

NATIONAL STEEL POLICY 2017

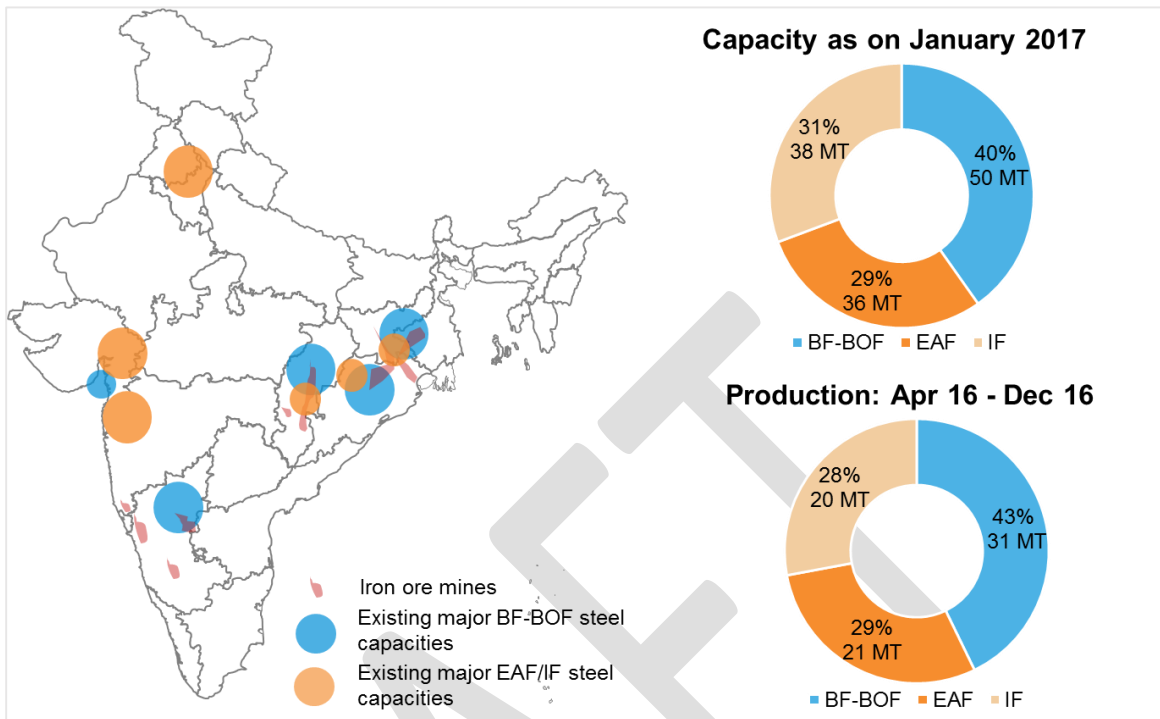
1. Introduction

- 1.1. Steel is a product of large and technologically complex industry having strong forward and backward linkages in terms of material flows and income generation. It is also one of the most important products of the modern world and of strategic importance to any industrial nation. From construction, industrial machinery to consumer products, steel finds its way into a wide variety of applications. It is also an industry with diverse technologies based on the nature and extent of raw materials used. In India, steel has an output multiplier effect of nearly 1.4X on GDP and employment multiplier factor of 6.8X.
- 1.2. A vibrant Steel industry has historically been the foundation of a nation's rapid Industrial Development. On account of rapid industrial development, from a small capacity of 22 MT in FY 1991-92 prior to deregulation, India has become the 3rd largest steel producer in the world with a production of 91 MT and a capacity of 122 MT in FY 2015-16. The National Steel Policy 2017 (NSP 2017) is an effort to steer the industry to achieve its full potential, enhance steel production with focus on high end value added steel while being globally competitive.
- 1.3. The National Steel Policy 2005 (NSP 2005) sought to indicate ways and means of consolidating the gains flowing out of the then economic order and charted out a road map for sustained and efficient growth of the Indian steel industry. However, the unfolded developments in India as also worldwide, both on the demand and supply sides of the steel market, have warranted a relook at the different elements of the NSP 2005.
- 1.4. India's competitive advantage in steel production is driven, to a large extent, from the indigenous availability of high grade iron ore and non-coking coal – the two critical inputs of steel production. In addition, it also has a vast and rapidly growing market for steel, strong MSME sector and a relatively young work force with competitive labour costs.
- 1.5. Driven by the positive demand outlook and prevailing high prices of steel in the period post 2004, the Indian steel sector witnessed a wave of investments in the states of Odisha, Jharkhand, Karnataka and Chhattisgarh. Substantial new capacity was created and existing plants were modernized. A significant portion of these investments were funded by banks and other forms of borrowings.

- 1.6.** India became the 3rd largest producer of steel in 2015 and is now well on track to emerge as the 2nd largest producer after China. There is significant potential for growth given the low per capita steel consumption of 61 Kg in India, as compared to world average of 208 Kg. Indian economy is rapidly growing with enormous focus on infrastructure and construction sector. Several initiatives mainly, affordable housing, expansion of railway networks, development of domestic shipbuilding industry, opening up of defence sector for private participation, and the anticipated growth in the automobile sector, are expected to create significant demand for steel in the country. Further, while the main focus of the industry is on the domestic market, being in close vicinity of the developed west and developing east, provides it a strategic location that augurs well for the industry seeking opportunities for exports of finished goods and imports of some scarcely available raw materials.
- 1.7.** The Indian steel industry is structured in between three broad categories based on route wise production viz. BF-BOF, EAF and IF. BF-BOF route producers have large integrated steel making facilities which utilize iron ore and coking coal for production of steel. Currently, the BF-BOF route had a combined capacity of around 50 MT at utilization level of 82%¹. Unlike other large steel producers, the Indian steel industry is also characterized by the presence of a large number of small steel producers who utilize sponge iron, melting scrap and non-coking coal (EAF/IF route) for steelmaking. As on March 2016, there were 308 sponge iron producers that use iron ore/ pellets and non-coking coal/gas providing feedstock for steel production; 1175 electric arc furnaces & induction furnaces that use sponge iron and/or melting scrap to produce semi-finished steel and 1392 re-rollers that rolls out semi-finished steel into finished steel products for consumer end use.

¹ Capacity Utilisation calculated on pro-rata basis of April – December 2017 production (30.88 MT)

Figure 1: Current steel footprint in India



Source: Ministry of Steel, JPC

- 1.8. Over the past two decades, the Indian steel industry has developed capabilities of producing a wide range of sophisticated steel at par with global best practices addressing diverse needs of the end user industries. However, India still needs to make a special effort to domestically produce steel for high end applications, electrical steel (CRGO), special steel and alloys for Power equipment, Aerospace, Defense and Nuclear applications.
- 1.9. However, the Indian steel sector is disadvantaged due to **limited availability** of essential raw material such as high grade Manganese ore & Chromite, coking coal, steel grade limestone, refractory raw material, Nickel, Ferrous Scrap etc. Due to shortage of domestic coking coal, both in terms of quantity and quality, pig iron producers/ BF operators in India have to significantly depend on import of coking coal.
- 1.10. In the recent past, multiple issues have also adversely impacted the steel sector, viz. cancellations of iron ore and coal mine allocations, delays in land acquisition, environmental clearances, which led to many of the projects facing significant cost and time overruns. Additionally, companies also faced substantially increased operating costs on account of increased logistics & raw material costs and other charges.

