREP norms, 100% utilization of Solid wastes generated from the process is mandatory. One of the major challenges would be 100% utilization of EAF/IF slag produced from secondary steelmaking.

To reduce the overall environmental impact and curtail CO2 emission, Life Cycle Assessment (LCA) needs to be carried out at least quarterly. LCA helps in inventorisation of material inputs & environmental emissions and evaluation of possible impacts associated with the inputs & emissions. This in turn assists in identifying the lacunae in an operation and highlights opportunities for process improvements & technological upgradation.

Life Cycle Assessment

Climate change and sustainable use of natural resources are the main challenges for society at large and steel sector in particular. This puts them at the top of the political environmental agenda as well.

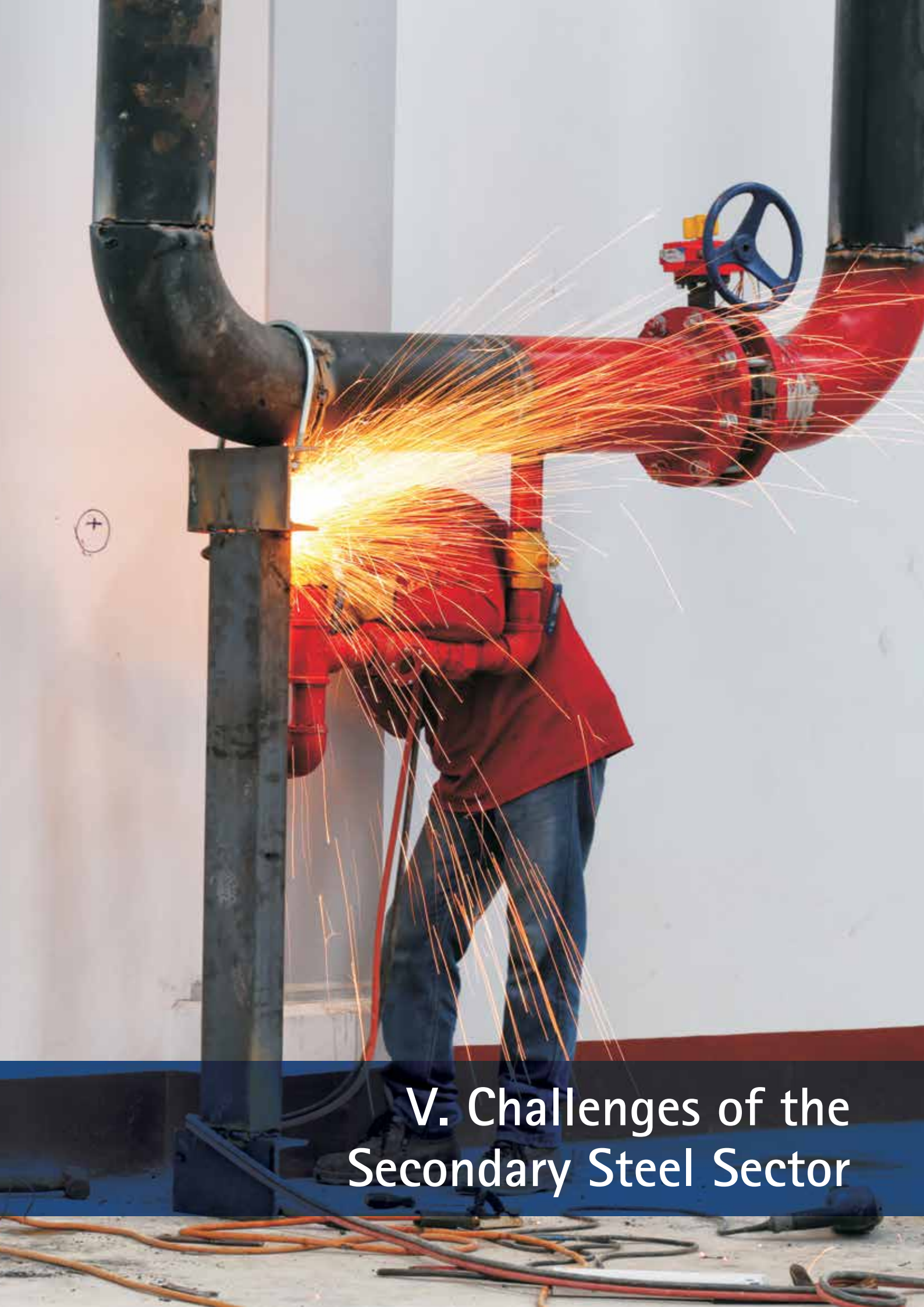
LCA is a tool to assist with the quantification and evaluation of environmental burdens and impacts associated with product systems and activities, from the extraction of raw materials in the earth to end-of-life and waste disposal. The tool is increasingly used by industries, governments, and environmental groups to assist with decision-making for environment-related strategies and materials selection.

LCA can assist in:

- identifying opportunities to improve the environmental aspects of products at various points in their life cycle
- decision-making in respect of strategic planning, priority setting, product or process design or redesign
- comparing alternative systems for waste management
- selection of relevant indicators of environmental performance
- marketing by way of environmental claim or eco-labelling

LCA, based on sound methodology and transparent reporting, is an important tool to assist policy-making.

