CHAPTER – 1

EXECUTIVE SUMMARY

M/s. Baba Akhila Sai Jyothi Industries Pvt. Ltd. (BASJIPL), is an existing company incorporated on 25th May 2005. The company has established 30,000 MTPA capacity of manufacturing of **SPONGE IRON** or **DIRECT REDUCED IRON (DRI)** at Village Chikkabaganal, Post Kerikihalli and District Koppal. Environmental Clearance has been obtained from Department of Ecology & Environment, Govt. of Karnataka vide file ref. no. FEE 317 ECO 2005 dated 1st July 2008. Copy of Environmental clearance is enclosed as **Annexure No – 1.** Consent for Establish (CFE) vide letter no.: CFE/CELL/BASJIPL/NE-1058/2005-06/73 dated 30th July 2005 was obtained and started construction activities and copy of CFE is enclosed as **Annexure No – 2.**

Further, the proposal was made for the expansion from 100 TPD to 175 TPD capacity of Sponge Iron Plant. Environmental Clearance has been obtained from SEIAA, Karnataka Govt. of India vide file ref. no. SEIAA 19 IND 2009 dated 22nd March 2011. Copy of Environmental clearance is enclosed as **Annexure No – 3**. Consent for Establish (CFE) vide letter no.: 23/KSPCB/SEO/MINES/CFE/2011-12/231 dated 07th July 2011 was obtained and started construction activities and copy of CFE is enclosed as **Annexure No – 4.** Consent for operate (CFO) was obtained from Karnataka State Pollution Control Board (KSPCB) vide letter no.: 205/PCB/MIN/CFO/2011-12/1022 dated 17th March 2012 and started its operation.

Terms of Reference were issued from Ministry of Environment & Forests vide file ref. no. J-11011/163/2010-IA-II (I) dated 12th August 2010 for the following capacities. A copy of the Terms of Reference is enclosed as **Annexure No – 5.**

The proposed activity is categorized as 'Category – A' project as per Environmental Impact Assessment (EIA) Notification.

Due to the market condition and ban on iron ore mining in three Districts of Karnataka including Bellary vide MoEF OM dated 05.10.2011. Proponent could not take-up the proposal.

Later, Proponent wants to expand the project within the existing area by adding Induction Furnace and Power Plant. The capacities are given in below table. Accordingly, obtained Environmental Clearance from SEIAA, Karnataka, Govt. of India

vide letter no. SEIAA 32 IND 2012 dated 1st October 2013. Copy of Environmental clearance is enclosed as **Annexure No – 6**.

Table 1.1: Facilities for which EC issued in 2013

Sr. No.	Particulars	Existing Facility	Proposed Facilities
1	Sponge Iron Plant	175 TPD	No Change
2	Induction Furnace	--	1 X 20 T
3	Captive Power Plant	--	12 MW (WHRB – 8 MW & AFBC – 4 MW)

Consent for Establish (CFE) vide letter no.: CFE/PCB/EXP/LR/2014-15/216 dated 30th May 2014 was obtained and started construction activities and copy of CFE is enclosed as **Annexure No – 7 but not implemented due to Financial Problem.**

Consent to Operate (CFO) from Karnataka State Pollution Control Board for the existing sponge iron plant is being renewed time to time. A copy of CFO is enclosed as **Annexure No – 8.**

Further, proponent intended to expansion and modification in the existing integrated steel plant. The facilities are given in **Table 1.1.**

Table 1.1: Proposed Manufacturing Facilities

Sr. No.	Particulars	Existing Facilities	Proposed Facilities
1.	Sponge Iron	1X 100 TPD	1 X 125 TPD
2.	Sponge Iron	1 X 75 TPD	1 X 125 TPD
3.	Sponge Iron	--	1 X 125 TPD
3.	Induction Furnace	1 X 20 TPD	No Change
4.	Rolling Mill	--	72,000 TPA
5.	Captive Power Plant	12 MW (WHRB - 8MW & AFBC - 4MW)	12 MW (WHRB – 6 MW + AFBC – 6 MW)

BASJIPL have engaged the services of **METAMORPHOSIS Project Consultants Pvt. Ltd.,** Bengaluru for preparing the Environmental Impact Assessment Report for the proposed expansion project. A copy of the Accreditation Certificate of Consultant is enclosed as **Annexure No – 6.**

CHAPTER – 2

INTRODUCTION OF THE PROJECT / BACKGROUND INFORMATION

2.1 Identification of the Project and Project Proponent

2.1.1 Identification of the Project

India was the world's third-largest steel producer in 2017. The growth in the Indian steel sector has been driven by domestic availability of raw materials such as iron ore and cost-effective labour. Consequently, the steel sector has been a major contributor to India's manufacturing output.

The Indian steel industry is very modern with state-of-the-art steel mills. It has always strived for continuous modernization and up-gradation of older plants and higher energy efficiency levels.

Indian steel industries are classified into three categories such as major producers, main producers and secondary producers.

M/s. Baba Akhila Sai Jyothi Industries Pvt. Ltd. (BASJIPL), is an existing company incorporated on 25th May 2005. Based on the steel demand, Company proposes to expand the project with minor modification in the existing integrated steel plant at Village Chikkabaganal, Post Kerikihalli and District Koppal.

2.1.2. About Project Proponent

The promoters have rich industrial background having vivid business experience and excellent track record. The promoters have sound financial position with sufficient liquidity to promote new ventures. They have vast business network in various field of business since long and are having good business developments along with securing all availed limits enjoyed from various banks in an excellent manner. The strength of their records shows that, they are enjoying good market reputation in the business and industry related fields.

The promoters / Directors of the company are as under:

1. **Mr. Krishna Murthy Veluguri**
2. **Mrs. Lakshmi Kumari Veluguri**

A brief profile of the directors is given below;

Mr. V. Krishna Murthy, B. Tech (Mechanical), Managing Director, Starting his career an Engineer in Sponge Iron India Ltd., in the Engineering and projects Department and executed more than 30 Sponge Iron Projects right from the foundations to commissioning of plant. He established cold storage unit in Khammam (Dist) successfully running the same. He has to his credit, an eighteen years' experience in handling complex jobs with a Specialization in constructions and designs; he has executed a number of projects for Sponge Iron in the name and style of Sri Balaji Infra (India) Ltd. He also looked after the day to day administrative matters of the companies effectively

Mrs. V. Lakshmi Kumari Veluguri, is a B.Com graduate and she is well experienced in financial management. Presently she is looking after day to day financial activity of the company

2.1.2.1 Strength of Directors

- ✓ A Team of Entrepreneurs, having ventured into Greenfield Projects and successfully established and managed the Business Ventures.
- ✓ Have come out as Champions, even in most difficult situations, having mastered the art of managing Technology & Innovations, Human Resources and Finance, the most critical factors in any successful Venture.
- ✓ Having In-Depth Knowledge of the Steel Sector, well placed to ascertain Requirements, Benefits as well as Pitfalls of the Industry.
- ✓ In-House Financial Strength, either through their Own Financial Strength or Internal Borrowings from Relatives or Friends, enabling to take quick and unanimous decisions at critical junctions.

2.2 Brief Description of Nature of the Project

2.2.1 Proposed Expansion Project

The plant location has been chosen close to the industries. The site located in the Chikkabaganal & Kunikeri Village of Koppal Taluk & District. The average elevation 549 MSL and is geographically located at E: 76^0 11' 49.28" Longitude & N: 15^0 19' 27.77"

Latitude. The nearest railway station is Ginigera Railway station, which is at a distance of 8.0 Km. Road connectivity is through NH - 63 located at distance of 8.0 Km from the plant. Hence the transportation to various sites of finished products is easy and economical. The estimated cost of the project is Rs. **145.00 Crores.**

The manufacturing capacity of the Proposed Expansion Project is given in **Table – 2.1.**

Table 2.1: Proposed Manufacturing Facilities

Sr. No.	Particulars	Existing Facilities	Proposed Facilities
1.	Sponge Iron	1X 100 TPD	1 X 125 TPD
2.	Sponge Iron	1 X 75 TPD	1 X 125 TPD
3.	Sponge Iron	--	1 X 125 TPD
3.	Induction Furnace	1 X 20 TPD	No Change
4.	Rolling Mill	--	72,000 TPA
5.	Captive Power Plant	12 MW (WHRB - 8MW & AFBC - 4MW)	12 MW (WHRB – 6 MW + AFBC – 6 MW)

2.2.1 Nature of the Project

The project fall under category A, section 3 (a) of EIA Notification 14th September 2006 and amendment thereof vide Notification no. S.O 3067 (E) dated 1st December 2009.

2.3 Need for the Project and its Importance to the Country

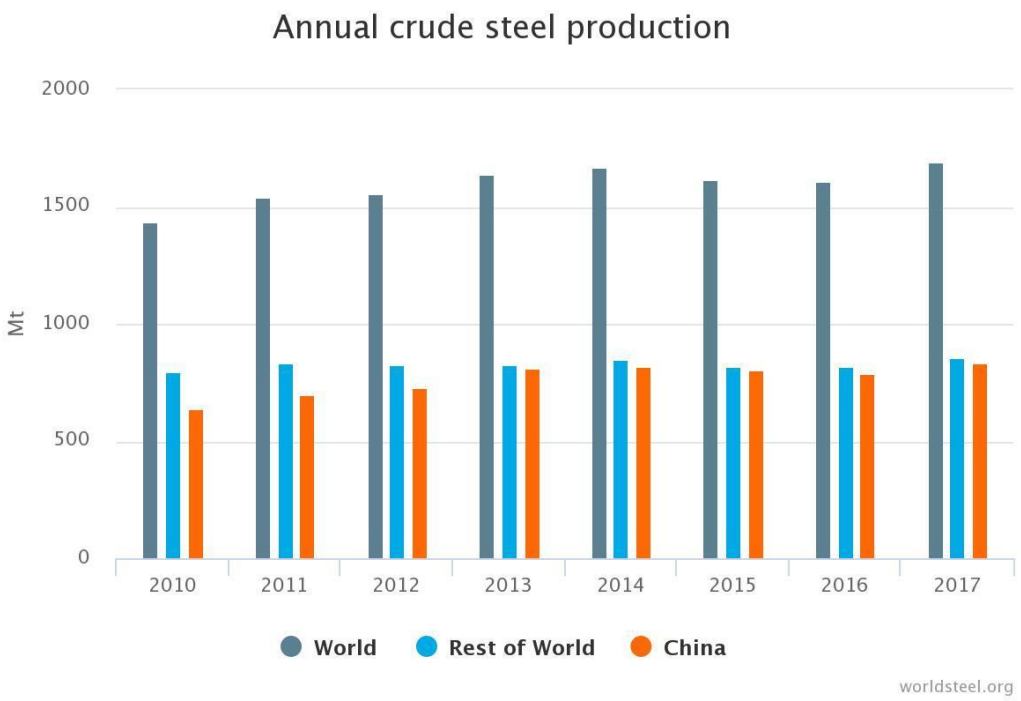
2.3.1 Global Steel Scenario

Steel is one of the world's most essential materials. It is fundamental to every aspect of our lives, from infrastructure and transport to the tinplated steel can that preserves food. It is one of the most important products of the modern world and is of strategic importance to any industrial nation. From construction, industrial machinery and transportation to consumer products, steel finds a wide variety of applications. It is also an industry with diverse technologies based on the nature and extent of use of raw materials. Steel's great advantage is that it is 100% recyclable and can be reused infinitely. The industry uses advanced technologies and techniques to increase production yield rates and to facilitate the use of by-products. As a result of the intrinsic recyclability of steel, the value of the raw materials invested in steel production lasts far beyond the end of a steel product's life.