- 1.11.** Post 2011, global prices of steel began to decline, marking the beginning of a downturn in the global steel industry triggered by slowdown in global demand and over capacities in a number of countries including China. By July 2015, prices had fallen by 50% compared to January 2011 - their lowest in decades, as cheap imports flooded world steel markets. This significant structural asymmetry between demand and supply also affected large number of Indian companies leading to surge in imports resulting in weak pricing conditions, low profitability, lower capacity utilization and even closure of capacities in some cases.
- 1.12.** In the new environment, the industry has to be steered with appropriate policy support to ensure that production of steel matches the anticipated pace of growth in consumption. Special emphasis is needed to ensure that the industry follows a sustainable path of development in respect of environmental friendliness, mineral conservation, quality of steel products, use of technology and indigenous R&D efforts to ensure that the country can, over time, reach global efficiency benchmarks to become a world leader in steel production technology, as well as in production of high end steel.

2. NSP 2017 – Vision, Mission & Objectives

a) **Vision:** To create a globally competitive steel industry that promotes inter-sectoral growth.

/OR/

To create a self-sufficient steel industry that is technologically advanced, globally competitive and promotes inclusive growth.

b) **Mission:** Provide environment for attaining –

- Self-sufficiency in steel production by providing policy support & guidance to private manufacturers, MSME steel producers, CPSEs & encourage adequate capacity additions.
- Development of globally competitive steel manufacturing capabilities
- Cost-efficient production and domestic availability of iron ore, coking coal and natural gas
- Facilitate investment in overseas asset acquisitions of raw materials.
- Enhance domestic steel demand.

c) **Objectives:** The National Steel Policy aims at achieving the following objectives –

- i. Build a globally competitive industry with a crude steel capacity of 300 MT by 2030-31
- ii. Increase per Capita Steel Consumption to 160 Kgs by 2030-31
- iii. To domestically meet entire demand of high grade automotive steel, electrical steel, special steels and alloys for strategic applications by 2030-31
- iv. Increase domestic availability of washed coking coal so as to reduce import dependence on coking coal to 50% by 2030-31
- v. To be net exporter of steel by 2025-26
- vi. Encourage industry to be a world leader on energy and raw material efficient steel production by 2030-31, in a safe and sustainable manner
- vii. Develop and implement quality standards for domestic steel products

3. The current context and the long term perspectives on growth

- 3.1.** The domestic demand backed growth of the Indian economy and consequently the steel consuming sectors has been a key trait of Indian steel industry. The decade before the liberalization of the Indian steel industry in 1991 witnessed growth in crude steel production at a CAGR of 5.2%. Post liberalization, witnessed a decadal CAGR of 6.1% which accelerated to 8.3% during 2000-01 to 2015-16.
- 3.2.** However, today the steel industry in India faces challenging external conditions manifest in slow economic growth and idle steel capacity globally. With weak global economic prospects, the Indian steel industry will have to strongly depend on the growth of domestic consumption for its future.

4. The Policy

NSP 2017 covers the following policy areas –

- a. Steel Demand**
- b. Steel Capacity**
- c. Raw Materials**
- d. Land, Water and Power**
- e. Infrastructure & Logistics**
- f. Product Quality**
- g. Technological Efficiency**
- h. MSME Sector**
- i. Value Addition in Stainless/ Alloy Steel**
- j. Environment Management**
- k. Safety**
- l. Trade**
- m. Financial Risks**
- n. Role of CPSEs & Way Forward**
- o. Focus on High-End Research: Steel Research & Technology Mission of India**

4.1. Steel Demand

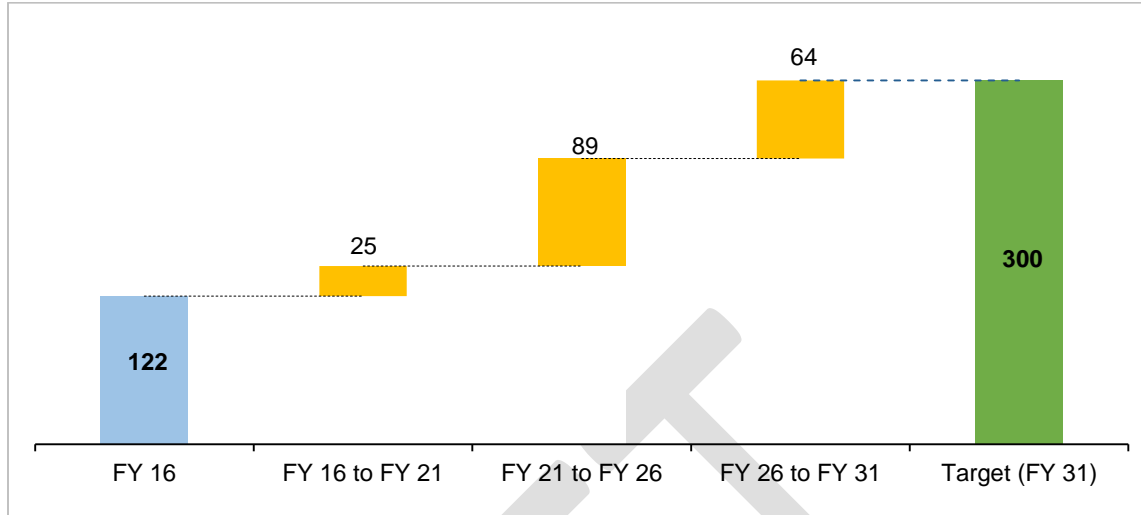
- 4.1.1. In 2015, India was the only large economy in the world where steel demand continued to demonstrate positive growth at 5.3 %, as against negative growth in China -5.4%, and Japan -7.0%. India's growing urban infrastructure and manufacturing sectors indicate that demand is likely to remain robust in the years ahead. If India is to achieve the goal of being a "developed nation", the steel industry must play a crucial role as has been the case with all the major developed countries and East Asian countries like Japan, South Korea and China.
- 4.1.2. Notwithstanding the current challenges, Indian steel industry still has significant potential for growth, underscored by the fact that the per capita steel consumption in the country at 61 kg (incl. rural consumption at 10 kg) is much lower than the global average of 208 kg. Going forward, the accelerated spend in infrastructure sector, expansion of railways network, development of domestic shipbuilding industry, opening up of defence sector for private participation, anticipated growth in automobile and capital goods industry and the construction in urban & rural areas, are expected to create significant demand for steel in the country.
- 4.1.3. Growth in steel consumption in a country is typically linked to the economic growth and steel intensity. While growth in GDP is a crucial determinant of growth in overall consumption, steel intensity is the definitive parameter for an economy and determines the growth rate of steel demand vis-à-vis consumption over time.
- 4.1.4. It is expected that at the current rate of GDP growth, the steel demand will grow threefold in next 15 years to reach a demand of 212 - 247 MT by 2030-31 as illustrated in **Annexure I**. However, even with this demand of finished steel by 2030-31, India's per capita consumption would reach only to 160 Kgs, lower than the current global average of 208 kg.
- 4.1.5. Currently around 40% of the steel consumption is from construction & infrastructure sectors which is expected to increase to 59% by 2030-31 as illustrated in **Annexure II**.
- 4.1.6. Creation of steel demand in the country is one of the major task to be undertaken in this direction. To drive steel demand, Ministry has identified construction and manufacturing sectors like Rural development, Urban infrastructure, Roads & Highways, Railways etc. to be the key focus areas and will take necessary steps to achieve the same through following –