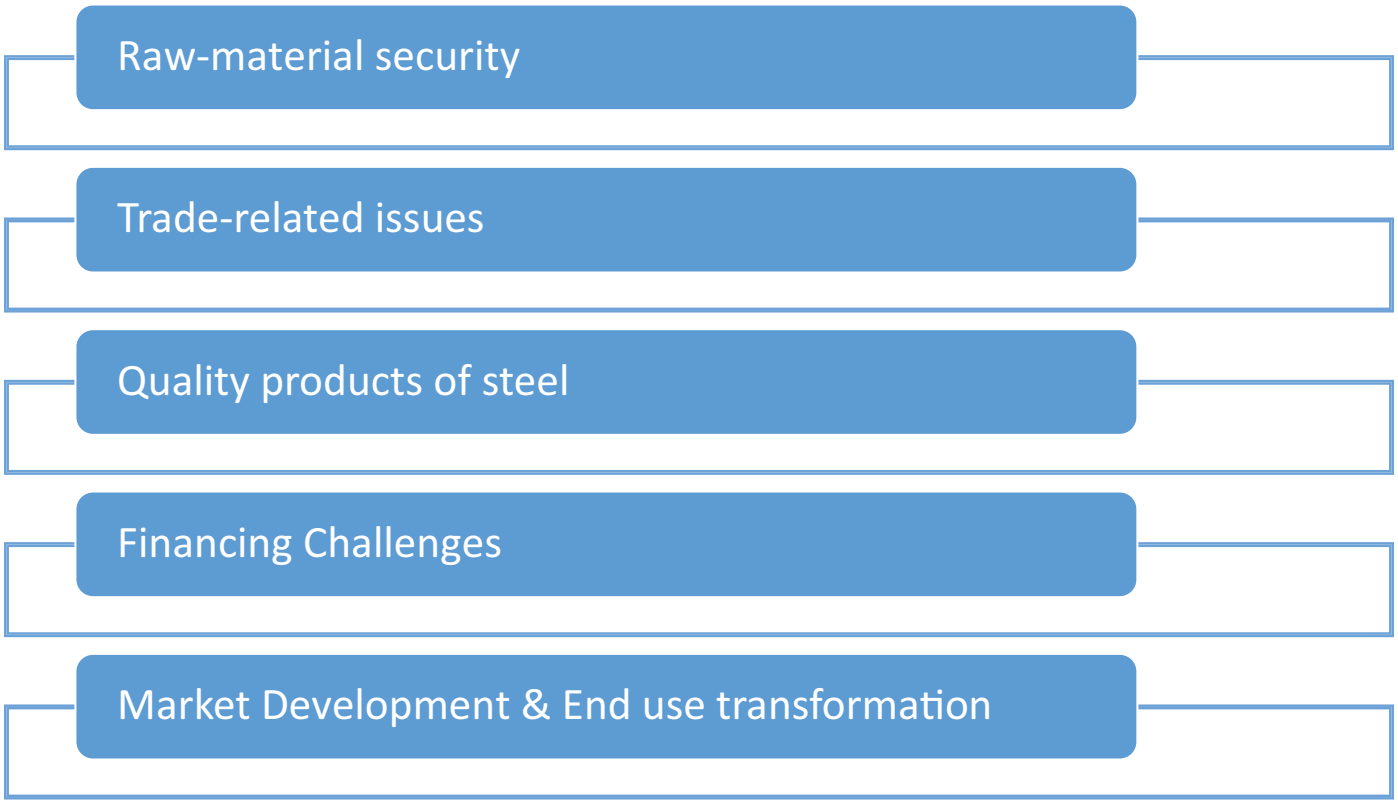




V. Challenges of the Secondary Steel Sector

V. Challenges of the Secondary Steel Sector

The Indian Steel industry has been experiencing stress in the recent months. On one side, the dumping from China has increased and, on the other, domestic industry has been rendered uncompetitive due to high input cost, freight and port handling charges, multiple levies and high interest rates. Globally, iron ore and coal prices have come down; the prices in the domestic market still remain high. The raw material prices are significantly high, unlike in other countries such as Japan, where the government and the end-use industries together decide the raw material prices.



These challenges are listed in detail below:

i. Raw Material

India is deficient in coking coal. A significant percentage of Indian steel production is carried out using blast furnaces, with coking coal used as a reducing agent. India has the fourth-largest proven coal reserves in the world, but these are low quality and 83% of the total reserve is non-coking coal. Over the past several years, the domestic supply of coking coal has lagged behind robust domestic demand. As a result, India imports a large quantity of coking coal, particularly from Australia. Coking coal constitutes around 34% of total coal imports. India imported 35 million tonnes of coking coal in FY12. Demand for coking coal is only going to increase as new steel capacity comes online in the next few years, with India's coking coal requirement expected to reach 90 million tonnes by FY20. Going forward, access to coking coal is expected to have a huge impact on the margins of steel manufacturers. The Indian coke industry is dominated by integrated steel players (ISP), as these facilities operate captive coke capacities. The ISPs produce around 40% of total coke in India annually. Secondary steel producers (SSP), which require around 10 million tonnes of coking coal per annum, rely mostly on imported coke as they do not possess captive coking coal facilities.