Steel is critical simply because no other material has the same unique combination of strength, formability and versatility. Without being aware of it, society now depends on

steel. Humankind's future success in meeting challenges such as climate change, poverty, population growth, water distribution and energy limited by a lower carbon world depends on applications of steel. Steel plays a critical role in virtually every phase in our lives. The rails, roads and vehicles that make up our transport systems use steel. Steel provides a strong framework and connections in the buildings where we work, learn and live. It protects and delivers our water and food supply. It is a basic component in technologies that generate and transmit energy. The World Steel Association (WSA) recently announced that the total crude steel production in 2016 was 1628 million Tons which is 8 million Tons higher than the previous year (2015) production. Steel demand in emerging and developing economies (excl. China) is expected to increase by 4.9% and 4.5% in 2018 and 2019 respectively.

The Indian economy is stabilising from the impact of currency reform and GST implementation and steel demand is expected to accelerate gradually, mainly driven by public investment. Stronger growth is held back by still weak private investment. Global steel sector has seen significant growth after the turn of present century. The steel demand and the capacity have grown almost threefold over the last two decades. This rate of growth is unprecedented in the human history. Though it has started faltering with steel demand in China moderating, there are some bright spots in the World which raises possibility of revival of growth in the medium to long run. One of the key determinants of future growth will be the economic growth of India and related infrastructure spends. The demand for steel has grown over time with increasing industrialization, from 200 MT in 1976 to more than 1000 MT in 2015. However, it was only after the turn of the century that the global steel demand has increased rapidly.



- In 2016, the world crude steel production reached 1630 million tonnes (mt) and showed a growth of 0.6% over 2015.
- China remained world's largest crude steel producer in 2016 (808 mt) followed by Japan (105 mt), India (96 mt) and the USA (79 mt).
- World Steel Association has projected Indian steel demand to grow by 6.1% in 2017 and by 7.1% in 2018 while globally, steel demand has been projected to grow by 1.3% in 2017 and by 0.9% in 2018. Chinese steel use is projected to show nil growth in 2017 and decline by 2% in 2018.
- Per capita finished steel consumption in 2016 is placed at 208 kg for world and 493 kg for China by World Steel Association.

2.3.2 Steel Industry in India

1. India has seen nearly a century of Steel making as it stands on the threshold of a new era. The face of the Indian Iron and Steel Industry is changing at such a fast pace that it is difficult to focus it now in the historical perspective. Steel is a core industry and thus its demand is strongly linked to overall level of economic activity in the country. Given the inherent long-term potential of the Indian economy and its cyclical nature, the long-term prospects of the Steel industry are fairly comfortable. Liberalization and the opening up of the economy have given a new vitality to this sector. Demand and production have been growing at a healthy rate for the past two years and forecast for the next ten years is very bright. The Indian Iron and Steel industry today displays variety in size, ownership, technology and output. The industry was traditionally divided into main producers and so called secondary sector. This division is getting blurred by latest developments fuelled by liberalization and opening up of the economy, such as:

   - Larger IF based units going on stream producing sophisticated finished products as compared to small IF/IF units producing pencil ingots.
   - Mini BF based plants being planned in the private sector.
   - Growth in induction furnace units with sizeable production.
   - High growth in Iron making sector with large gas based DRI units, coal based Sponge units and mini blast furnaces producing merchant grade pig Iron.

2. The Electric Steel industry, which initially started as a result of general Steel shortage and dual pricing policy in the country in the past, has been growing significantly in the recent years. The older units are modernizing while new units are being set up with latest technology enabling reduction in cost of production.

3. The major factors contributing to the existence and growth of the industry are as follows:

- Lower investment cost and shorter gestation period as compared to BF-BOF route of Steel making.
- Ability for wider dispersal.
- Less strain on transport and other infrastructural facilities.
- Fewer units operation.
- Non-dependence on metallurgical coke and coking coal.
- Less manpower per ton of Steel produced.
- Short conversion time for raw material to finished product.
- Lesser environmental and pollution problem.
- Flexibility in production of different qualities of Steel & Alloy Steel.

4. Besides the above factors, the Induction Furnace / Electric Arc furnace method of manufacturing Iron and Steel allows flexibility in the charge mix, leading to reduced electricity consumption and decreased refractory consumption, which has resulted in the manufacture of international quality Steel. ***Since India has rich reserves of coal, the technology for manufacturing Sponge Iron is no more new. Sponge Iron production seems to have a bright future.***

5. India is blessed with most of the principal raw materials in abundance, required for Steel industry and enjoys a unique position in the world in this respect. Under the programme of economic reforms introduced by the Government the approach to foreign investment has radically changed. Production and demand have started picking up as the recessionary conditions and trends prevalent earlier have now ended. However, in the new competitive environment, Steel producers have their priorities with special focus on quality, productivity, cost efficiency and also profitability on the one hand and customer-oriented market strategies and product mix on the other. In the wake of globalization most of the developing countries like India are presently undergoing structural adaptation with eagerly trying to cope up with the tides and ebbs of the current economic influences of the developed countries. And also they have modelled their way of developing through industrialization and mobilization of the potential surplus available.

6. It is worth to note that,

- After liberalization, there have been no shortages of Iron and Steel materials in the country.

- Apparent consumption of finished carbon Steel increased from 65.87 Million Tons in 2010 to 79.80 Million Tons in 2015.
- The Steel industry in general is in the upswing due to strong growth in demand particularly by the demand for Steel in Infrastructure industry.

Domestic Scenario

- The Indian steel industry has entered into a new development stage, post de-regulation, riding high on the resurgent economy and rising demand for steel.
- Rapid rise in production has resulted in India becoming the 3rd largest producer of crude steel in 2015 as well as in 2016. The country was the largest producer of sponge iron or DRI in the world during the period 2003-2015 and emerged as the 2nd largest global producer of DRI in 2016 (after Iran). India is also the 3rd largest finished steel consumer in the world and maintained this status in 2016. Such rankings are based on provisional data released by the World Steel Association for the above year.
- In a de-regulated, liberalized economic/market scenario like India the Government's role is that of a facilitator which lays down the policy guidelines and establishes the institutional mechanism/structure for creating conducive environment for improving efficiency and performance of the steel sector.
- In this role, the Government has released the National Steel Policy 2017, which has laid down the broad roadmap for encouraging long term growth for the Indian steel industry, both on demand and supply sides, by 2030-31.
- The said Policy is an updated version of National Steel Policy 2005 which was released earlier and provided a long-term growth perspective for the domestic iron and steel industry by 2019-20.
- The Government has also announced a policy for providing preference to domestically manufactured Iron & Steel products in Government procurement. This policy seeks to accomplish PM's vision of 'Make in India' with objective of nation building and encourage domestic manufacturing and is applicable on all government tenders where price bid is yet to be opened. Further, the Policy provides a minimum value addition of 15% in notified steel products which are covered under preferential procurement. In order to provide flexibility, Ministry of Steel may review specified steel products and the minimum value addition criterion.

7. Production

- Steel industry was de-licensed and de-controlled in 1991 & 1992 respectively. India is currently the 3rd largest producer of crude steel in the world.

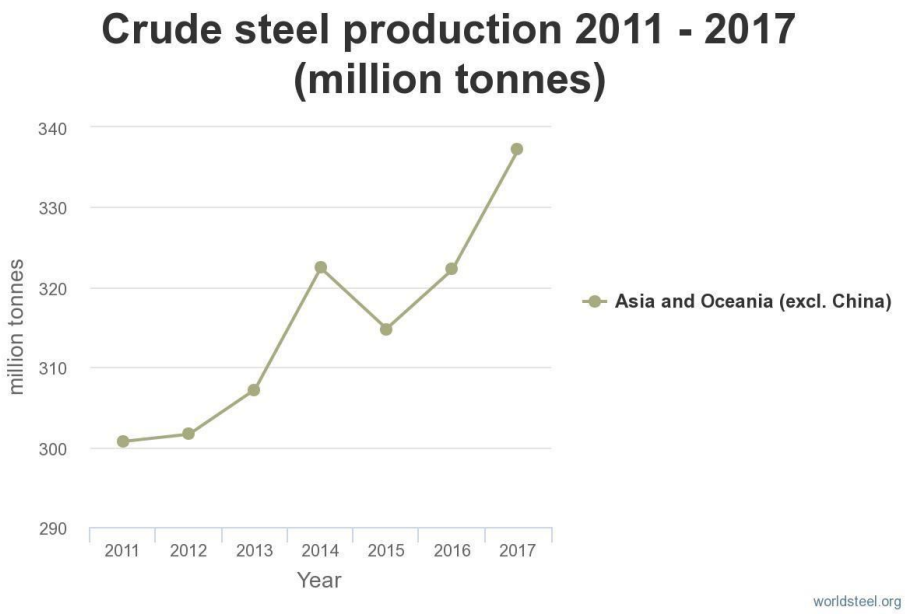
- In 2016-17 (prov.), production for sale of total finished steel (alloy + non alloy) was 100.74 mt, a growth of 10.7% over 2015-16.
- Production for sale of Pig Iron in 2016-17 (prov.) was 9.39 mt, a growth of 1.8% over 2015-16.
- India was the largest producer of sponge iron in the world during the period 2003-2015 and was the 2nd largest producer in 2016 (after Iran). The coal based route accounted for 79% of total sponge iron production in the country in 2016-17 (prov).
- Data on production /production for sale of pig iron, sponge iron and total finished steel (alloy/stainless + non-alloy) are given below for last five years and April-May 2017
- India's finished steel consumption grew at a CAGR of 5.69 per cent during FY08-FY18 to reach 90.68 MT.
- India's crude steel and finished steel production increased to 102.34 MT and 104.98 MT in 2017-18, respectively.
- In 2017-18, the country's finished steel exports increased 17 per cent year-on-year to 9.62 million tonnes (MT), as compared to 8.24 MT in 2016-17. Exports and imports of finished steel stood at 1.35 MT and 1.89 MT, during Apr-Jun 2018.