- 4.1.6.1. Steel structures are highly cost effective and have shorter lead time for erection and have greater durability with high design comfort. Hence usage of steel needs to be encouraged in all buildings and structures. Efforts will be made to emphasize the lower lifecycle costing while evaluating projects rather than looking at just the upfront cost in isolation, which would encourage greater usage of steel in Government as well as the private sector.
- 4.1.6.2. The Government has chalked out an extremely ambitious plan of Housing for all by 2022 as well as schemes such as Pradhan Mantri Awas Yojna, Saansad Adarsh Gram Yojna etc. These provide a huge opportunity for use of steel intensive structures and designs, usage of pre-fabricated and precast steel structures, etc. Hence, Ministry will take all necessary measures to promote the increased usage of steel intensive structures/designs under these schemes.
- 4.1.6.3. Commercial, Residential buildings and flyovers also provides immense opportunities. Necessary efforts will be made in conjunction with Ministry of Road, Transport & Highways to evaluate the replacement benefits of the existing bridges, pavements and crash barriers used in Roads & Highways and consider for projects in steel bridges, steel reinforced pavements and steel crash barriers respectively.
- 4.1.6.4. Usage of steel in railways is limited to laying of railway tracks, rolling stocks, wagons, platforms and coaches. Efforts will be made to increase the steel usage in making railway station, foot over bridges, rail coaches, construction of steel based railway colony buildings especially in seismic prone areas, construction of dedicated freight corridors & superfast rail corridors and construction of more steel bridges for saving time & capital expenditure.
- 4.1.7. The “**Make in India**” initiative is expected to witness significant investments in Construction, Infrastructure, Automobile, Shipbuilding and Power sectors, which will stimulate steel demand. Hence, efforts will be made to pass on such benefit to the domestic steel producers. Use of cost efficient and competitive ‘**Indian Made steel**’ will pave the way for infrastructure development and construction activities in the country.

4.2. Steel Capacity

- 4.2.1. It is anticipated that a crude steel capacity of 300 MT will be required by 2030-31, based on the demand projections as mentioned above. However, achieving crude steel capacity up to 300 MT will require extensive mobilization of natural resources, finances, manpower and infrastructure including land.

Figure 2: Phasing of Capacity Expansion (in MT)



Source: JPC (for present), MECON (for projection)

Note: Capacity additions are considered based on the announcement made by steel manufacturers.

- 4.2.2. Considering the competitive advantage of steel production in India, the country also has the potential to export sufficient quantities of steel and become a major player in the global market, thus mitigating the foreign exchange risk emanating out of the exposure of the industry to the global raw materials market especially for coking coal.
- 4.2.3. As illustrated in **Annexure III**, BF-BOF route will contribute about ____% of the crude steel capacity & production in 2030-31. DRI-EAF & IF route is expected to contribute ____% while other emerging routes are expected to contribute the balance ____% of the crude steel capacity & production. **(Under discussion)**
- 4.2.4. Demand for pig iron for merchant use, such as for castings and supplementary metallic in the electric arc or induction furnaces, is forecast to increase to 23 MT by 2030-31. Similarly, demand for sponge iron is expected to increase to ____ MT by 2030-31 as illustrated in **Annexure I**. It is expected that the sponge iron capacity may increase to ____ MT by 2030-31 with around ____% share of gas based capacities under increased environmental considerations and long term availability of gas. **(Under discussion)**
- 4.2.5. Creation of additional capacity for fulfilling the anticipated demand will require significant capital investment of about Rs. 10 lakh Crore by 2030-31 and will also generate significant employment in the range of 36 Lakhs by 2030-31 from the current level of 25 Lakhs depending on degree of automation resulting from adoption of different technologies.

- 4.2.6. In order to ensure optimal growth of the industry and to avoid situations of over or under capacity, the Ministry will work with all the stakeholders to monitor investments in the steel industry on a continuous basis and will also facilitate setting up of SPVs in mineral rich states of Odisha, Chhattisgarh, Jharkhand and Karnataka.
- 4.2.7. Establishment of steel plants along the coast under the aegis of Sagarmala project will be undertaken. Such plants would be based on the idea of importing scarce raw materials and exporting steel products. The Ministry will also promote cluster based approach particularly in MSME steel sector with common infrastructure on consortium approach for optimum land use, easy availability of raw materials and economies of scale.
- 4.2.8. Necessary policy environment will also be provided to promote gas based steel plants, electric/ induction furnaces and other technologies which will bring down usage of coking coal in blast furnaces.

4.3. Raw Materials

Availability of raw materials at competitive rates is imperative for the growth of the steel industry. Details of the estimated raw material requirement by 2030-31 for the steel industry have been provided in **Annexure IV**.

4.3.1. Iron Ore

- 4.3.1.1. The government has already come up with Mines and Minerals (Development and Regulation) Amendment Act, 2015 which gives greater emphasis on time bound mine development and increased stress on mineral exploration and sustainable mining operations. The Act has brought clarity on mine allocation process (through auction) and procedure for mining lease renewal and provides for reservation of any particular mine for a particular end use and put conditions permitting auction among such eligible end users.
- 4.3.1.2. To ensure adequate availability of iron ore and other minerals, suitable efforts will be made in conjunction with Ministry of Mines to facilitate auction of mineral blocks in a regular manner.
- 4.3.1.3. Utilization of low grade fines lying at mine sites of captive iron ore miners will be promoted and any regulatory changes that may be required will be evaluated in conjunction with concerned ministries. Beneficiation and agglomeration industries would be strengthened through suitable support.

- 4.3.1.4. Transportation of iron ore fines to pelletisation units will be targeted through **slurry pipelines and conveyors** as it will reduce pollution and de-congest transportation infrastructure in mining areas. To encourage this environment friendly transportation, Ministry of Steel will pursue timely completion of on-going **slurry pipeline** projects and their further expansion in the coming years.
- 4.3.1.5. To ensure long term supply of iron ore, intensive & deeper exploration would be promoted to augment resource base. Eco-friendly viable underground mining technique for gainful exploitation of magnetite ore deposits locked in Western Ghats would also be explored in conjunction with mining research institutes.
- 4.3.1.6. In order to develop a strategic footprint in the global natural resource industry, acquisition of mineral assets overseas will also be facilitated through bilateral talks with the prospective nations. Steel sector players will be encouraged to acquire and develop global projects individually or on partnership basis.
- 4.3.1.7. Ministry of Steel in conjunction with Ministry of Mines, will facilitate creation of a uniform country-wide sales platform for bringing transparency and predictability in the process of sale of iron ore.

4.3.2. **Iron Ore Pellets**

- 4.3.2.1. During mechanized mining, 60 to 70% output is generated as fines below 10 mm size. Fines are also generated during transportation and handling. To economically utilize these fines, suitable agglomeration process is necessary for converting them into sinters or pellets.
- 4.3.2.2. Till the recent past, domestic steel industry was mainly using higher grades of iron ore and a higher proportion of lumps due to their easy accessibility and availability. However, there is a pressing need to utilize low grade iron ores including slimes and dump fines which are stockpiled at different mine heads. Hence, optimal use of existing low grade iron ore resources with special emphasis on conservation of high grade ores will be encouraged. As of 2015-16, there exists pelletisation capacity of about 85 MT with a capacity utilization 32.5%. Impetus will be given to **Pellet industry** as it helps in mineral conservation by acting as direct feedstock in Blast Furnace in place of high grade iron ore.

4.3.3. **Coking Coal & Non-Coking Coal**

- 4.3.3.1. About 70% of the coking coal requirement of the domestic steel industry is presently being met through imports. Ministry of Steel will coordinate with Ministry of Coal to increase availability of coking coal through **overseas asset**

acquisition and will also ensure that **sufficient number of modern coking coal Washeries get established**. Suitable fiscal measures will also be taken to support the rising requirement in the steel sector.

4.3.3.2. Furthermore, deliberations will be held with Ministry of Coal to persuade CIL to create special coal linkage e-auction window for steel players to ensure supply of coal to steel sector. Ministry of Steel will also facilitate periodic auction of coking coal blocks as it will encourage the steel industry to develop its own dedicated coking coal mines.

4.3.3.3. To ensure long term availability of coking coal, Ministry of Steel in conjunction with Ministry of Coal will facilitate exploration & exploitation of deep seated coking coal reserves. Efforts will also be made to expeditiously implement Jharia Action Plan to improve the domestic availability of coking coal.