Another important challenge in terms of raw material is relating to the iron ore. There is an urgent need to expedite the auction of the raw material under the Amended MMDR Act, 2015 to increase and ensure the sufficient availability of the raw material to the Indian steel industry.

a. Coal:

The secondary steel producers like sponge iron manufacturers did not take part in the recent bidding process as they were not eligible. At the same time Coal India Limited has fallen short of its production target last year. Moreover, the bulk of their coal produce has catered to the power sector. As a result there is both a shortage and uncertainty on the availability of coal as well as on price.

b. Iron ore issues:

Inadequate supply along with supply security of this key raw material is potentially jeopardising the prospects of the sponge iron units, as India continues to import iron ore despite having the world's 5th largest iron ore deposits. Iron ore production has fallen from 218 MT in 2010 to 125 MT in 2014-15. In the notified Mineral Auction Rules, 2015, iron based industry like sponge iron/pig iron is ineligible to participate in the auction of captive iron ore mines. Small sponge iron units with less than 1 MT capacity cannot participate in the auction and will continue to be dependent on the merchant miners, which most times are inadequate.

c. Natural gas issues:

The contribution of gas-based plants in production of DRI has come down drastically. In 2010, it was 26.2% which has come down to 17.1% in 2014. The present availability is 1.14 mmscmd while the total requirement for the DRI industry is 7.64 mmscmd. The imported LNG is too costly to afford for the steel producers in India, especially for the secondary sector.

d. Security of raw material:

Similarly the key ingredients for production of stainless steel include Ferro chrome, Ferro Nickel, Pure Nickel, Charge Chrome, Ferro Moly etc., Pure Nickel, Ferro Nickel, and Ferro Molybdenum. These are not available in India in required quantities or are not available at all. They are mostly imported for the production of stainless steel. The main concern of the secondary steel producers is to ensure availability of the raw materials to retain its global competitive advantage.



ii. Trade Issues

India has operational FTAs with ASEAN region and Korea since 2010 and with Japan since 2011. Now India is a partner country for the Regional Comprehensive Economic Partnership (RCEP –ASEAN 10 countries + 6 other partner countries namely China, Korea, Japan, Australia, New Zealand & India).

Among these countries, China, Japan& Korea may be considered as major stainless steel producers (In fact China alone accounts for 50% of the global production of stainless steel as per figures released by the ISSF in 2013). As a part of the tariff concessions offered under these agreements, India has lowered import duties on stainless steel flat products.

The applicable current status is as given below:

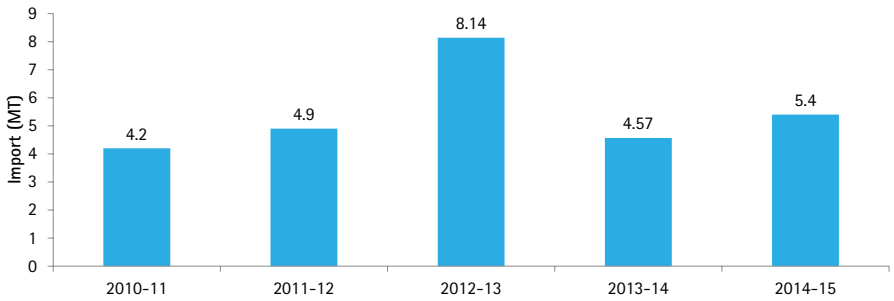
FTA partner	MFN duty	Preferential duty
ASEAN	7.5%	NIL Duty
Japan	7.5%	0.8%
Korea	7.5%	1.88%

In another two years, duties applicable to imports of stainless steel flat products from Korea and Japan would come down to NIL. As against this the effective basic customs duty on steel products is 12.5% for Flat and 10% for long products.

Although there has been a lowering of duties on raw materials as a part of the ongoing FTAs, the same has not yielded any benefit for the domestic secondary steel industry because the bulk of the raw material procurement is from outside the RCEP region.

a. Surging Imports:

India imported more than 10 million tonnes (MT) of steel in 2014-15, more than 75% of which came from China, Korea and Japan. Imports have further surged by 57% in the first quarter of the current fiscal year. This is posing a major threat for domestic secondary steel producers as capacities are remaining underutilized, declining prices, declining net sales realizations and erosion of profitability. The sponge iron producers are being affected by the high volumes of import of scrap which is evident in the following graph:



b. FTAs to the detriment of Domestic Steel Production:

While countries like Japan and Korea have substantially increased their steel exports to India (they have surplus capacity) availing of the near zero customs duty on steel products that they enjoy under the existing Free Trade Agreements (CEPA), countries like China are using the ASEAN FTA to increase their exports to India after circumventing the existing regulatory mechanism. Under the ASEAN FTA, the raw materials have to be necessarily imported from either within the RCEP region or outside the region. It has been amply proved that within the ASEAN country it would not be possible to deliver a 35% value addition in order to qualify for preferential duty by a simple transformation from Hot Rolled to Cold rolled products. However, it has been increasingly found that countries like Malaysia are certifying a 35% value addition and claiming preferential duties for exports to India under the India ASEAN FTA.

c. Import of Scrap:

In order to meet the demand for domestic scrap, Indian importers rely on imported ferrous and non-ferrous metal scrap. However, there are various hurdles placed in imports of metal scrap like CENVAT credit, pre-shipment inspection certification, higher logistic cost and cartelization of foreign shipping lines and their counterpart, problems of transactional value faced at customs, problems due to FTA's, no disposal policy by AERB, form 9 and reporting to state pollution control board.

d. Section 4A of valuation Rule 2000 Rule 8, 9 & 10:

The Induction Furnace units sell the final product "Ingot" to Rolling mills (being the feed material) at market price. However, the units are being asked to pay duty on 110% of the cost of production as per section 4A of Central Excise Act, thus causing a lot of problems and unnecessary litigation, whereas, the whole exercise is revenue neutral as both of the units are registered under Central Excise and availing CENVAT credit.