Indian steel industry :(in million tonnes)

Category	2012-13	2013-14	2014-15	2015-16	2016-17*	April-May 2017*
Pig Iron Production for sale	6.870	7.950	9.694	9.228	9.391	1.53
Sponge Iron Production	23.01	22.87	24.24	22.43	24.39	4.23
Total Finished Steel Production for sale (alloy/stainless + non alloy)	81.68	87.67	92.16	90.98	100.74	17.48

Source: Joint Plant Committee; *prov.

8. Pricing & Distribution



- Distribution controls on Iron & Steel removed except 5 priority sectors, viz. Defense, Railways, Small Scale Industries Corporations, Exporters of Engineering Goods and North Eastern Region.
- Allocation to priority sectors is made by Ministry of Steel.
- Government has no control over prices of Iron & Steel.
- Open market prices are generally on rise.
- Price increases of late have taken place mostly in long products than flat products.

9. Opportunities for growth of Iron and Steel in Private Sector

The New Industrial policy has opened up the Iron & Steel sector for private investment by (a) removing it from the list of industries reserved for public sector and (b) exempting it from compulsory licensing. Imports of foreign technology as well as foreign direct investment are freely permitted up to certain limits under an automatic route. Ministry of Steel plays the role of facilitator, providing broad directions and assistance to new and existing Steel plants, in the liberalized scenario.

The New Industrial Policy Regime

The New Industrial policy opened up the Indian iron and steel industry for private investment by (a) removing it from the list of industries reserved for public sector and

(b) exempting it from compulsory licensing. Imports of foreign technology as well as foreign direct investment are now freely permitted up to certain limits under an automatic route. Ministry of Steel plays the role of a facilitator, providing broad directions and assistance to new and existing steel plants, in the liberalized scenario.

The Growth Profile

(i) Steel: The liberalization of industrial policy and other initiatives taken by the Government have given a definite impetus for entry, participation and growth of the private sector in the steel industry. While the existing units are being modernized/expanded, a large number of new steel plants have also come up in different parts of the country based on modern, cost effective, state of-the-art technologies. In the last few years, the rapid and stable growth of the demand side has also prompted domestic entrepreneurs to set up fresh green-field projects in different states of the country.

Crude steel capacity was 126.33 mt in 2016-17 (prov.), up by 3.6% over 2015-16 and India, which emerged as the 3rd largest producer of crude steel in the world in 2016 as per provisional ranking released by the World Steel Association, has to its credit, the capability to produce a variety of grades and that too, of international quality standards. The country is expected to become the 2nd largest producer of crude steel in the world soon.

(ii) Pig Iron: India is also an important producer of pig iron**.** Post-liberalization, with setting up several units in the private sector, not only imports have drastically reduced but also India has turned out to be a net exporter of pig iron. The private sector accounted for 92% of total production for sale of pig iron in the country in 2016-17 (prov.). The production for sale of pig iron has increased from 1.6 mt in 1991-92 to 9.39 mt in 2016-17 (prov.).

(iii) Sponge Iron: India, world's 2nd largest producer of sponge iron (2016, prov.), has a host of coal based units located in the mineral-rich states of the country. Over the years, the coal based route has emerged as a key contributor and accounted for 79% of total sponge iron production in the country. Capacity in sponge iron making too has increased over the years and stood at around 43 mt (2015-16).

10. Investments

Steel industry and its associated mining and metallurgy sectors have seen a number of major investments and developments in the recent past. According to the data released by Department of Industrial Policy and Promotion (DIPP), the Indian metallurgical industries attracted Foreign Direct Investments (FDI) to the tune of US$ 10.84 billion in the period April 2000–June 2018.

Some of the major investments in the Indian steel industry are as follows:

- JSW Steel will be looking to further enhance the capacity of its Vijayanagar plant from 13 MTPA to 18 MTPA. In June 2018, the company had announced plans to expand the plant's production capacity to 13 MTPA by 2020 with an investment of Rs 7,500 crore (US$ 1.12 billion).
- Vedanta Star Ltd has outbid other companies to acquire Electrosteel Steels for US$ 825.45 million.
- Tata Steel won the bid to acquire Bhushan Steel by offering a consideration of US$ 5,461.60 million.
- JSW Steel has planned a US$ 4.14 billion capital expenditure programme to increase its overall steel output capacity from 18 million tonnes to 23 million tonnes by 2020.
- Tata Steel has decided to increase the capacity of its Kalinganagar integrated steel plant from 3 million tonnes to 8 million tonnes at an investment of US$ 3.64 billion.

2.4 Demand – Supply Gap

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

- Interface with consumers exists by way of meeting of the Steel Consumers' Council, which is conducted on regular basis.
- Interface helps in redressing availability problems, complaints related to quality.

2.5 Domestic / Export Markets

2.5.1 Import

- Iron & steel are freely importable as per the extant policy.

- Data on import of total finished steel (alloy/stainless + non alloy) is given below for last five years and April-May 2017:

Indian steel industry : Imports (in million tonnes)						
Category	2012-13	2013-14	2014-15	2015-16	2016-17*	April-May 2017*
Total Finished Steel (alloy/stainless + non alloy)	7.93	5.45	9.32	11.71	7.23	1.06
Source: Joint Plant Committee; *prov.						

2.5.2 Export

- Iron & steel are freely exportable.
- India emerged as a net exporter of total finished steel in 2016-17 (prov.)
- Data on export of total finished steel (alloy/stainless + non alloy) is given below for last five years and April-May 2017

Indian steel industry : Exports (in million tonnes)						
Category	2012-13	2013-14	2014-15	2015-16	2016-17*	April-May 2017*
Total Finished Steel (alloy/stainless + non alloy)	5.37	5.99	5.59	4.08	8.24	1.38
Source: Joint Plant Committee; *prov						

2.6 Karnataka Industrial Policy 2014-18

2.6.1 Introduction

Karnataka is one amongst the industrially developed States in the Country. The State has potential to stand out on the fore front and has been focusing on development of industries, trade and service sectors.

The State Government understands that the challenges posed due to global economic recession have to be addressed to promote economic growth of the State. A stimulus to boost economic activities needs to be given to sustain the current pace of over all development. Further, the state is endowed with rich natural resources across the State and such resources need to be optimally utilized for the benefit of local people.

Value addition to resources is one of the efficient ways of optimizing the locally available wealth. This will also help to ensure uniform spread of industries and economic activities throughout the state and will accelerate the pace of development especially in the district of North Karnataka. Through these measures, the Government would be able to readdress the serious issue of regional imbalances in development.

The state government realizes the limitation of agriculture sector to generate large scale employment to the local youths. About 56% of the state's workforce is estimated to contribute 19.13% of the GSDP. It is agreed that, the implementing sector has high potential to create maximum employment that too, to all sections and level of the aspirants. In order to provide suitable environment for investors, the state government has already enacted Karnataka Industries (Facilities) Act, 2002. Due to the progressive measure and pro-active mind set of the government, today, the Karnataka has been recognized as one of the preferred investment destination both for domestic and overseas investors.

The state government has introduced Industrial Policy 2006-11 with an aim to increase the growth of GDP, strengthen manufacturing industries, increase share of exports from Karnataka, to generate additional employment of at least 10 lakh persons in the manufacturing and service sectors, reduce regional imbalance and ultimately aim at overall socio-economic development of the state.

In the meantime, the Government of India enacted Micro, Small and Medium Enterprises Development Act, 2006 and requested all the States to provide required support and encouragement to make MSMEs more competitive. In order to make the state more attractive and investors friendly, there was a need to focus more on inclusive industrial development, comprehensive HRD programme's special attention towards development of sector specific zones, classification of Taluks according to Mr. D M Nanjundappa Committee Report, attractive package of incentives and concessions, encouragement for existing industries to take up expansion, modernization and diversification etc.

The state also understands the need to provide stimulus measures for industries to combat the prevailing financial crisis. Keeping these points in view, the state intends to formulate a new Industrial Policy with a determination to provide required platform for all the investors.

This policy is framed with the broad guiding principles of creation of employment development of backward regions and value addition to local resources.

2.6.2 Vision

To build prosperous Karnataka through development of human & natural resources in a systematic, scientific and sustainable manner.

2.6.3 Mission

- To create enabling environment for the robust industrial growth.
- To ensure inclusive industrial development in state.
- To provide additional employment for about 10 lakh person by 2014.
- To enhance the contribution of manufacturing sector to the state's
- GDP from the current level of 17% to 20% by the end of policy period.

2.6.4 Strategies

- Thrust on provision of world-class infrastructural facilities for industries with active participation of private sector/industry.
- Development of sector-wise industrial zones for optional utilization of local natural and human resources so as to minimize migration of people to urban centers.
- Simplification of land acquisition procedures with emphasis on inclusive development.
- Safeguarding the socio-economic interests of both farmers and investors while acquisition of land.
- Referential treatment for MSME sector enabling to meet the global Challenges.
- Attractive employment and performance linked package of incentives and concessions to attract investments to backward regions and also to provide leverage to MSME sector.
- Thrust on development of MSME sector through attractive package of incentives & concessions.
- Tailor made package of incentives to larger projects having wider positive implication on the state's economy to leverage a better edges over other competing states.
- Additional incentives for entrepreneurs belonging to under privileged sections of the society to bring them to the main stream in order to achieve much needed inclusive growth.
- Focus on skill development in order to enhance the employment ability of youth especially women and also to make ready-to-employ human resource to the industry.

- Inculcate entrepreneurial qualities amongst local youth in general and women in particular and motivate them to take up self employment by extending handholding support.
- Create level playing environment for all investors/private sector players by enhancing the facilitation mechanism enabling to do their business with ease and less transaction cost.
- Appropriate provision for the protection of environment and to encourage energy & water conservation measures in industry / project through go-green strategy.

2.7 Government Initiatives

Some of the other recent government initiatives in this sector are as follows:

- An export duty of 30 per cent has been levied on iron ore^ (lumps and fines) to ensure supply to domestic steel industry.
- Government of India's focus on infrastructure and restarting road projects is aiding the boost in demand for steel. Also, further likely acceleration in rural economy and infrastructure is expected to lead to growth in demand for steel.
- The Union Cabinet, Government of India has approved the National Steel Policy (NSP) 2017, as it seeks to create a globally competitive steel industry in India. NSP 2017 targets 300 million tonnes (MT) steel-making capacity and 160 kgs per capita steel consumption by 2030.
- The Ministry of Steel is facilitating setting up of an industry driven Steel Research and Technology Mission of India (SRTMI) in association with the public and private sector steel companies to spearhead research and development activities in the iron and steel industry at an initial corpus of Rs 200 crore (US$ 30 million).