4.3.4. **Natural Gas**

4.3.4.1. Under the Paris Treaty (COP 21), India intends to reduce the emission intensity of its GDP by 33-35% by 2030 from 2005 levels. In order to achieve this target, India needs to find energy efficient resources that are affordable and also available. Natural Gas is one such greener alternatives available.

4.3.4.2. Given the future potential of gas based technology, in terms of up-gradation of coal based DRI capacities in the MSME sector to gas based route, need for captive gas based power plants for the sector and the alternative of injecting natural gas in blast furnace to reduce dependence on imported metallurgical coal (both coking and PCI), ensuring firm supply of natural gas is imperative to boost the confidence and investment in the gas based steelmaking technology.

4.3.4.3. In case of gas based steel plants which have been stranded due to lack of supply of natural gas from domestic sources, options will be evaluated in coordination with Ministry of Petroleum and Natural Gas for restoration of domestic gas supply to steel sector. Efforts will also be made to remove the cascading effect of anomalies in the tax structure.

4.3.4.4. To ensure long term availability of natural gas, Ministry of Petroleum & Natural Gas will be approached to explore new reserves of natural gas.

4.3.5. **Limestone, Manganese Ore and Chromite Ore**

4.3.5.1. Ministry will suitably facilitate the increased exploration efforts to raise resources of limestone, manganese and chromite ore in the country. In the case of steel grade limestone, high grade low phosphorus manganese ore and high grade

chromite lumpy ore, the steel industry is likely to remain dependent on imports. Suitable measures will be taken to encourage imports of these materials since they are available in limited quantities. The industry may also be encouraged to acquire such assets globally to maintain a steady supply of these materials to the growing industry. Necessary efforts will be made for greater exploration of manganese and chromite ore.

4.3.6. Ferro-Alloys

4.3.6.1. Ferro-alloy is a power intensive industry. Hence, captive power generation in the ferro-alloys plants will be extensively supported. Since the demand for ferro-alloys is likely to grow along with steel production in the country, the industry may be encouraged to set up larger units to achieve adequate economies of scale. Efforts will be made to provide necessary raw materials linkages and stable supply of power to grow Ferro-alloys units on priority.

4.3.7. Refractory Raw Material

4.3.7.1. India is not endowed with high quality reserves of key refractory raw materials viz. bauxite (refractory grade) and magnesite and is largely dependent on imports. Suitable measures and procedural simplifications will be done to support the rising requirement of refractories in the steel sector.

4.3.7.2. Geologically, fire clay, an important raw material for making refractories, exists concurrently with coal deposits. However, there have been difficulties in full utilization of the domestic resources found alongside coal deposits. The potential of fire clay extraction will be examined in order to raise supplies of the same to the domestic industries.

4.3.8. Nickel

4.3.8.1. Nickel has been under constant demand from the ferro-alloys and alloy / stainless steel industry. Nickel is practically unavailable in the country and the entire quantity of unwrought and other forms of the nickel needs to be imported. Hence, the industry may be encouraged to acquire such assets globally to maintain a steady supply to the industry. Simultaneously, R&D will be pursued to extract Nickel from the lateritic ore overburden available in Sukinda Valley, Orissa.

4.3.9. Ferrous Scrap

4.3.9.1. In order to promote use of scrap based steelmaking technologies inter-alia to reduce GHG emission intensity in the country, actions will be initiated to increase availability of ferrous scrap. Options will also be evaluated in coordination with other concerned ministries to develop a scrap segregation (quality-wise), collection, processing and recycling policy.

- 4.3.9.2. In order to ensure availability of sufficient quantities of good quality scrap, establishment of an organized and environment friendly steel scrap processing units within the country will be facilitated by promoting modern steel shredding plants.
- 4.3.9.3. In order to promote increased use of scrap based steel-making in the country, efforts will be made in coordination with Ministry of Power to ensure availability of electricity to the sector.

4.4. Land, Water & Power

- 4.4.1. The growth plans of the Indian steel industry have also been hindered by difficulties in land acquisition. Many projects have stuck due to delays in acquisition of adequate land at the preferred locations due to policy and procedural issues. In order to reach crude steel capacity of about 300 MT, additional land requirement is estimated to be ~91,000 acres considering green field expansion. To help in early implementation of projects, Ministry will coordinate with respective State Governments to ensure timely availability of litigation-free lands to the industries.
- 4.4.2. The formation of steel clusters (especially for MSME steel units), service centers and steel processing centers will be facilitated. Creation of related common infrastructure on partnership basis will be promoted to optimize land use. Small and medium steel enterprises, including FDI projects, will be encouraged to be set up in industrial corridors and in clusters under PPP (Public Private Partnership) to ease land acquisition.
- 4.4.3. It has been observed that the water allocation for steel industry is generally accorded low priority. But it is forecast that by 2030-31, the steel industry will annually require approximately 1500 million cu. meter of water. Keeping this in view, the Ministry will coordinate with respective State governments to allocate water to steel projects on priority basis. Water conservation at all levels will be encouraged and the industry's efforts will be supported.
- 4.4.4. Considering the importance of water as a scarce resource, there has been a major thrust by the Government on reduction of discharge from the steel plants which will require innovative solutions and techniques to effectively recycle treated waste water. Hence, the steel industry will be encouraged to pursue plans and strategies to reduce specific water consumption per tonne of steel produced.
- 4.4.5. Since steel is an energy intensive industry, Ministry will focus on availability of power to steel making facilities. The power required by the industry is estimated to increase to 27,717 MW by 2030-31. Post de-allocation of coal blocks, various units in steel sector, especially the sponge iron plants, have been procuring power at

high cost. Ministry of Steel will deliberate with Ministry of Power to make power available to such units through open access.

- 4.4.6. Ministry of Steel will facilitate the use of waste heat recovery in Steel plants in consultation with other ministries. Efforts will also be made to facilitate usage of captive power for MSME sector and remove the cascading effect of anomalies in the tax structure.
- 4.4.7. In view of impending growth scenario in steel sector, Ministry of Steel will facilitate mechanism of Special Purpose Vehicles (SPVs) for Greenfield capacity additions. Steel SPV would acquire the land, get the necessary statutory approvals, water linkage and iron ore linkage and develop the minimum necessary infrastructure for setting up of steel plants. The Steel SPV would thereafter be put to open bidding in a transparent manner for setting up of the steel plant by interested parties. Similarly, the mining SPV will provide long term iron ore linkage to the Steel SPV.

4.5. Infrastructure & Logistics

- 4.5.1. Since bulk of the capacity additions are likely to come up in the three eastern states of Odisha, Chhattisgarh and Jharkhand, Ministry of Steel will pursue for the adequate and timely infrastructure growth in these regions to address the increased industry requirement in areas such as **railways, roadways, power generation and distribution etc.**
- 4.5.2. With the increase in steel demand and production, the requirement of adequate infrastructure will further increase. Government will need to invest heavily in development of **evacuation infrastructure** to minimize turn-around-time as well as to build the necessary linkages to reduce the length of haulage. Ministry of Steel will also encourage steel players to **promote better plant layout design, engineering, technologies and optimum use of economic capacity.**
- 4.5.3. With plans to have large number of blast furnaces in future, the use of pellets shall also increase, requiring grinding of ores/fines to ultra-fine size, hence **increased investment in slurry pipelines.** This will be encouraged through suitable policy support from the government.
- 4.5.4. Alternative modes for transportation of raw materials such as **slurry pipelines and conveyors** will go a long way in reducing the problems of pollution and congested transportation network in the mining areas. To encourage environment friendly transportation of raw material, efforts will be made to accord all the benefits available to the infrastructure industries, to slurry pipelines also.