e. Credit on certain categories of iron & steel scrap:

The Iron Steel Scrap which is generated from non-excisable units such as cycle industry, sewing machines, SSI engineering, and other SSI units making steel based products, and units located in tax free zone are excise duty paid. On the other hand, the procurement of scrap through imports, CENVAT Credit is available on the basis of Countervailing Duty (CVD) paid. The indigenous steel melting scrap procured by kabaries from small manufacturing unit is available without any excise documents. Therefore, no such Excise document can be submitted to the Excise Authority. In view of the above, the Induction Melting Furnace units are not able to get CENVAT Credit on steel products made out of this type of scrap.

iii. Transport and Logistics

a. The various in motion weighbridge of Indian railways are not being properly maintained and calibrated regularly. They show variation in weights when the same rakes is made to run on them at different speeds. This has led to most steel producers not utilizing full capacity of the wagon in fear of being penalized for over-weight. FICCI would suggest here for the establishment of motion weighbridge both at the start and end destinations; where the investment would be supported by industry.

b. Currently the railways are using the concept of CC+8+2 for loading the goods in the wagons. This restricts the loading capacity to 68 MT in wagon. Thus, with cooking coal being having lighter calorific value as compared to thermal coal, cannot be loaded to its full capacity in a railway wagon; therefore most of the steel manufacturers importing cooking coal are paying dead freight to the extent of 2-3mt. Also, it is necessary to augment the fleet of BOST and BRN wagon which are the primary wagon for steel movement; along with the deployment of specialized wagons for transportation of long rails, wide plates and HR/CR coils.

c. The facility of ICD (inland container depot) is available at only 26 ports, therefore, the industries where such facilities are not available are compelled to obtain the scrap from the nearest ports/ICDs, located outside the boundary of their cluster which is not only time consuming but also not economically viable due to high logistic charges, duties and taxes. Therefore, necessary action should be taken by the Government in order to open/ establish more ICD ports in unrepresented areas.

iv. Quality Order

Worldwide, countries are taking strong measures to ensure that sub-standard products do not enter their markets for general consumption. Countries resort to regulatory measures by introducing mandatory standards maintained for various reasons, including health, safety, environmental protection, etc.

The demand for steel products in India has been increasing over the last decade in sectors like architecture, construction, automobiles, railways, transportation, nuclear projects, consumer durables, and other industrial applications, etc. These industrial applications demand steel of very high quality as per the prescribed technical standards. The strategic nature of these applications make it imperative to ensure that quality is not compromised in any way since questions of national interest and public health are involved.

Also, it is worth noting that for end user applications like cutlery, utensils, kitchenware, medical equipment etc.; which largely uses stainless steel; the adherence to quality standards is very important as such applications are used by Indian households on a daily basis. Therefore, it is necessary to have stricter quality control standards for such products used as well.

a. BIS certification for induction furnace:

BIS has listed 16 products under the BIS certification. Out of these 16 products, the two products, IS1875 & IS7283 are applicable to the induction furnace. By this notification, most of the induction furnaces and integrated rolling mills will be wiped out as these two IS standards can only be maintained for steels made through LRF/VD technology or may be ARC furnaces which is virtually impossible to be adopted by even small fraction of existing Induction furnace units.

b. Wire Steel Industry:

The production of wire rods has reduced from 1.82 MT in 2002-03 to 1.10MT in 2013-14. The total installed capacity of the domestic steel wire industry is approximately 3 MT per annum, whereas, for the last five years domestic steel producers supply of wire rods in the market is only 1 MT per annum. There is no option to the domestic steel wire industry but to import wire rods to keep their mills operating and there is no opportunity/ space for growth for the domestic steel wire industry. Incorporation of Steel Wire Rods under compulsory BIS certification would lead to serious difficulties for imports, as all imported wire rods would have to bear the mandatory BIS certification. This would aggravate the shortage of wire rods and would push many units of the domestic steel wire Industry to the verge of closure.

c. Quality and Product Development:

Quality order notified by BIS for steel products has to simultaneously address the key issue of Quality and Product development for the Indian secondary steel producers, otherwise it remains a trade barrier even within the domestic sector.

d. Lack of centralized testing cum training centres:

There is no adequate laboratory approved by BIS for testing ferrous and other materials as per the BIS standard and specification, in order to improve the quality of the product and also help the consumers to know the products that they are procuring. In order to obtain the test report of sample from already existing labs is very time consuming.

v. Operational Issues

Every 1 tonne of steel produced requires the transportation of 4 tonnes of material, implying that close to 200 million tonnes of steel production by FY20 would require the transportation of 800 million tonnes of material. However, an unorganized and fragmented road network; rake movement delays, congestion and insufficient line capacity of the railways; frequent outages and high-voltage fluctuations in power supply are some of the key logistical issues that plague the industry.