2.8 Employment Generation (Direct and Indirect) due to the Project

During the construction & operation phases of the proposed expansion project, both direct & indirect deployment of local work force would be facilitated. The nature of employment opportunities would involve contractual & casual labor work for semi skilled & unskilled local skilled staff and direct employment for skilled locals.

It is estimated that there would be a requirement of around 100 indirect workers, during the phase of construction. Subsequently in the operation phase, approximately 245 employees would be directly employed.

CHAPTER – 3

PROJECT DESCRIPTION

3.1 Type of Project including interlinked and interdependent projects, if any.

The proposed project is a brown field expansion project involving the Expansion with Modification in the Existing Integrated Steel Plant within the existing land 41.50 Acres area available with BASJIPL.

3.2 Location of the Project

The plant location has been chosen close to the industries. The site located in the Chikkabaganal & Kunikeri Village of Koppal Taluk & District. The average elevation 549 MSL and is geographically located at E: 76^0 11' 49.28" Longitude & N: 15^0 19' 27.77" Latitude. The nearest railway station is Ginigera Railway station, which is at a distance of 8.0 Km. Road connectivity is through NH - 63 located at distance of 8.0 Km from the plant. Hence the transportation to various sites of finished products is easy and economical. Location of the Project is given in **Figure No – 1** and Google Map is given in **Figure No – 2**. Site photographs are given in **Photo No – 1**.

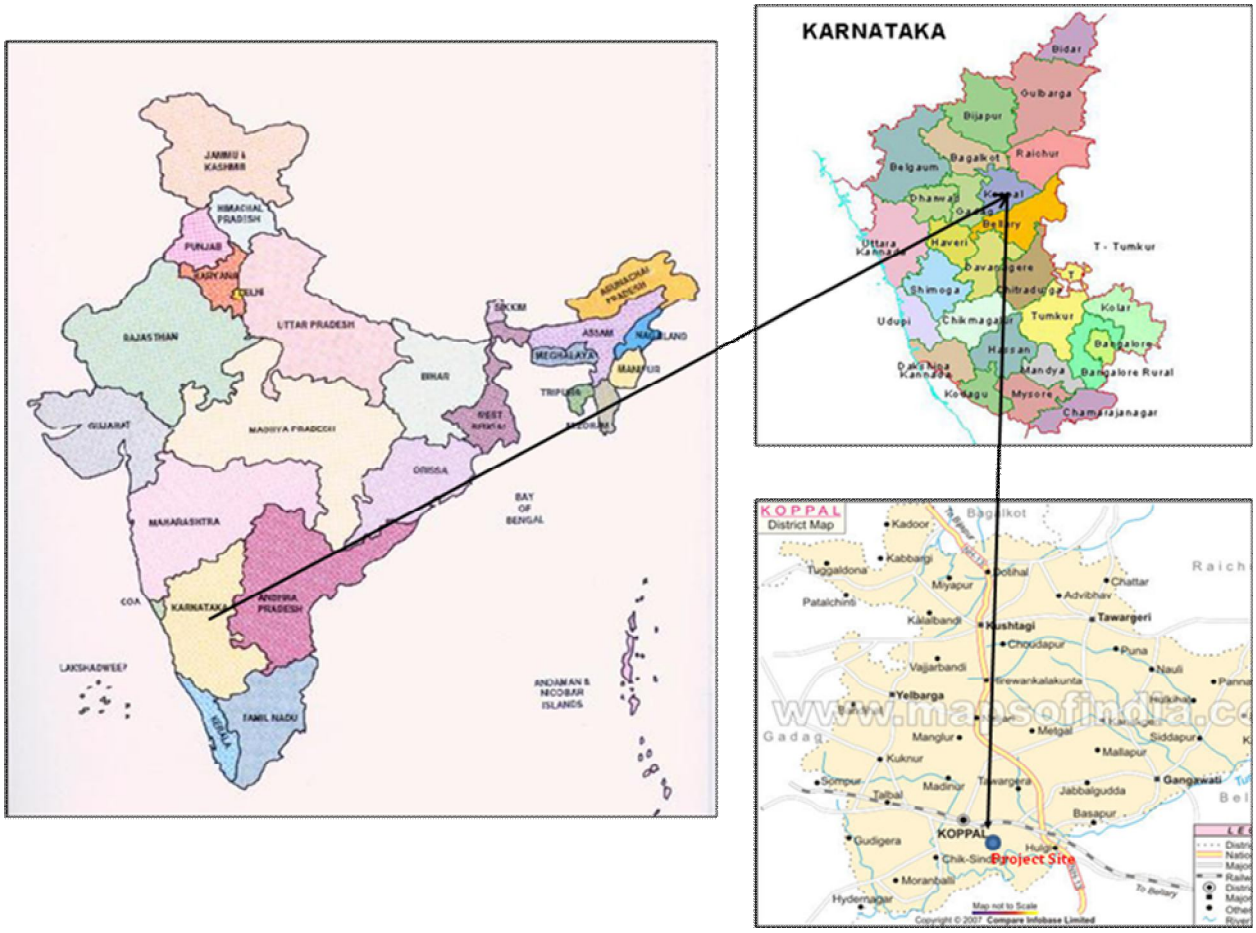


Figure No – 1: Location of the Project

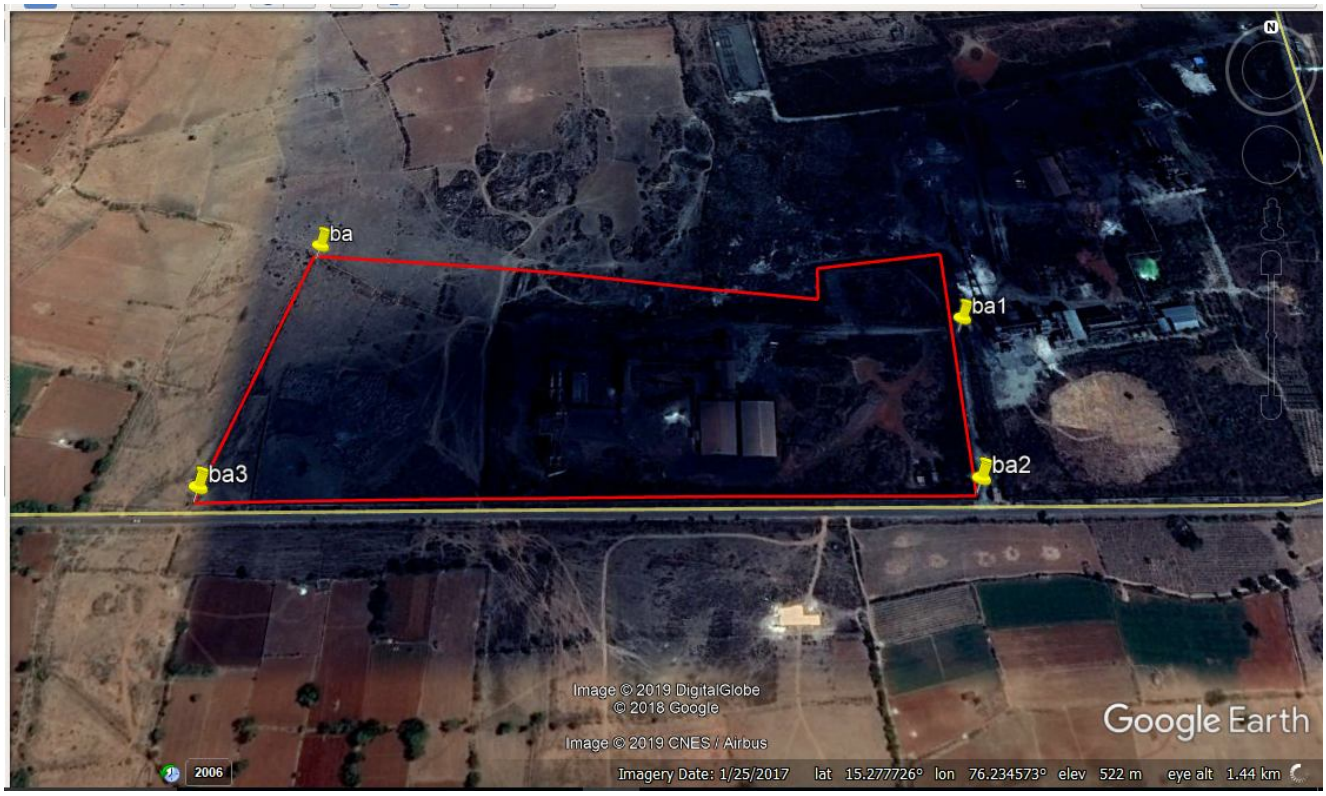


Figure No – 2: Project Site Showing – Google Map

Photo No 1: Existing Sponge Iron Plant

3.3 Details of Alternate Sites Considered and the Basis of Selecting the Proposed Site

The expansion and modification in the existing integrated steel plant. This is a brown field expansion, within the available land area of 41.50 acres and utilizing existing infrastructure. Hence, Alternative site was not examined.

3.4 Size or Magnitude of Operation

The proposed expansion project after its completion will facilitate in production along with value added long and flat steel products to meet the increasing demand of the customers and country`s infrastructure development. The proposed facilities will be set up within the area of about 41.50 acres.

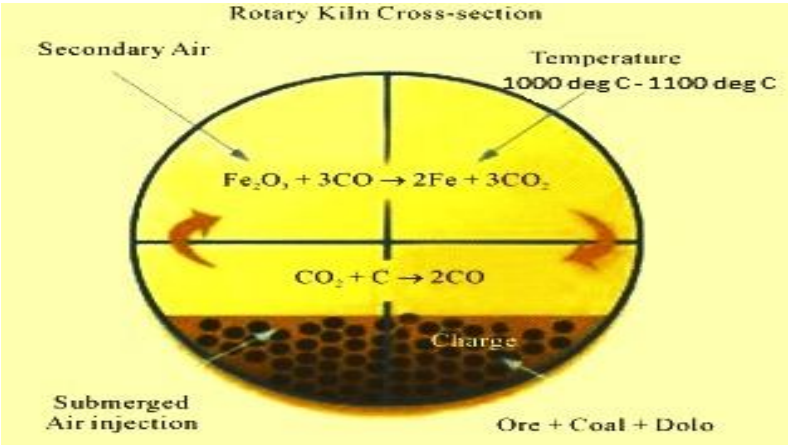
3.5 Project Description with Process Details (a schematic diagram/flow chart showing the project layout, component of the project)

Plant Layout with all the component if the project is enclosed as **Drawing No – 1.**

3.5.1 Sponge Iron Plant

COAL BASED DIRECT REDUCTION PROCESS.