- 4.5.5. To exploit export opportunities and be competitive on account of low cost of ocean freight, the Government of India is contemplating **port-led development of steel clusters under the aegis of Sagarmala program**. Establishment of coast based steel plants will suitably be undertaken in conjunction with Ministry of Shipping.
- 4.5.6. Given the expected growth in demand in steel production and the corresponding requirement for raw materials, the port infrastructure in the country, especially at coking coal importing ports needs to be significantly strengthened. Such ports will be identified in conjunction with the steel industry and would be taken up with Ministry of Shipping to ensure uninterrupted supply of coking coal to steel industry.

4.6. Product Quality

- 4.6.1. Bureau of Indian Standards (BIS), has formulated a large number of Indian Standards for most of the iron and steel products produced in the country. Actual implementation of these standards by the industry is however limited, resulting in large scale production, imports and use of sub-standard material, putting infrastructure and public safety at risk.
- 4.6.2. **Quality Control Order:** Adoption of the standards by producers and users will be facilitated and mandatory quality certification will be ensured. Recently the Steel and Steel Products (Quality Control) Order and Stainless Steel (Quality Control) Order that mandates Bureau of Indian Standards certification for certain products was introduced. The implementation of this order will be closely monitored in conjunction with Bureau of Indian Standards. Thirty Three (33) steel products have already been notified under the mandatory quality certification mark scheme of BIS. Efforts will be made to bring in additional steel products, which are used in critical end-use applications, under the mandatory scheme to ensure protection of human health, environment, and safety.
- 4.6.3. MSME sector units, particularly the small re-rolling mills and Induction Furnace Units lack in-house testing facilities. Testing facilities would be set up in steel hubs and already established facilities would be further strengthened to cater to possible rise in demand.
- 4.6.4. Apart from the adherence to conditions under Steel and Steel Products (Quality Control) Order, Ministry of Steel is also facilitating the production of quality steel, particularly in MSME sector by carrying out R&D and technological interventions and providing financial assistance. More steps in this direction will be encouraged.

4.7. Technological Efficiency

- 4.7.1. Though the choice of technology will be determined by entrepreneurs based on techno-economic considerations, Ministry of Steel would encourage adoption of technologies, which:
- 4.7.1.1. Are conducive to effective & efficient utilization of domestic resources with minimum damage to environment and production of high-end and special steel required for sophisticated industrial and scientific applications.
 - 4.7.1.2. Minimize environmental damage at various stages of steel making.
 - 4.7.1.3. Optimize resource utilization and facilitate modernization of the steel industry so as to achieve global standards of productivity and efficiency.
 - 4.7.1.4. Led to the development of front end and strategic steel based materials.
- 4.7.2. Improving the techno-economic performance of steel units is crucial to improving competitiveness of the industry. Details of the estimated techno-economic performance parameters by 2030-31 for the steel industry have been provided in **Annexure V**. Ministry of Steel, in association with suitable agency, will constantly monitor techno-economic performance of all the steel plants within the country vis-à-vis the global best practices. Furthermore, increased use of prepared burden in charge mix and greater use of PCI in blast furnaces will also be promoted.
- 4.7.3. Steel companies will be encouraged to have strategic joint ventures for production and development of technologically more advanced products. Transfer of technology for production of automotive steel and other special steels will be facilitated by helping set up JV's with global leaders in such products.
- 4.7.4. Ministry will encourage the research institutes within the country to develop less resource intensive and less energy intensive steelmaking technologies as well as new products.

4.8. MSME Steel Sector

- 4.8.1. India over the years has developed a strong MSME sector (comprising of DRI-EAF/IF route based steel producers and rolling mills) which is unique to India. It embodies the entrepreneurial and innovative strengths of Indian steel industry which turned the unavailability of coking coal – a key input for BF-BOF route into an opportunity.
- 4.8.2. However, there exists large variations amongst various units in terms of scale of operations, product-mix and technology. The MSME sector, including sponge iron industry, plays an important role in providing employment, meeting demand of some special products required in small volumes and local demand of steel in

hinterlands. Apart from this, the sector is also highly export oriented which helps in earning foreign exchange for the country.

4.8.3. Various measures as mentioned below will be taken to improve the performance of MSME steel sector and sponge iron industry-

4.8.3.1. Availability of raw materials will be facilitated by providing long term linkages of non-coking coal to sponge iron industry and increasing the iron ore availability in the domestic market.

4.8.3.2. Adoption of energy efficient technologies in the MSME steel sector will be encouraged to improve the overall productivity & reduce energy intensity.

4.8.3.3. Small and medium iron and steel making units will be encouraged to be set up in the proposed industrial corridors and clusters for optimal utilization of land and reach economies of scale.

4.9. Value addition in Stainless/Alloy Steel

4.9.1. Though India is 3rd largest producer of steel globally, it is still a net importer of stainless steel and alloy steel used in high-end applications. With increased demand of steel and need to build 200 MTPA additional capacity by 2030-31, considerable capacity addition of stainless/ alloy steel (specialty steel) will also be required. Like most segments of the Indian steel sector, stainless steel industry has also been facing difficulty over the last 3-4 years. Today, the domestic stainless steel industry has a low capacity utilization of around 50% due to the surge in low priced imports and fall in prices. Hence, necessary efforts will be made to protect the existing & upcoming stainless steel facilities from unfair trade practices through suitable trade remedial measures.

4.9.2. Besides, price consideration, import of stainless steel takes place on quality considerations. Country is dependent on import of most of the super duplex, super austenitic and high alloyed varieties of stainless steel for stringent end use applications. Ministry will encourage steel producers to have strategic ventures in production and development of technologically more complex products including high end varieties of stainless steel, alloy steel and electrical steel.

4.9.3. To counter threats from competing materials, promotion of stainless steel through mass campaigns, particularly in rural areas will be encouraged. Greater use of stainless steel in residential or commercial constructions in coastal and earthquake prone areas of the country will also be promoted. Use of high quality stainless steel in drinking water pipelines, packaging of food grains etc. will be promoted to prevent intake of hazardous impurities.

4.10. Environment Management

- 4.10.1. While steel companies are themselves addressing the energy & environment issues in the plants through technological upgradation/ modernisation, and/or diffusion of energy efficient & environment friendly technologies in the plants, Ministry will facilitate improvement in the energy & environment scenario of steel plants through various forums/ mechanisms.
- 4.10.2. Ministry will facilitate the formation of a forum to chalk out best practices and promote policies and programs that encourage and expedite the transition to a clean energy economy. Apart from the adherence to these stringent energy efficiency parameters, steel companies will also be encouraged to adopt best available technologies & practices to provide clean & green environment.
- 4.10.3. Energy & Environment management is an on-going process and is directly related to the technologies adopted by the iron & steel plants. So far, Ministry has successfully implemented certain mechanisms such as NEDO model projects in CPSEs and UNDP-AUSAID-MOS steel project in steel re-rolling mills to facilitate improvement in energy efficiency. Efforts will further be made to scale up these mechanisms with enlarged coverage in steel re-rolling mills and induction furnace units.
- 4.10.4. Considering all waste materials as an economic asset, Ministry will encourage the steel companies to develop a Waste Management Plan for additional impetus on zero-waste or complete waste recycling. Concrete efforts will further be made by Ministry to promote use of iron & steel slag in alternate uses like road making, rail ballast, construction material, soil conditioner etc. Simultaneously, steel plants will be pursued to set up SMS slag weathering/ steam ageing plants to enable them to supply processed/ sized SMS slag for road making, rail ballast etc.
- 4.10.5. Ministry of Steel will also facilitate the formulation and adoption of standards at par with global best practices with regard to particulate matter emissions, SO_x & NO_x, water consumption and zero or near zero liquid discharge.
- 4.10.6. India has recently signed Paris Declaration (COP 21) under which intends to reduce the emission intensity of its GDP by 33-35% by 2030 from 2005 levels. Towards this end, Ministry of Steel has already submitted the Intended Nationally Determined Contributions (INDC) for reducing GHG emissions in iron & steel sector which inter-alia projects CO₂ emission of 2.2 – 2.4 tonnes per tonne of crude steel in BF-BOF route and 2.6 – 2.7 tonnes per tonne of crude steel in DRI-EAF route by the terminal year of 2030. Ministry will find ways and means in

consultations with industry to achieve aforesaid targets or even better targets at par with global best practices, wherever possible.