Lack of adequate investment in rail network is constraining the growth of mining and metals sector in the country. Over the past 15 years, there has only been a 3% growth in the railway network. The railway network only has a 30% transportation market share despite being a cheaper and faster mode of freight movement than road. To help the Indian Railways gain a bigger share of the freight market, in 2005, the Indian Government offered licenses to private players to start container operations in the country. However, the rail container sector accounts for only about 1% of the cargo-handling market.

a. High Freight and Power Cost:

In India, the transportation cost and the power cost are very high compared to other steel making countries. The freight rate for Mumbai–Delhi route is Rs 3,500 a tonne while the Freight rate for Mumbai-Bangkok is USD 5 per tonne (approximately Rs 400 a tonne). Moreover, the high power tariff for industries reduces the cost competitiveness of Indian steel makers. Poor cost competitiveness does not offer a level playing field for the domestic secondary steel producers in global markets or even at domestic markets due to surge of cheap imports.

b. Process of Obtaining Government Clearances:

In the last few years it has been found difficult for any steel producer to start green field project or even brown field expansion as it involves various issues ranging from cumbersome, lengthy and costly land acquisition to number of government clearances from state and central governments, which takes an unduly long time thus escalating costs. Until such clearances are streamlined and made time-bound, meeting the vision of 300 MT will remain extremely challenging.

c. Assured supply of electric power at reasonable tariff:

The steel making through electric arc furnace route is electric energy intensive. It is, therefore, imperative to ensure regular power supply to the steel companies at reasonable tariff.

Also, the recent increase in electricity charges announced by various states specifically for steel industry is having a detrimental impact on the secondary steel producers.

vi. Policy Issues

While several players have announced their plans to make significant capacity additions in the coming years, not many of the projects envisaged have taken off due to issues related to land acquisitions, mining leases, forest clearances and, relief and rehabilitation (R&R) policies.

a. Discriminatory purchase policy of the government:

There is a need to create level playing field whereby the identical quality finished products manufactured by primary and secondary steel producers are treated equally by the government procurement agencies. Presently, most of the government procurement institutions procure steel products, such as TMT bars and mild steel sections, only from the primary producers though same BIS norms are applied on similar products from Secondary steel producers.

b. Lack of laws and legislations to encourage domestic metals recycling industry:

In India there are no laws that govern the recycling industry. There are no guidelines to promote metal recycling in an organised and safe manner.

c. Re-rollable Steel Materials obtained from Ship Breaking (Clause 1.6 of IS 1786-2008):

According to the clause, the metallurgical history of the inputs should be fully documented. TMT bars manufactured out of Re-rollable Steel Materials obtained from Ship Breaking Industries cannot comply with this stipulation. The clause forces the Re-rollers of TMT bars not to buy the re-rollable steel materials obtained from Ship Breaking. As a result, more than 2.75 Million Tonnes of re-rollable steel materials is required to be converted into "Melting Scrap" which can very well be used in manufacturing TMT bar directly from recycling plates. This has actually made a huge disparity in market. The Re-rollable Steel being used by Re-rollers of TMT bars have to be heated up to Temperature i.e. 900-1000 Degree Centigrade to make it plasticize. This process is same whether ship recycled plates or ingot/ billet made from recycled melting scrap, is used as raw material. There cannot be any remarkable changes to Metallurgy of steel by that temperature. This is also a National loss as the same item is produced with an energy input of 600-700 precious electric units in converting melting scrape to ingot and makes the same TMT from that let apart the other process costs.

d. Requirement of environmental clearances:

At present, the economically viable projects for production of Billet/Ingot are 100,000 tpa and above. The small scale projects of 30,000 tpa are not considered economically viable. It is difficult for these small projects to get the environmental clearances. Thus, it is recommended that the project limit should be increased to 100,000 tpa.

e. Policies to improve per capita consumption of steel:

Though, India is the third largest steel making country in the world, the per capita usage at around 60 kg is below world average of 220 kg. Further, the per capita usage of special steel like alloy steel which is used in critical application is very low. The demand needs to be encouraged by undertaking huge investment projects and also making the domestic steel cost competitive. One support here could be similar to policy Melt & Manufacture adopted by the US; under which for all the government projects, the steel products requirement is met through domestic production by melting and production. The imported products or parts for assemblage are not used. The policy can act as an incentive for domestic production.

vii. Financial Issues

The sales realization of the Indian steel industry largely depends on global pricing, while cost structures in various countries are different. Although costs such as taxes, raw material price movements and logistics costs are external to any company, other cost elements that depend on a company's decision such as location, procurement and supply are very much under its control. Effective cost management would be very critical to ensure healthy rate of returns for new projects and the viability of greenfield projects in a capital-intensive industry such as steel.

a. High cost of capital:

Poor demand growth for steel and cheaper imports to India are putting pressure on prices offered by the domestic producers. The prices are approaching closer to the cost of production which is adversely impacting the profitability of the domestic secondary iron and steel makers. Given the high interest cost which is prevalent in India, profitability is not even enough to cover interest costs and debt servicing is negatively being affected. The banks are reluctant for further exposure to the steel sector; especially for the secondary steel producers. This is resulting into huge shortage of funds and delay in investments. In turn, it will affect the domestic producers' appetite for future investments and would be a big dent for the Indian steel industry and to the 'Make-in-India' programme of the Government of India.

b. Flexible structuring of existing long term project loans to infrastructure and core industries:

Reserve Bank of India (RBI) vide circular dated December 15, 2014 has provided for "Flexible Restructuring of Existing Long Term Project Loans" to infrastructure and core industries including steel with a minimum financial exposure of Rs 500-crore. While this has benefitted the integrated steel plants, the secondary steel sector is not covered by this financial ceiling. Most of the steel companies in the secondary steel sector are having financial exposure of less than Rs 500-crore. Therefore, it is recommended that the minimum limit of the financial exposure should be brought down to Rs 200-crore.