The coal based direct reduction process is more commercially viable and is currently in use in India. The main component in the flow sheet of these Rotary Kiln Systems are similar consisting of the solid feed system, the rotary kiln, a product cooler, screens, magnetic separators and gas cleaners, Coal based plants have the advantages of utilizing smaller units, lumps iron as feed stock and abundant availability of non-cooking coal.



Cross Section of Rotary Kiln

Coal based direct reduction process is based on the solid reducing agent which is non-coking coal. The reaction takes place at high temp (1000°C to 1100°C). Coal plays a dual role in the kiln. Part of coal is used as fuel to supply the desired heat so as to take the raw materials to the desired temperature. But main role of coal is to supply carbon for the reduction process. Dolomite is used as sulphur scavenger which finally comes out with the char. Char contains ash of coal and other impurities of iron ore. The reactions inside the kiln take place in several stages during the reduction of iron ore to DRI. Iron ore undergoes the following final reduction reaction.

$$Fe_2O_3 + 3CO = 2Fe + 3CO_2$$

The reaction shows that the carbon monoxide (CO) is reducing gas which is obtained by controlled combustion of coal, according the Boudouard reaction as given below.

$$C + O2 = CO_2$$
$$C + CO_2 = 2CO$$

The carbon monoxide produced as above reduces iron oxide of iron ore to metallic iron as per the reaction given above. However, the reduction from oxide to metal does not take place in one step, but by gradual removal of oxygen giving, rise to various intermediate oxides. The reduction sequence can be expressed as

$Fe2O_3$ to Fe_3O_4 to FeO to Fe.

The reaction occurring inside the bed of iron ore and coal are heterogeneous in nature. Two sets of reactions take place. The first set of reactions takes place between coal, carbon dioxide and oxygen while in the second set the reactions are between iron ore particles and CO. Since oxygen of the iron ore gets removed as CO_2, escape of CO_2 gas makes the product DRI porous. Reaction between the ore particle and the gaseous reductant can be visualized to occur in the following five successive stages.

- **Stage 1 –** In this stage diffusion of gaseous reactant takes place through the film surrounding the ore particle to the surface of the solid.
- **Stage 2 –** In this stage, penetration and diffusion of the reactant through the blanket of the reacted outer layer takes place to the surface of the unreacted core.
- **Stage 3 –** In this stage, reaction of gaseous reactant takes place with solid at the reaction surface.

- **Stage 4 –** In this stage diffusion of gaseous products takes place through the reacted layer to the exterior surface of the solid.
- **Stage 5 –** In this stage diffusion of gaseous products through the gas film back to the main body of the gas.

Since the reaction takes place in several stages and each stage in succession, the stage with the least rate controls the rate of the reaction. Both the diffusion rate and the reaction rate are primarily a function of the three parameters namely (i) concentration of reactants, (ii) active interface temperature, and (iii) active area of reaction.

Rotary Kiln Process

This process has essentially been designed to carry out reduction using solid reductions like non-metallurgical coal. A long, slightly inclined, slowly rotating kiln is employed to carry out the reduction. The charge is fed from the higher level and it travels under gravity, aided by rotating motion through several heating zones. The reduced charges come out from the other end of kiln and passes through a continuous cooling cooler without coming in contact with atmospheric air.

The reduced and cooled product is screened and the oversized are subjected to magnetic separation to obtain clean, and sponge iron while the non-magnetic oversized portion as well as the undersized are re-circulated through the charge. In a country like India, which does not possess adequate natural gas and abundant non-coking coal bed, rotary kiln process is the obvious choice for producing sponge iron from their own grade iron ores.

Process Selected

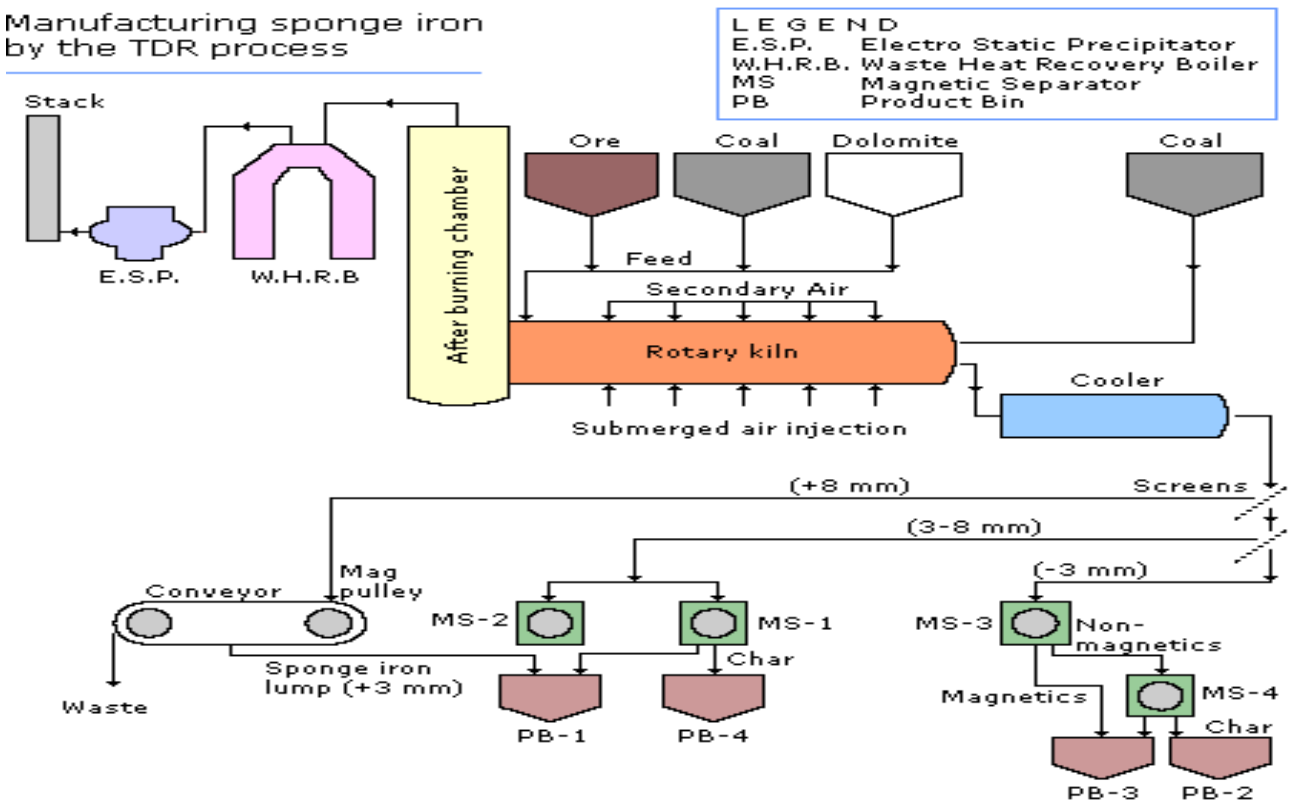
The Rotary Kiln process is well-established process for production of coal based sponge iron. The process, in general, salient features of the various rotaries kiln processes available now for commercial exploitation, and the process selected are discussed in this chapter.

In this process a refractory lined **Rotary Kiln** is used for reduction of iron ore in solid state. The kiln is mounted with a slope of 2.5% down words from the feed end to the discharge end. A central burner located at the discharge end is used for initial heating of the kiln. Sized iron ore is continuously fed into the kiln along with coal, which has dual role of fuel as well as reductant. Small quantities of lime stone/dolomite are added to scavenge the sulphur from the coal.

A number of air tubes are provided along the length of the kiln. The desired temperature profile is maintained by controlling the volume of combustion air through these tubes. Air is introduced through these tubes axially in the free space over charge. The rotary kiln is broadly divided into two zones namely, the pre-heating zone and the reduction zone. The pre-heating zone extends over 40 to 50 percent of length of the kiln. In this zone, the moisture in the charge is driven off, and the volatile matter in the coal, liberating over a temperature range of 600 to 800 degree centigrade, is burnt with the combustion air supplied through the air tubes in the free space above the charge. Heat from combustion raises the temperature of the lining and the bed surface.

As the kiln rotates, the lining transfers the heat to the charge. Charge material, pre-heated to about 1000°C enters the reduction zone. Temperature of the order of 1050°C to 1100°C is maintained in the reduction zone, which is the appropriate temperature for solid-state reduction of iron oxide to metallic iron. The reduced product is discharged into a rotary cooler along with coal ash, calcinated limestone and residual char, where they are cooled to below directly by spraying water on the outer surface of rotary cooler. The product is then screened and magnetically classified.

Process Flow Chart



The following major areas are envisaged for the proposed Sponge Iron Unit.

a. Raw materials preparation, Storage, and handling,
b. Kiln and Cooler axis,
c. Product Separation,
d. Utility Services,
e. Waste gas Cleaning system,
f. Power Supply and Distribution,
g. Quality Control Facilities,

The raw material storage is located close to the raw material handling plant and the day bins. The kiln cooler building is also located close to the raw material handling plant. A well planned and laid out road network is proposed inside the plant connecting all the units of the plant. Provision has been kept in the layout for providing future expansion and downstream.

3.5.1.1 Raw material preparation, storage and handling

Iron Ore, Coal and sized Lime Stone would be received from the mines/ suppliers directly by road, and unloaded and stacked in the raw material yard. Raw material handling is consisting two circuits namely, Iron Ore Circuit and Coal Circuit, which containing crushing, screening, conveying and storage Coal circuit and separately conveying and storage of Iron Ore circuit.

The material would be transported by means of Tippers/Dozers and unloaded into the Ground Hoppers. Adequate weighing facilities would be provided for all the incoming materials to the storage yard and outgoing materials from the storage yard.

3.5.1.2 Vibrating Feeders

All vibrating feeders shall be of electro-mechanical design driven by unbalanced motors. The vibrating force shall be generated by rotation of eccentric mass of motor. The length, width, slope etc., of the pan shall be so selected that material from the storage bin do not flow out when the gate is open but the feeder is not in operation.

3.5.1.3 Belt Conveyors

The selection and design of belt conveyors shall generally be guided by Indian standards unless otherwise stated in the specification.

The belt conveyors shall be designed such that similar components of various belt conveyors are interchangeable to the extent feasible. Special emphasis shall be given for standardization of belt, pulley, idler, bearing, drive unit components i.e. motor, coupling, gear box and brake/hold back. All components of the belt conveyor shall be designed for starting with material (corresponding to design capacity) of belt.

3.5.1.4 Vibrating Screen

All linear motion vibrating screen shall be of unbalanced motor driven type design and of adequate size to achieve desired separation of materials.