- 4.10.7. Capacity additions through coal based routes will have far reaching implications for India in terms of environmental degradation. Hence, necessary efforts will be made to have a judicious mix of production routes to reduce the carbon footprint of steel sector in line with the INDC targets.

4.11. Safety

- 4.11.1. Ministry of Steel will continuously monitor the safety performance of all its steel companies including those in private sector through periodic reviews. Necessary efforts will be made to encourage the development of clearly defined safety standards and goals to become a zero accident workplace.
- 4.11.2. Ministry of Steel will coordinate with steel companies to ensure that on the job trainings on maintaining a safe workplace are provided to employees of the steel companies. Small sized units which cannot afford to conduct such trainings on their own will be facilitated by Steel Research and Technology Mission of India (SRTMI) for organizing the same

4.12. Trade

- 4.12.1. India was a net exporter of steel in 2013-14. However, due to global downturn in steel demand and excess capacities in major steelmaking countries such as China and Japan, India witnessed a significant surge in imports in 2014-15, which continued in 2015-16 as well. Production, consumption, imports and exports of finished steel since 2013-14 are provided in **Annexure VI**.
- 4.12.2. Given the current overcapacity and volatility in the global steel industry, appropriate measures in form of MIP mechanisms, Anti-Dumping Duty, Safeguard Duty and Quality Control Order has been taken. Given the cyclical nature of steel industry, there would be situations of trade and financial stress in the sector. Hence, Government will take suitable trade remedial measures in line with WTO guidelines and/or India's Foreign Trade Policy, if need so arise in future.
- 4.12.3. Steel sector will be encouraged to be globally competitive and develop export market for Indian steel products. Such markets where demand for steel is expected to grow will be targeted.

- 4.12.4. In addition, certain trade restrictions have been imposed on Indian steel products by other countries. Hence, domestic steel industry will be encouraged to convey their grievances during trade remedial proceedings with those countries.
- 4.12.5. Considering the importance of information in today's world, the existing institutions such as Joint Plant Committee (JPC) and the Economic Research Unit (ERU) will be further strengthened to meet the requirement of industry and market information related to steel and its raw materials. Continuous strategic research in the steel and related areas, constant tracking of developments in global trade, global investment in the steel industry, emerging technologies in steel & its related areas and data on new mining assets in iron ore, coal, etc. in foreign countries will also be supported. Continuous research on international and domestic steel demand will also be encouraged and risks of investments in foreign countries in steel and related industries will be continuously assessed.

4.13. Financial Risks

- 4.13.1. Given the enormity of requirement of financial resources to add the required steel capacity and the current conditions of steel industry, mobilizing adequate capital for the industry will be a challenging task in future. Hence, the steel industry will be encouraged to reduce capital costs and remain innovative in developing appropriate structure of the capital to minimize debt and service equity.
- 4.13.2. Ministry of Steel will also make necessary efforts to identify bad debts in the steel sector. Such companies will be encouraged to lower their Debt/EBITDA ratio by adopting appropriate debt restructuring in consultation with banks as per the RBI guidelines.

4.14. Role of CPSEs and Way Forward

- 4.14.1. The Companies Act, 2013 was enacted on 29th August 2013 replacing the Companies Act, 1956. In addition, the Ministry of Corporate Affairs has also notified Companies Rules 2014 on Management and Administration (March 2015), Appointment and Qualification of Directors (January 2015), Meeting of Board and its powers (March 2015) and Accounts (October 2014). The Companies Act 2013 together with the Companies Rules provide a robust framework for corporate governance. These statutory provisions are also applicable to CPSEs.
- 4.14.2. In the current scenario, steelmaking CPSEs need to not only compete with private integrated steel players and cater to the requirements of the MSME steel sector but are also required to be globally competitive. In order to provide

economies of scale, CPSEs will be encouraged to increase focus on their core competencies and divest their non-core assets through mergers and restructuring.

- 4.14.3. As of now, CPSEs have primarily focused and invested more in brown-field expansion of similar steel capacity with limited value addition in terms of high end product development. Ministry will encourage the CPSEs to develop a policy for future investment, so that impetus could be given for development of value added steel capacity and adoption of latest technologies at par with global best practices.
- 4.14.4. Besides, the CPSEs will also be encouraged to take leadership role in development of steel industry & the community, adopt a more inclusive business model, increase their CSR spends, invest in R&D for indigenous design & engineering and product development for replacement of import. Further, CPSEs will also be encouraged to take lead in promoting steel usage through developing steel intensive structural designs for roads, railways, bridges, crash barriers etc. with proper technical consultations and setting up of service centers for more customized and de-centralized product delivery.
- 4.14.5. Further to encourage synergy across similar CPSEs, efforts will be made to ensure appointment of independent directors across similar / independent CPSEs.

4.15. Focus on High - End Research: Steel Research & Technology Mission of India (SRTMI)

- 4.15.1. In India, substantial R&D in Iron and Steel sector is currently being carried out by the leading steel companies like SAIL, Tata Steel, JSW Steel, etc. who have accomplished some significant work in the areas of raw material beneficiation, agglomeration and product development. However, in general, major focus of R&D is limited to day to day operations and hence, lacks disruptive innovation.
- 4.15.2. India's R&D investment in steel sector is limited not only in absolute terms but also as percentage of turnover which is 0.05 – 0.5% as against 1% in leading steel companies abroad. The Indian steel companies need to evolve a time bound action plan to enhance their R&D expenditure to at least 1% of the turnover.
- 4.15.3. Efforts will be made through joint collaborative R&D programmes to create manufacturing capabilities for development of process and products in synergy

with natural resources of the country with an aim to minimize damage to the environment.

- 4.15.4. Ministry of Steel has taken full cognizance of the technological scenario in Indian Steel Industry and has initiated a fresh move for preparation of a comprehensive blue print for promotion of R&D in Iron & steel Sector. To bring in all the stakeholders into one platform and promote steel research on themes of critical and vital national importance, an institutional platform called “**Steel Research and Technology Mission of India**” has been established with an objective to spearhead R&D of national importance in iron & steel, creating state-of-art facilities to conduct cutting-edge research, develop expertise & skill development, manage human resources and bolster a tripartite synergy amongst industry, national R&D laboratories and academic institutes.
- 4.15.5. In order to boost innovation in the steel sector (future technologies), a time bound action plan will be evolved under the aegis of SRTMI to enhance the R&D expenditure of Indian steel CPSEs. The Ministry through SRTMI will also encourage corporates in steel sector, private and public sector alike, to direct certain sums from their profits towards continuous industry collaborative research. Apart, they would also be encouraged to set up their own steel technology centres and steel sector oriented research and education wings at universities in order to focus on technology based solutions for development of high quality, low cost steel products and to build greater interface between academia, R&D institutions and industry.
- 4.15.6. Product development is yet another challenge faced by the Indian steel industry which has given rise to import of most of the value added products like automotive steel for high end applications, electrical steel like CRGO & amorphous steel as well as special steel and alloys for the Power Equipment, Aerospace, Defense and Nuclear applications. Production of these value added, front end, and strategic products will be facilitated through acquisition of foreign technology by setting up of joint ventures, or subsidiaries of foreign companies or by indigenous development. Measures will also be taken to ensure development of all such special steel and alloys to minimize import dependence.
- 4.15.7. Indian steel industry is currently importing technology & critical equipment and systems for steel plants. Hence, necessary efforts will be made under the aegis of SRTMI to raise the level of R&D and acquire best in class manufacturing capabilities to develop all these equipment and systems.
- 4.15.8. CPSEs will be encouraged to reduce manpower and overhead expenses based on domestic and peer group benchmarking. Besides, the CPSEs will also be encouraged to right size their manpower over time through Superannuation/ Separation/ intakes in conformance with technological advances and suitably

exercise the option of Voluntary Retirement Scheme (VRS) to improve labour productivity.