VI. Recommendations Way Forward

VI. Recommendations – Way Forward

1 Raw Material	• Sufficient allocation of coal and coal mines • Process of price discovery of iron ore to be made transparent and scientific
2 Trade	• Free Trade Agreements with Japan and South Korea to be revisited • Import restrictions (anti-dumping) to safeguard the domestic players • Curtail import of sub-standard steel • Well-defined Product-Specific Rules (PSR) must be incorporated into the RCEP agreement • Special package to be introduced under "Make in India" for Alloy steel to make it export competitive • Imported steel to be quality compliant as per the BIS
3 Operations	• Various government clearances for doing business to be made efficient and time bound • Land acquisition is still a significant challenge for the industry
4 Transport & Logistics	• Along with development of roadways, focus should be given on strengthening coastal/water ways for domestic transport, which is relatively cheaper • Railways to treat the steel industry as a priority sector consider setting up dedicated tracks
5 Financing	• Alternative credit arrangements like bonds should be facilitated and encouraged • Concessions on interest rates for the steel sector

The recommendations are mentioned in detail below:

i. Raw Material

a. Sufficient number of captive coal mines of high grades of coal should be earmarked to meet the present requirements of sponge iron industry. During the next round of competitive bidding of coal mines, sponge iron sector should not be clubbed with cement and CPP sectors. Coal mines of high grades should be exclusively reserved for iron and steel sector as coal is a process necessity unlike the other sectors. Under the proposed mechanism of auction of coal linkages, all sponge iron producing units should be covered (post 2007). CIL should earmark a certain quantity of coal to this sector and should not focus on profitability only, as non-coking coal is key raw material (and not fuel unlike the other sectors). Also, there should be a special dispensation for the smaller units as they are unlikely to compete successfully in the proposed linkage auctioning mechanism . The gap between the auction quantity and actual requirement should not be left to the state government or commercial miners as there will be considerable time gap and high prices involved. Therefore, unfulfilled requirement should be supplemented by CIL sources. Railways should accords same priority in allocation of racks to the raw material as is given to steel.

b. In the Auction Rules, 2015 not only the sponge iron/pig iron should be included but also the requirement of sinter plant/ pellet plant should be considered. PSUs like NMDC, OMC, etc. should have special dispensation to meet the requirements of the small sponge iron/pig iron/sinter plants/pellet plants. Present pricing mechanism for iron ore is faulty. There is no standard mechanism of fixing the iron ore prices. There is immediate need to evolve a mechanism for the fixation of iron ore prices. To ease the availability of iron ore from domestic sources and reducing dependence on the imports, the required environment clearances and other clearances should be expedited..

c. Gas based sponge iron plants which were set up to utilize natural gas should be made available on urgent basis.

ii. Trade

a. Imports restriction is a need of the hour. It can be attained through imposing safeguard or anti-dumping duties on steel products which are worst hit. Also, efforts are required to remove the steel industry from Free Trade Agreements with countries like Japan and South Korea and the forthcoming RCEP agreement. India has not been benefitted from the FTAs. The signing of the FTAs has only lowered protection levels on finished goods without giving any corresponding benefits in Raw Material. Therefore, urgent review of all existing FTAs must be taken up so that a level playing field is created. NO tariff concessions should be granted to China on Steel and Stainless steel flat products under RCEP negotiations. Provisions of the Rules of Origin must be followed strictly to avoid mis-declaration and circumvention of duties. Well defined Product Specific Rules (PSR) must be incorporated into the RCEP agreement.

b. The alloy steel companies cater to the domestic market predominantly. They should be encouraged to produce complex alloy steel grades and export the same under 'Make in India' campaign. It can be attained by offering some special incentive for exports of alloy steel for limited time till they establish their relations in the foreign market.

c. There is a need to curtail the import of sub-standard steel from countries like China, by mis-declaring the goods and claiming them to be out of the purview of BIS certification, which the local manufacturers are subject to. Also, for the stainless steel, the raw materials (Hot rolled stainless steel flat products) have to be necessarily imported. It has been amply proved that within the ASEAN country it would not be possible to deliver a 35% Value addition in order to qualify for preferential duty by a simple transformation from Hot Rolled to Cold rolled products. However, it has been increasingly found that countries like Malaysia are certifying a 35% value addition and claiming preferential duties for exports to India under the India ASEAN FTA which would not be possible to achieve through this route. It is therefore suggested that value addition as a criteria for determining Rules of origin should not be applied to stainless steel goods. It is suggested that ONLY Product Specific Rules be followed under the RCEP negotiations.

d. The opinion about the import duty is divided among different

associations. It should either remain unchanged or brought down to zero.

e. The government should kindly consider deemed duty paid on steel scrap and allow for availing CENVAT credit which was available to the industry till 1987.

f. In order to safeguard public health, safety and environment and to ensure the safety of the stainless steel user it is imperative that compliance with the quality order standards as notified by BIS be made mandatory for imports of stainless steel flat products.

iii. Operations

a. The government should limit the capacity of furnace (Induction and Electric Arc Furnace, submerged Arc Furnace) to 100,000TPA and above for the environmental clearances.

b. Ministry of steel should take initiatives in connection with installation of centralized testing centers approved by BIS.

c. Ministry of steel should also take initiatives with the help of BIS to promote and educate the buyer for acceptance of ISI mark product without specifying any route.

d. Government clearances are major hurdles in the growth of steel sector. By smoothening and bringing transparency in processes for land acquisition and other government clearances required for the setting of factories, the project implementation will be faster. Moreover, the clearances should be given in a time bound manner.

e. The governments, both States and the Central, should treat similar quality of Steel in an equal manner while making purchase decisions; and adherence should not be given to the total production capacity of the producers.