The screen body shall be fabricated from steel plates and structural of adequate strength. All welded parts shall be stress relieved and all holes shall be drilled. Sharp edge on the screen body shall be avoided and adequately reinforced at supporting points where vibrating mechanism is connected. It shall be provided with suitable back plate at feed end to prevent spillage of material. The screen shall be supported by adequate number of springs to give rigidity to the equipment preventing minimum transmission of dynamic force to the supporting structure. The spring shall have uniform spring constant throughout its operating range.

The material of screen cloth shall be selected based on type and physical properties of materials to be handled. The clamping arrangement for screen cloth shall be suitable to retain proper tension and also to allow easy replacement of screen clothes.

3.5.1.5 Crusher & Screen House (Coal)

From ground hopper Coal is conveyed to Coal Crusher & Screen House for crushing & screening here there are two stage crusher viz. Primary & Secondary and two screens Raw Coal Screen & Crushed Coal Screen. The sized Coal is conveyed to Surge Hopper and oversize Coal is carried to Junction House through return conveyor, which is again feed to Coal Crusher & Screen House.

3.5.1.6 Stock House

From Surge Hopper raw material is being brought to the Day Bin or Stock House housing for storing various raw materials like Coal, Pellet (iron) & Limestone the bunkers shall be designed to store 1 day requirement to feed into kilns. It is recommended to fill all the bunkers by 90% of its capacity.

3.5.1.7 Weigh Feeders

Weigh Feeders are provided below the raw material bins for weighing. So, that predetermined quantities of Pellet (iron), Coal and Limestone from the bins shall be conveyed to the Kiln Feed Building by means of feed conveyor.

3.5.1.8 Kiln & Cooler Axis

The raw material from Stock House is being feed into the Kiln from inlet through Feed Tube. A portion of fine coal will be injected from the discharge end of the kiln using rotary air lock feed and coal throw pipe. The coal is injected with the air supplied by Twin lobe Compressor specially designed for this purpose.

3.5.1.9 Kiln

The kiln can be divided in three zones i.e. Kiln Inlet Zone (Pre Heating Zone), Reaction Zone & Kiln Outlet Zone. Inside the kiln, the raw materials would be dried and heated to the reduction temperature of approx. 1000° C. Reducing carbon monoxide inside the kiln would reduce the iron oxides of the ore to metallic iron. The heat required for the process would be supplied by controlled combustion of carbon monoxide and volatile matter available in the coal. Thermocouples would be located along the length of the kiln shell for temperature measurement in various zones. The temperature would be regulated by controlling the amount of combustion air admitted from Air Tubes provided at particular location on the Kiln through Shell Air Fans mounted on the kiln shell which is driven by speed controller Dampers.

A variable speed Twin Main Drive has been provided to rotate the kiln at desired speeds. For initial starting and during emergency operation an Auxiliary Drive has been provided which would rotate the kiln at a lower RPM.

3.5.1.10 Cooler

A horizontal rotary Cooler is where indirect Cooling of Sponge Iron takes place. Inside indirect cooling through water-cools the Cooler Sponge Iron & Char. Water is spread over the cooler and water is collected in pond below the cooler. Water is re-cycled after cooling down. A Cooling Tower is also provided near the water sump to cool down the water collected below the Cooler.

At outlet of Cooler a double pendulum valve is provided to take care & to prevent false air entry to avoid re-oxidation. The rpm of cooler is directly proportional to the retention time required.

3.5.1.11 After Burning Chamber (ABC)

ABC (after burning chamber), it is located at kiln inlet. Its main function is to allow waste gases to pass through it. After reaction gets completed inside the kiln, waste gases passes through ABC. Additional air is injected inside the ABC through ABC Fans so as to convert balance CO (carbon monoxide) present in the gases, to get converted into CO (Carbon di-oxide). During this process temperature of gases becomes high, to reduce the temperature atomized water is sprayed with the help of Water Nozzle & high pressure pump on the waste gases and dust get settled at DSC (Dust Settling Chamber).

3.5.1.12 Dust Settling Chamber

Any coarse, mechanically entrained dust particles are separated from the kiln off-gas stream in a spacious dust settling chamber by reducing the gas velocity.

The first dust settling chamber hopper collects kiln fee material penetrating through the small gap between the rotating kiln and the stationary retaining wall. The material is discharge via a motorized double pendulum flap. Kiln back flow material is collected in the second hopper and discharged via a double pendulum valve. Any coarse dust particles and the ash of the after combusted waste gas are collected in a third hopper and led via a chute to the wet scraper.

3.5.1.13 Product Separation

Finished Product (Sponge Iron / DRI) are conveyed through conveyor form CD Building to Product Housing. And it is separated from Coal Char. And ultimately stored and dispatched form Bunkers provided in PSB.

3.5.1.14 Product Separation Building

The product consisting of Sponge Iron (Lumps and fines) & Coal Char. which has to be screened through Product Screen so, that lumps & Fines gets segregated. Then Lumps are passed through Belt Type Concentrator (Lumps) and fines through Belt Type Concentrator (Fines) thus the product is separated to their sizes and then stored in the Hoppers respectively. Magnetic fraction will be conveyed to Sponge Iron Storage Bin. The non-magnetic fraction will be stored in Char Bin. Here there are enough Hoppers are provided for Lump Sponge Iron, Sponge Iron fines & Coal Char for storage purpose. After the product is being separated they can be directly loaded to the Trucks.

3.5.1.15 Utility Services

Water: Water will be required for cooling of Sponge Iron cooler and quenching and scrubbing unit of air pollution control system of kiln emission. Water will also be required for human consumption for drinking & sanitary usages. To economize the water consumption rate, reuse of water after the process of cooling is also necessary, Water recycling system may be for re-circulating of industrial water required mainly for Sponge Iron cooler and pollution control device.

Compressed Air: Compressed air will be required for operation of pneumatic equipment and tools, pneumatic actuators for chutes and gates in material handling system, control instrumentations and in bag filter of air pollution control system for cleaning of bags, other miscellaneous purposes including cleaning and de-dusting process.

Waste Gas Cleaning System: The waste gases from ABC will then pass through a GCT/WHRB, where the temperature of waste gas will get down from 950-1100°C to 180° – 220° C with the help of GCT/WHRB. These gases from GCT/WHRB is then passed through ESP (Electro Static Precipitator) where the excess dust is settled down and clean air is blown into the atmosphere through Chimney with the help of I. D. Fan.

Power Supply and Distribution: The Power shall be made available at plant site by Electricity Board; Power received would be stepped down to 0.433 kV by means of (33 KV) / 0.440 KV. The transformer for DRI plant located nearby DRI Plant and would be fed into the low tension switch board.

Power Factor Correction: Capacitor bank of adequate rating would be connected to the 0.43 KV switch board to improve the overall plant power factor 0.85 to 0.90.

Transformer: The transformer would be mineral oil filled with suitable cooling. It would be designed for temperature rise not exceeding 45° C in windings and 35° C in oil over ambient temperature.

Diesel Generator Set: Diesel Generator Set is standby arrangement to cope up the Power failure. Otherwise because of Power failure all the supporting equipment's through which Kiln parameters like temperature & draft being maintained shall get disturbed. To restore the same it takes time, and during the period quality of the product gets deceased. That's why we kept an arrangement of Diesel Generator to operate the plant without loss of production whenever there will be a power failure from State Electricity Board.

Control Room: A centralized control room would be provided with metering and control instruments besides interlocking and protection schemes. The room will be centrally air-conditioned.

Cabling: Power inside the plant would be distributed by insulated cables, which would be generally laid underground. The cables used for LT power distribution would be of 1100V grade, heavy duty with Copper / Aluminium conductors.

Electric Drive Control Room:

Drives: AC / DC motors will normally be used in all areas of plant except in places where the speed control and torque requirements call for DC motors like the kiln/cooler drive. In all other cases, squirrel case induction motors have been considered. The motors would be suitable for direct on line starting with full voltage on.

Controls: The control systems would be confirmed as a distributed hierarchical concept with the following three control levels.

- Individual drive control level
- Functional group control level
- Technological plant control level

For this purpose the contactors and relays techniques would be adopted for individual drive control at the bottom level in hierarchical structures. These will essentially take care of the connection (ON), disconnection (OFF) and individual error signalling of a drive.

Earthing and Lightning Protection: All electrical equipment would be provided with two distinct earth connections as per electricity rules. A ring main earthing system shall be provided for each shop/unit for this purpose. All buildings would be provided with necessary lightning protection arrangements. GI strips/ flats and GI electrodes will be used for earthing and lightning protection.

Illumination: The illumination level envisaged for the different areas indoor and outdoor will be as per international norms for industrial production units to ensure comfort and safety. High pressure, coloured vapour /sodium vapour lamps with reflectors will be used for high bay lighting and road lighting. Flood lighting will be used for open storage areas. Florescent lamps with reflector/enclosures will be used for low bays of production departments, office building, control rooms, electric rooms, laboratory and stores. Emergency lights along with batteries will be provided for strategic units and control rooms to ensure safety.

3.5.2 Manufacturing of BILLETS

Induction Furnace and Important Operational Aspects

The induction furnace consists basically of a crucible, inductor coil, and shell, cooling system and tilting mechanism. The crucible is formed from refractory material, which the furnace coils is lined with. This crucible holds the charge material and subsequently the melt. The choice of refractory material depends on the type of the charge and basically consist of either acidic, basic or neutral refractories.

The inductor coil is a tubular copper coil with specific number of turns. An alternating current (AC) passes through it and magnetic flux is generated within the conductor. The magnetic flux generated induces eddy currents that enable the heating and subsequently the melting process in the crucible.

The shell is the outer part of the furnace. This houses the crucible and the inductor coils, and has higher thermal capacity. It is made of rectangular parallelepiped with low carbon steel plate and joined at the corners by edge carriers from angular pieces and strips of non-magnetic metal.

The cooling system is normally a through one way flow system with the tubular copper coils connected to water source through flexible rubber hoses. The cooling process is important because the circuit of the furnace appears resistive, and the real power is not only consumed in the charged material but also in the resistance of the coil. This coil

loss as well as the loss of heat conducted from the charge through the refractory crucible requires the coil to be cooled with water as the cooling medium to prevent undue temperature rise of the copper coils.

One medium frequency induction furnaces of 12 MT/3.3 MVA will be installed to meet the annual requirement of liquid steel.

Raw Materials and Energy Source

Steel melting scrap and Sponge iron are the input raw materials for an induction furnace. The ratio of these items and the technology of melting these input materials varies according to the availability of raw materials and location of the plant. Further selected raw materials are required for the production of specific quality steel. For better and efficient operation of melting in induction furnace, raw material charge must fulfill the following criteria.