- 4.15.9. The Ministry through SRTMI will also work in association with Ministry of Skill Development and Entrepreneurship to re-structure the pedagogy within its associated technical institutes. As a part of skill development initiative, the Ministry will coordinate with the technical institutes under its aegis and INSDAG to re-align the education system to attract, facilitate and generate steel domain experts.

5. Power to amend the Policy

- 5.1. Notwithstanding anything contained in the foregoing paras, the Ministry of Steel, with the approval of Competent Authority, may amend various aspects of this Policy from time to time depending upon the experience gained during implementation, market dynamics, end user interest etc.

Annexure I: Forecast of iron and steel demand and production by 2030-31

(All values in MT unless stated)

Sr. No.	Parameters	Projections Scenario - I	Projections Scenario - II	Projections (Average)
1	Total crude steel capacity	300	300	300
2	Total crude steel demand/production	274	235	255
3	Total finished steel demand/production	247	212	230
4	Domestic finished steel demand	222	190	206
5	Exports of finished steel	25	22	24
6	Sponge iron demand/production	Under Discussion	Under Discussion	Under Discussion
7	Pig iron demand	25	21	23
8	Per Capita Finished Steel Consumption	169	145	158

Source: Ministry of Steel, MECON

Assumptions:

- i. GDP growth rate assumed at 7.5% y-o-y
- ii. Scenario 1: Elasticity of steel demand with GDP= 1.14 till FY20 and 1 from FY20 onwards
- iii. Scenario 2: Elasticity of steel demand with GDP= 1.14 till FY20 and 0.8 from FY20 onwards
- iv. Steelmaking capacity to reach 300 MT by 2030-31
- v. Domestic finished steel demand assumed to be 90% of total finished steel production
- vi. Exports of finished steel assumed to be 10% of total finished steel production
- vii. Sponge iron demand/production assumed to be ____% of crude steel production (**Under Discussion**)
- viii. Pig iron demand assumed to be 9% of crude steel production

Annexure II: Sector wise steel consumption in India in MT (unless stated)

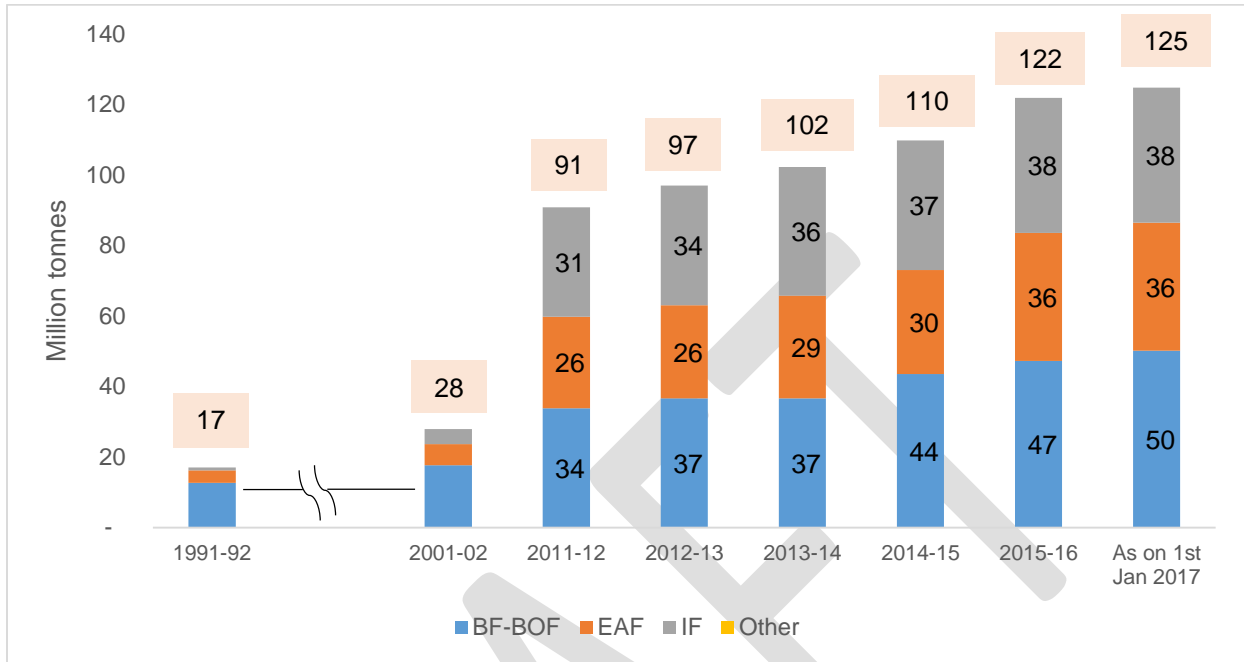
Sr. No.	Item	Current demand 2015-16	Projected demand in 2030-31
1	Infrastructure (Steel Projects, Oil refinery, Highways & Bridges, Airports, Seaports, Urban Infrastructure, Water transportation & sanitation, Industrial sheds, Pre-fabricated buildings)	9.5	90
2	Construction (Real Estate – residential, institutional, commercial & Industrial)	23.5	45
3	Engineering & Fabrication (Capital goods, Consumer durables, Yellow goods, Electrical goods, Industrial boilers & Pressure vessels, General engineering, Tube making, Cold reducing, Wire drawing, Nails, Fasteners, Bright bars, Agriculture implements, General fabrication including SMEs)	35	43
4	Automotive (Cars, two-three wheelers, commercial vehicles, auto components, tractors, bus trailer, tractor-trolley etc.)	2.5	10
5	Railways (Rail tracks, rolling stocks, wagons, coaches, etc.)	2	5
6	Packaging (Petroleum, non-petroleum, LPG cylinders, grain bins, GI boxes)	2	6
7	Energy (including Power projects, wind mills, power transmission)	3	11

Sr. No.	Item	Current demand 2015-16	Projected demand in 2030-31
8	Ship Building (AH 32/36, DH32/36, EH 32/36)	4	3
9	Oil & Gas Pipelines (X60, X65, X70 & X80 – For main line, X70 is mostly in use whereas X80 used in very limited quantities. For smaller pipes, X60 & X65 grade materials are in use)		4
10	Defence (including space, nuclear) (Steel grades – Maraging Steel, Ultra high strength steels such as AISI/SAE 4130, High strength 4140, deeper hardening and high strength 4340, 6150 & 8640; High alloy Hardenable steel viz. HP9-4-20, HP9-4-25, HP9-4-30, HP9-4-45, HP9-4-20 & HP9-4-30)		2
11	Others (Misc. other machinery)		11
Total Finished Steel Consumption in MT		81.5	230
Per Capita Finished Steel Consumption in Kgs		61	158

Source: Ministry of Steel, MECON

Note: Steel Demand in 2030-31 is considered to be the mean value of two scenarios mentioned in Annexure - I

Annexure III: Crude steel capacity process route-wise (Under Discussion)



Source: Ministry of Steel, JPC

**Annexure IV: Forecast of major raw material requirement by 2030-31
(All Values in MT unless stated)**

Sl. No.	Raw materials	Projections
1	Iron ore requirement	447
2	Coking coal requirement	180
3	Non-coking coal requirement for PCI	35
4	Non-coking coal requirement for DRI	82
5	Natural Gas (in MMSCMD ²)	(Under Discussion)
6	Manganese ore requirement	11
7	Chromite ore requirement	5
8	Limestone & dolomite requirement	91
9	Ferro-alloys	4
10	Refractories	3.2
11	Scrap	11