f. Government of India should frame laws and legislation that assist, encourage and incentivize domestic Metals Recycling Industry. The metals recycling industry should be given an industry status.

iv. Transport and logistics

a. Better connectivity of steel plants to raw material reserves, ports and steel markets is critical for the steel industry's competitive strength. Along with development of roadways, focus should be given on strengthening coastal/water ways for domestic transport, which is relatively cheaper. Dedicated railway lines should be established for steel plants. Such investment projects will also in turn, accelerate the demand for steel.

b. Inland Container Depot: The facility of ICD (inland container depot) is available at only 26 ports, therefore, the industries where such facilities are not available are compelled to obtain the scrap from the nearest ports/ICDs, located outside the boundary of their cluster which is not only time consuming but also not economically viable due to high logistic charges, duties and taxes. Therefore, necessary action should be taken by the Government in order to open/ establish more ICD ports in unrepresented areas.

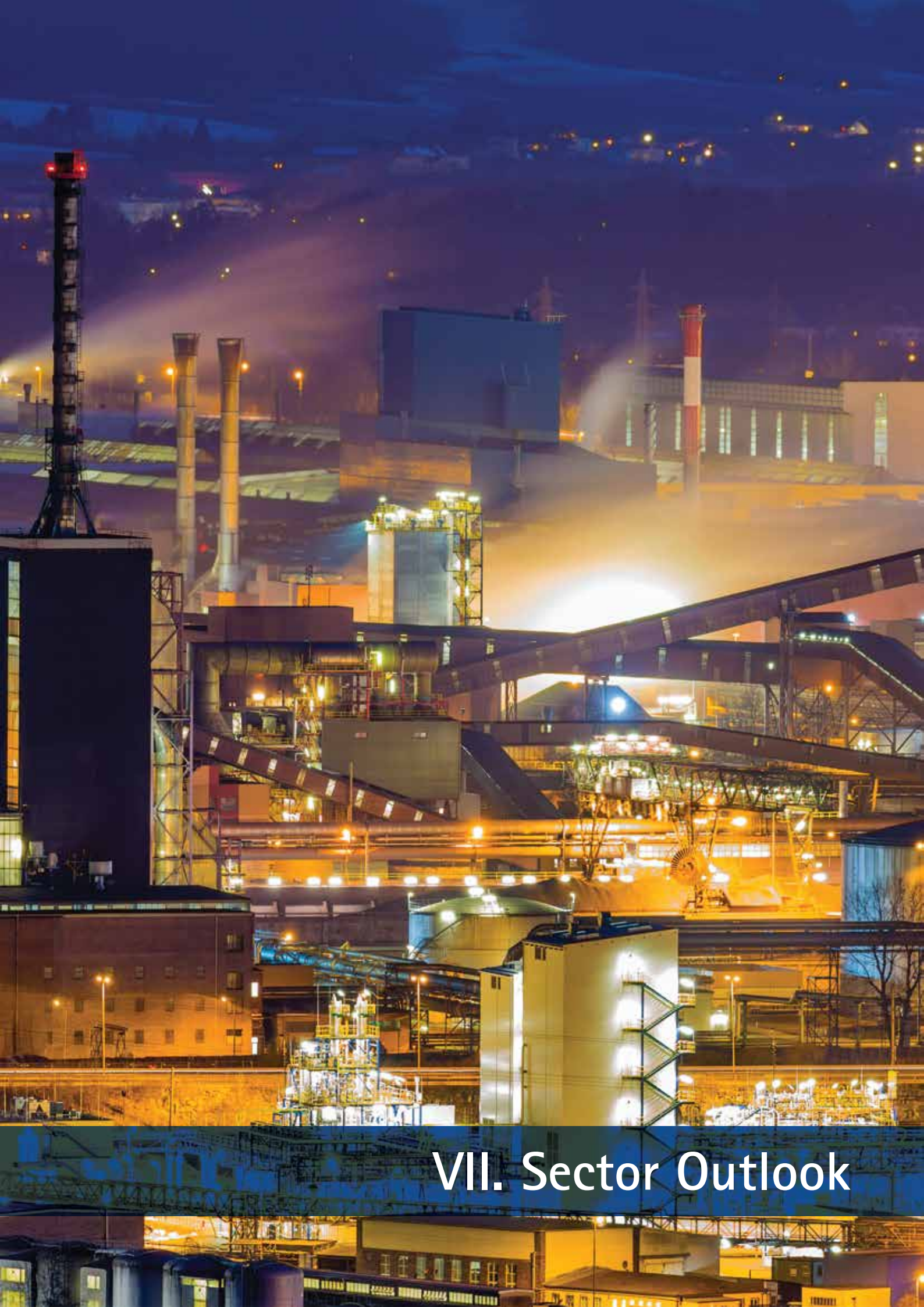
c. Slurry Pipeline: One environmental friendly and convenient way to transport iron ore from the mines to the plants elsewhere is through slurry pipelines. However, in India we do not incentivize this method of transportation, which we need to, if we are to save on fuel and already overburdened Indian Railways. The slurry pipelines IN India Need to be recognized as Infrastructure which legitimately, they are. The Rangarajan Committee has also recommended for the same.

v. Finance

a. Cost of capital is a major concern for highly capital intensive business like steel. The alternative credit arrangements like bonds should be facilitated and encouraged, especially for the secondary producers.

b. Maximum limit of financial exposure for availing the RBI's facility of "Flexible Restructuring of Existing Long-Term Loan Policy" should be brought down to Rs 200 crore from the existing Rs 500 crore limit.

c. With the already high exposure to steel sector for the banks, they are generally reluctant to give further loans to the sector. The problem is all the more acute for the secondary and small players. It is therefore, recommended that a steel finance corporation may be created that can act as central funding agency for the sector.