- It must be as dense as possible. Compaction of scrap is important for ensuring uniform and rapid heating as well as for energy saving.
- It must be clean. Rust, oil, grease, and sand etc. should preferably be nil.
- It must be metallurgically clean, i.e. free from slag lumps, oxides etc., particularly for direct reduced iron, skull and ferro alloys.
- There are no or less sharp pointed edges, particularly in case of heavy and bulky scrap.
- It must be segregated from harmful ingredients like explosives, closed containers, evaporative substances and readily available in chargeable sizes on the shop floor.

Electricity is the only energy source for steel melting in the induction furnace. Induction furnace is to run at maximum power since beginning. There are some misconception of running furnace at low tap initially and then gradually increase to higher tap. Maximum power input increases rate of melting and hence reduces cycle time of a heat. Power factor is to be maintained near to one.

Important Aspects of Operation

As liquid steel is excited by current opposite to current flowing in induction coil, it is agitated to raise its surface in the center. Surface of liquid steel is risen higher as frequency becomes lower, i.e. agitation of the liquid steel occurs stronger in low-frequency furnace than in high-frequency furnace. This effect of agitation makes it possible to ensure uniform temperature of the liquid steel and its uniform quality as

well as to promote entrapment of material charged and fusion of chemical composition adjusting agents, especially carbon addition. On the other hand, excessive agitation may cause such troubles as oxidative wearing of liquid steel and fusing out of refractories or danger of spattering of liquid steel.

Once the melting is complete, the slag is skimmed off. Slag generated during melting has tendency to stick on the furnace wall. This reduces volume of furnace hence reduces metal output per heat. Superheating of metal is done at higher temperature and held for few minutes. This inhibits slag to deposit on the furnace lining keeping furnace clean with full volume.

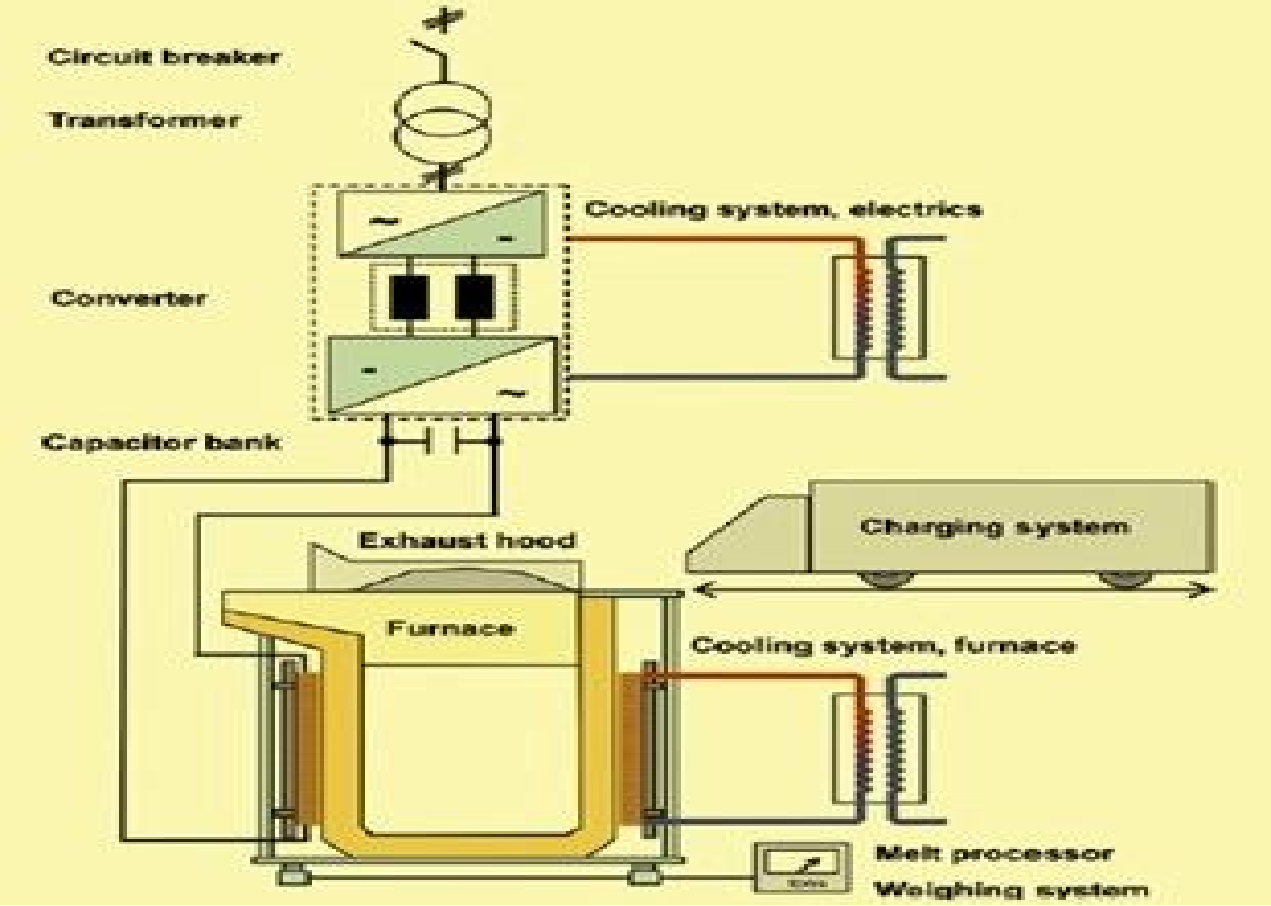
The composition of the slag varies depending on the specific process being used and the type of steel being produced. The compositions of furnace and ladle slags are often very complex. The slag which is formed is the result of complex reactions between silica, iron oxide from steel scrap, other oxidation by products from melting, and reactions with refractory linings. The slag consists of a complex liquid phase of oxides of iron, manganese, magnesium and silicon, silicates and sulfides plus a host of other compounds, which may include alumina, calcium oxides and sulfides, rare earth oxides and sulfides etc.

While producing the steel, the chemistry of end product is controlled. The chemical analysis of all the input materials is done to have a decision on the charge mix. After completing 50 % charging of the input materials, a bath sample is analyzed for chemical composition. Based on the chemical analysis of the bath sample at this stage calculations are made for further additions of the metallics. If the bath sample at this stage shows high percentage of carbon, sulphur and phosphorus then the direct reduced iron content of the charge is increased. Final bath sample is taken when 80 % melting is completed. Based on the analysis of this sample, another adjustment is made in the charge. The lower content of carbon in the sample is corrected by increasing the quantity of pig iron/cast iron in the charge. Silicon and manganese in the metal is oxidized by the iron oxide of the direct reduced iron. Sulphur is also diluted by the direct reduced iron. Because of use of direct reduced iron the trace elements in the steel made in the induction furnace remains under control.

The liquid steel is the desired output of the induction furnace. The quantity depends upon the capacity of the furnace, and the quality depends upon the raw materials and the steel composition. The tapping temperature depends upon the type of steel and the super heat needed in the liquid steel for its end use. Tapping of steel at high temperatures increases refractory erosion and power consumption.

Unnecessary superheating of liquid steel to high temperature costs to energy significantly. Minimizing the overheating of molten bath saves energy. Depending on steel specification and temperature loss during transfer of liquid steel to continuous casting machine, superheat temperature is to be decided. In every heat, temperature of the liquid steel bath is to be measured and monitored to get optimum energy saving. Proper power control systems with potentiometer adjustment need to be provided for minimizing energy losses due to overheating.

Tilting of the furnace is to effect pouring of the melt is a last operational activity before casting. The furnace is usually tilted to achieve an angle of 90 degree or greater for complete pouring of the liquid steel. After that the liquid steel directly poured into moulds to produce Ingots/ Billets. Process Flow Chart of Induction Furnace is given in Below.



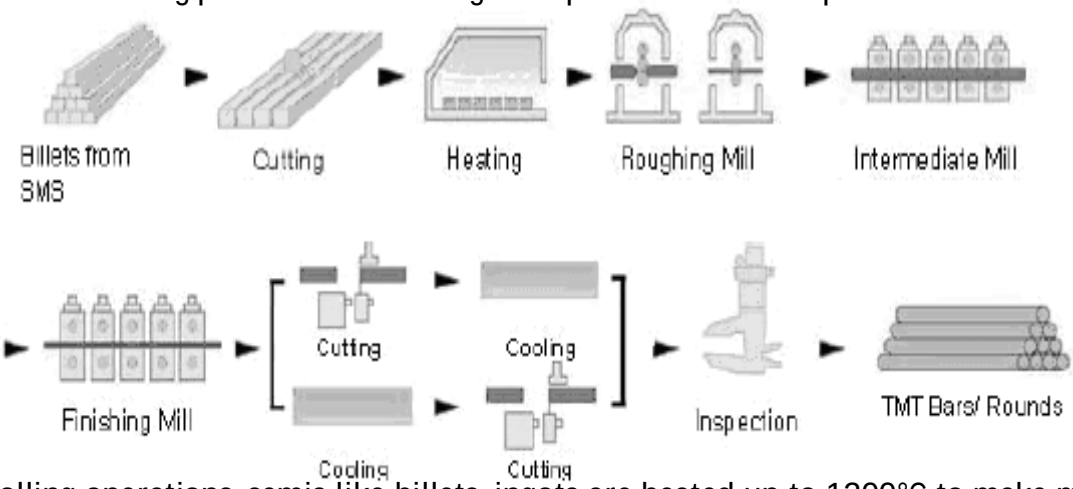
Process Flow Chart of Induction Furnace

Rolling Mill

Rolling is the process of plastically deforming steel by passing it between rolls. Rolling is defined as the reduction of the cross sectional area of the steel piece being rolled, or the general shaping of the steel products, through the use of the rotating rolls.

Rolling of steel is one of the most important manufacturing processes for steel. It is usually the first step in the processing of steel after it is made and cast either in Ingot or continuous cast product in a steel melting shop. The initial rolling of steel is done in a hot rolling mill where blooms and slabs are rolled down to various rolled products such as plate, sheet, strip, coil, billet, structures, rails, bars and rods. Cold rolling of steel is also carried out for some products. Many of these rolled products such as rails and reinforcement bars etc. are directly used by the consumers while the other rolled products are the starting raw materials for subsequent manufacturing operations such as forging, sheet metal working, wire drawing, extrusion, machining, and fabrication industry. Steel rolling can produce a wide range of products.

The manufacturing process of the rolling mills products can be depicted as follows.



For rolling operations, semis like billets, ingots are heated up to 1200°C to make metal malleable. The hot semis are then subjected to rolling mill operations where with the help of different dies fitted at a number of passes, these are given desired shapes. The technology has been in use since many decades with ongoing modifications aimed towards higher efficiency and better quality.