Source: Ministry of Steel, MECON

Assumptions:

- i. BF-BOF route: 68% (2030-31)
- ii. DR-EAF route: 20 % (2030-31)
- iii. DR-IF route: 10% (2030-31)
- iv. Finex-BOF route: 2% (2030-31)
- v. % Scrap in Charge mix of BOF : 15
- vi. DR-EAF charge mix considered : 63 % DRI, 35 % hot metal & 2 % Scrap
- vii. DR-IF charge mix considered : 80 % DRI & 20 % Scrap
- viii. Charge mix in BF considered : 60 % Sinter, 25 % Pellet & 15 % Lump ore
- ix. Charge mix in gas based DR plant considered : 30% Lump ore & 70% Pellet
- x. Charge mix in Coal based DR plant [50% kilns running on pellet & 50% on lump ore]
- xi. DRI made through coal based route : 70 % [Balance through gas based route]
- xii. Skip Coke required in BF : 450 kg/thm
- xiii. Avg. PCI Injection in BF considered : 150 kg/thm
- xiv. Iron ore required /t of Hot metal in BF : 1.65 t
- xv. Iron ore required /t of solid charge in DR plant : 1.55 t
- xvi. Natural Gas required /t of DR production: 1 MMSCMD

² Million Metric Standard Cubic Meter Per Day

Annexure V: Targets for techno-economic performance

Parameter	Units	International Best Practices	Current Value	Target for 2030-31
Coke Rate	Kg/thm	275 - 350	400 - 600	300 – 350
CDI Rate	Kg/thm	200 – 225	50 – 200	180 - 200
BF Productivity	tonnes/m ³ /day	2.5 – 3.5	1.3 – 2.2	2.5 – 3.0
Specific Energy Consumption	Gcal/tcs	4.5 – 5.0	6.2 – 6.7	5.0 – 5.8

Source: Ministry of Steel, MECON

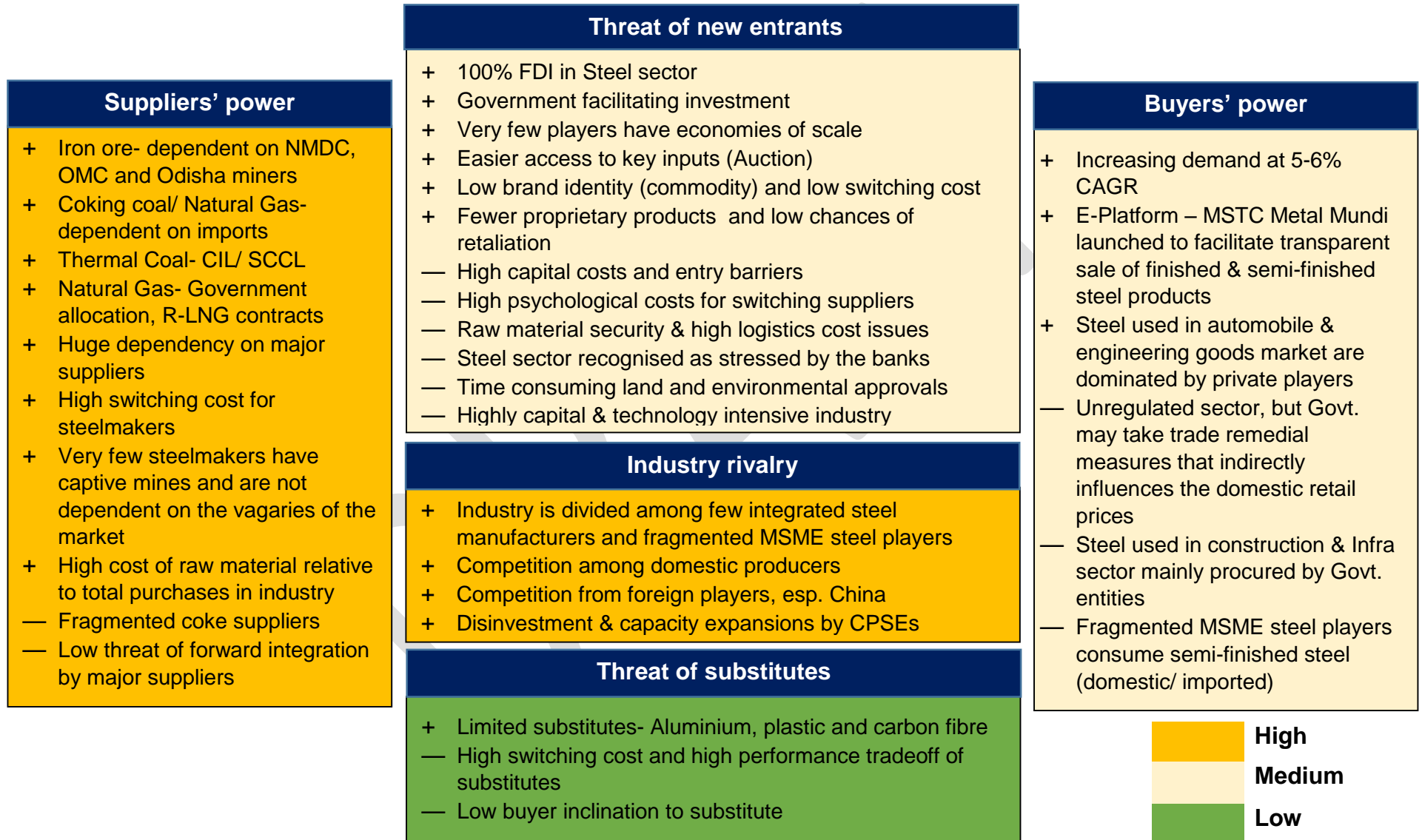
Annexure VI: Production, consumption, imports and exports of finished steel

(in MT)

Period	Production for sale	Import	Export	Consumption
Apr – Nov 2016	65.4	4.7	4.2	54.2
2015-16	91	11.7	4.1	81.5
2014-15	91.5	9.3	5.6	77
2013-14	87.7	5.5	6	74

Source: Ministry of Steel, JPC

Annexure VII: Indian Steel sector – Industry Analysis



Appendix I: List of Abbreviations

BF-BOF	Blast Furnace – Blast Oxygen Furnace
CAGR	Compounded Annual Growth Rate
CDI	Coal Dust Injection
CDR	Corporate Debt Restructuring
CIL	Coal India Limited
CIS	Commonwealth of Independent States
COP	Conference of the Parties
CPSE	Central Public Sector Enterprises
CRGO	Cold Rolled Grain Oriented
DPE	Department of Public Enterprises
DRI	Direct Reduced Iron
EAF	Electric Arc Furnace
EBT	Eccentric Bottom Tap
FDI	Foreign Direct Investment
FTA	Free Trade Agreement
GDP	Gross Domestic Product
GST	Goods and Services Tax
IF	Induction Furnace
INDC	Intended Nationally Determined Contribution
MMSCMD	Million Metric Standard Cubic Meter Per Day
MoPNG	Ministry of Petroleum & Natural Gas
MoS	Ministry of Steel
MT	Million Tonnes
MTPA	Million Tonnes Per Annum
NMDC	National Mineral Development Corporation
NPA	Non-Performing Assets
PPP	Public Private Partnership
R&D	Research and Development
REC	Renewable Energy Certificates
R-LNG	Regasified Liquefied Natural Gas
UHP	Ultra High Power
UNDP	United Nations Development Programme
VAT	Value Added Tax
WTO	World Trade Organization