VII. Sector Outlook

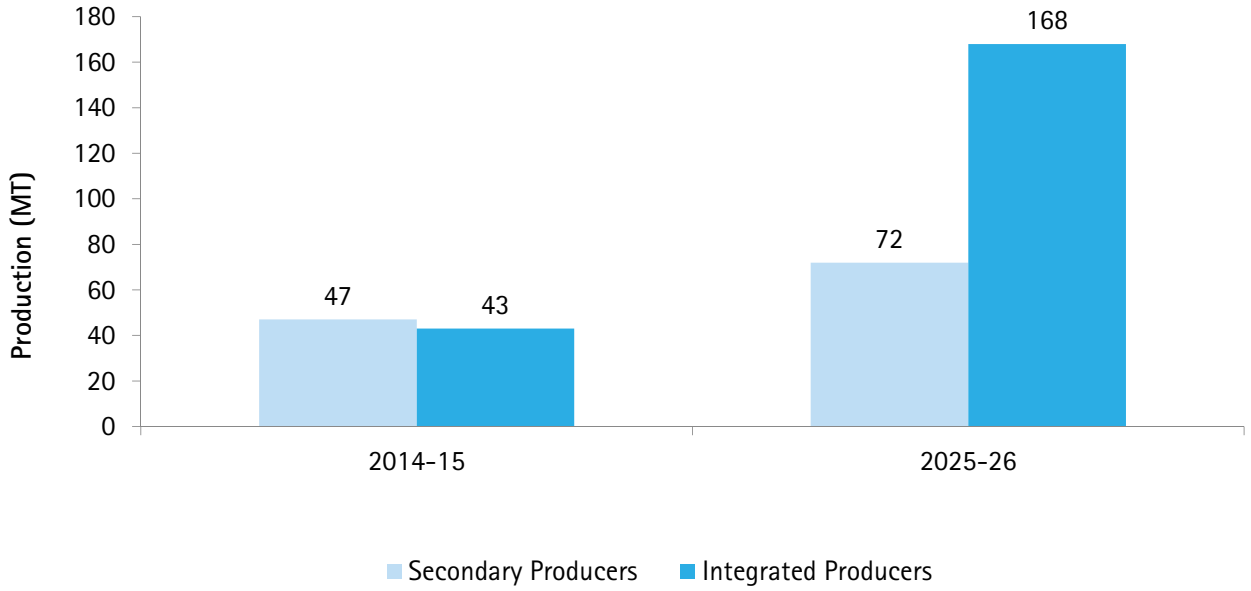
VII. Sector Outlook

The targeted capacity of 300 MT for Indian steel industry by 2025, leads to a target of production of 240MT pa (assuming a capacity utilisation of 80%). Considering the targeted contribution of secondary steel sector and expansion planned by the integrated steel producers, we can safely assume 70%-30% contribution tilted in favour of the integrated steel producers. Therefore, the production target for the secondary steel sector by 2025 is around 70-72 MT pa, comprising of arc furnace and induction furnace along with alloy and stainless steel producers under the category of secondary producers.

Looking at the current scenario of 45-47 MT production by secondary producers through the above mentioned production results and taking into consideration that owing to the financial and long-term sustainability challenges, few of the secondary producers will shut out, thereby causing a further vacuum in the total production to the tune of 10 MT pa. Thus, the expansion to be planned has to ensure doubling the production to 70 MT by 2025.

It is in this context and background that the secondary steel sector needs to be promoted, encouraged and incentivized in the country to give a boost to the manufacturing sector to lead the real achievement of the flagship programme of Government of India of 'Make-in-India', alongside the achievement of the target of 300MT of steel production.

Fig 3.1 Current & Forecasted Production of Indian Steel Industry



Established in 1927, FICCI is the largest and oldest apex business organisation in India. Its history is closely interwoven with India's struggle for independence, its industrialization, and its emergence as one of the most rapidly growing global economies.

A non-government, not-for-profit organisation, FICCI is the voice of India's business and industry. From influencing policy to encouraging debate, engaging with policy makers and civil society, FICCI articulates the views and concerns of industry. It serves its members from the Indian private and public corporate sectors and multinational companies, drawing its strength from diverse regional chambers of commerce and industry across states, reaching out to over 2,50,000 companies.

FICCI provides a platform for networking and consensus building within and across sectors and is the first port of call for Indian industry, policy makers and the international business community.

Mines and Metals Division at FICCI

The Mines and Metals Division at FICCI endeavors to support the mining and metals industries (both steel and non-ferrous metals) in India as well as for the global players looking to foray into the Indian Markets. It is strongly committed to provide a platform for industry players to raise their voices over a number of points covering investments, operations, issues & future roadmaps to the decision making authorities. The Key Contacts for the division are.

Notes

Notes

Notes



Apran Gupta
Deputy Director & Head, Mines and Metals
Tel: +91 11 23487564
Mob: + 91 9810572331
Email: arpan.gupta@ficci.com

Charu Gupta
Research Associate, Mines and Metals
Tel: +91 11 23487456
Mob: +91 9582101139
Email: charu.gupta@ficci.com