Raw Material Preparation

Ingots/ Billets from Own Induction Furnaces/LRF are the main Raw material for the Plant. The Billets/Blooms are received in the Raw - Material Bay and unloaded with the help of Crane. The Billets/Blooms from the Cooling Bed will be shifted to Billet storage

shed. From the Billet storage EOT Crane will shift it to raw material storage. The Billet is cut by the Billet shear into required length for rolling. Billets/Blooms are prepared for charging into the furnace as per the quality and size to be rolled. The Billets/Blooms are kept on the Charging Platform by means of Electric Crane. They are then pushed into the Re-heating Furnace with the help of Charging Roller Table and PUSHER.

Re-Heating Furnace

The Billets/Blooms are heated to 1100-1200 degree C in the Pusher type Re-heating Furnace as they are slowly advancing into the Furnace towards the burners. The Re-heating Furnace is equipped with low air pressure burners, Air Blower, Recuperator, Chimney and Oil preheating and Pumping Unit etc. The Furnace temperature is indicated by Pt-PtRh Thermocouple and Electronic Digital temperature Indicator. The Billet/Blooms is discharged out of the Furnace with the help of Mechanical Ejector. The Billet/Bloom is conveyed by a Roller Conveyor (RC) to the Main Roller Table and then automatically fed into the 1st Pass of Roughing Mill Stand No. I.

Roughing in Roughing Mill

In Roughing Mill, there are 2 Stands driven with the help of Electric Motor, Flywheel and Gear Boxes. Several passes are cut into the Rolls to reduce the material in size and shape. There are also two passes in Intermediate Mill and two passes in Continuous Mill. The cutting of passes in the rolls is very important and it varies with the size, shape and quality of the material to be rolled. PASS DESIGN in a Rolling Mill is very important aspect and experienced FOREMAN or ENGINEER is appointed to take care of it. The material (Billet/Bloom) fed into the bottom passes with the help of Main Roller Table and Turning walls and in the top they are fed with the help of Tilting Table. Approximately 4/6 passes have been provided in No. 1st Stand as per the size to be

rolled. After that the material is transferred by sliding rails and Skew Rolls to 2nd Stand and 1 pass is provided in the 2nd Stand. From Stand No. 2 the material is taken to 1st stand of Intermediate Mill via Roller Table and Y Table. Intermediate Mill has 2 Nos. Stands driven by Electric Motor. The 1st stand is opposite 2nd Stand of Roughing Mill. For top pass feeding `Y' Table is provided. Next the material is transferred to 2nd Stand of Intermediate Mill by sliding rails Skew Rolls. The material elongates each time it passes through the rolls and area reduction takes place. From Stand No. 2 of Intermediate Mill the material is taken to Continuous Mill No-1 via a Roller Table and then it's going to Continuous Mill No-2 via a Roller Table. Final shape is given in this Stand and accurate adjustment is required. The material is fed into the mill with the help of roller table automatically and it acquires the desired shape and size and further

travels to Cooling Bed via a Roller Table. The temperature at finishing stage is 800/900°C approx. The rolls and guides and fiber bearings in the mill are cooled with the help of water recirculation.

Natural Cooling on Cooling Bed

The Cooling Bed is Duplex type and fabricated with structural material and in the center C.I. plates are provided with few individually driven rolls in between. After finishing pass the material comes to Cooling Bed via Roller Conveyor. Then it is shifted to one side of the Cooling Bed by Manual Shifting arrangement. When one side is filled up, the other side is used. The first side material is cleared while the other side is being used and vice a versa. The material is cleared via Roller Conveyor and cut into required specific length with the help of Shearing Press.

Inspection and Dispatch

Inspection is done at every stage of Production by Quality Assurance Department. After cutting the inspected material to specific length it is transferred to stockyard and staked properly with the help of crane. Wherever, straightening is required, it is taken to a straightening M/C, and straightened and then properly staked. From the stacked material samples are taken for quality checks and suitable grading is done, s per Indian Standards. The material is then ready for dispatch.

Power Generation

The DRI Gas, as it comes out of the After Burning Chamber, contains sufficient quantity of Heat - Energy which if not properly harnessed will go to waste and will contribute to Atmospheric Pollution. If the exit gas is not conditioned as per stipulations of the Environmental Regulating Authority, it affects the Environment. The conditioning of the exit gas, which is a mandatory requirement, involves substantial amount of capital investment without any return on investment. Considering the extant Supply - demand scenario in National perspective, it is the policy of the Government to harness all possible Energy resources to augment the Generation capacity. As such, none can afford the luxury of wasting such enormous amount of Heat Energy, which could be rather fruitfully utilized for generating Electric Power.

Such Energy waste could be abated by installing Waste Heat Recovery Boiler at the tail end of each DRI Kiln, which in fact works as a cooler for the high temperature gas. Heat that is extracted from the hot gas is utilized in transforming water to high temperature -

high pressure Steam to run conventional Condensing type Steam Turbo - Generator for Generation of Electricity as a part of forward and backward integration process.

DRI Kiln enable the company to be self reliant in the arena of Power requirement for production of Steel and dependence on import of Power from the State Grid at a higher cost can be reduced substantially. Cheaper Power availability through this CPP route will help the company to have lesser production cost of Steel, which is especially of consequence when high Power intensive Induction Furnaces are in use.

The proposed Captive Power Plant (CPP) accordingly comprises of WHRB compatible for 6 MW at the tail end of the 3 no. DRI kilns Turbine- Generator equipped with Water Cooled Condenser. Though Actual Estimated Gross Generation output is 6 MW, adoption of standard frame size of Turbo-generator has led to the selection of. Turbo-Generator Unit having maximum continuous rating of 6 MW.

Selection of the System Scheme and Unit Size has been influenced by the prime consideration that in the event of any forced outage of anyone of the three DRI Kilns with associated WHRBs, the Captive Power Plant shall be in a position to generate Net MVA to meet the Power requirement of steel plant.

The 123750 TPA Sponge Iron plant entails a sufficient amount of fuel for a WHB plant to function by cooling its waste gas for making it suitable to be accepted in an ESP. The Harnessing of the waste heat of kiln is another reason for wide acceptability gained by Coal based sponge iron technology, which offers additional advantage of generating considerable quantity of electricity through use of hot waste gases and kiln waste (char) materials. Generation of power through waste flue gases emanating from DRI kilns with the help of Waste Heat Recovery Boilers is a time-tested technology and several plants are successfully running with this technology, the machinery for which is indigenously available. In coal based sponge iron technology, the furnace (rotary kiln) fulfills various functions. It is used as a conveying, mixing and charring unit, as a heat exchanger and as a reactor for coal gasification and iron ore reduction. The advantage of these applications from single equipment in the rotary kiln is partly offset since the kiln is considered to be a poor heat exchanger. This is due to the reduced contact of gas and solids when compared with a shaft furnace resulting in high loss of gas energy. In coal based sponge iron kilns, depending on the quality of reductant i.e. coal used; about 40% of the total heat input is utilized in the reduction process. Remaining 60% is discharged with the kiln waste gases and the kiln materials in the form of sensible or chemical heat. The hot waste gases and char thus produced contain considerable energy saving potentials. With the help of Waste Heat Recovery Boilers (WHRB) substantial electric energy can be produced by utilizing heat content of the kiln waste gases. The company

has proposed to install a total 12 MW (consisting of 6 MW from WHRB and 6 MW from FBC) co generation power plant using three WHRB boilers & one FBC boiler. The proposed power produced is mainly to be used for captive consumption by steel melt shop and Rolling Mill.

3.5.3 Power Generation Process

The proposed plant shall be configured with one Waste Heat Recovery Boilers (WHRB). The balance steam for generating the rated power will be generated by one nos. of Fluidized Bed Combustion Boiler (AFBC) using Coal. The proposed 12 MW Steam Turbine/Turbines shall have one uncontrolled extraction connected to one constant pressure detector normally working at 125°C feed water temperature. The steam generated in the boilers would be sufficient to generate 12 MW of power. The feed water system of Boilers is sized to support the installed capacity of boilers to enable 12

MW power generation. The steam at required parameter to STG would be provided through a main steam header. All Boilers will be connected to this main steam header. The variation in the steam generation of WHRB will vary in line with the variation in the hot gas parameters and its flow. The total steam requirement for 12 MW power generation, as per the suppliers of turbine and generator, shall be minimum 80 TPH operating. Therefore, the heat energy available from 375 TPD DRI kilns feeding to 20 TPH capacity WHRB boilers & one 60 TPH capacity FBC boiler will be sufficient for generating sufficient steam to run 12 MW turbine and generator.

As per the standard practice and efficiency ratio of turbines clubbed with generation system, the average steam requirement for generation of 1 MW works out to 4-5 TPH with specified temperature and pressure of steam, as such each of the boilers (WHRB & FBC) have been selected with higher rated capacities for the reasons elaborated below-
Most of the power generated is to be consumed by the melt shop & rolling sections of the unit and to ensure continuous power supply to these sections, even if DRI plant is under shut down, FBC boiler will generate adequate power to feed both melt shop & rolling mill.

The technology for power Generation from hot flue waste gases is proven one and available with leading manufacturers, like Simens, BHEL Triveni Engineering & Industries Limited, M/s Cethar Vessels (P) Ltd. The company after final round of negotiations have placed order with M/s Thermax Limited to source boilers for plant configuration, design, material specification in consultation with technical consultants and for turbines from BHEL.

Selection of System Scheme

Following factors have been considered in selecting the system scheme.

a. Type of fuel to be used
b. Common ESP and ID fan for ABC and waste heat boiler
c. Energy effectiveness of the system
d. The power plant shall be selected considering the lowest possible capital investment without sacrificing quality and safety of the system. In view of foregoing and the data available on off gas.

The State of the Art Technology

Waste Heat Boiler

M/s BHEL, M/s Thermax Babcock and Wilcox Ltd., M/s Isgec John Thompson, M/s Cethar Vessels Ltd., M/s Thermal Systems Pvt. Ltd. and many indigenous manufacturers are there who have supplied waste heat boilers to various clients. There are a few renowned parties in Europe, America and Asia competent to supply such boilers.

Description of Plant & Equipment with unit sizes

The Principal Thermal Scheme

The waste heat boiler will be installed after the ABC of DR kilns in shunt configuration with conditioning tower. The flue gases after ABC will be taken to unfired furnace chamber and then flow over banks of super heater, convective evaporator and economiser before being discharged to atmosphere through ESP and chimney of DR kiln. In case of shutdown/breakdown of waste heat boiler, flue gases will pass through conditioning tower.

The condensate after condenser of TG will be pumped to a deaerator by condensate extraction pumps. Feed water from the deaerator will be pumped to the waste heat recovery boiler by boiler feed pump.

The steam generated from the boiler will drive the steam turbine through a steam header.

Brief Description of Plant and Equipment

The captive power plant will comprise the following equipment and systems.

- Waste heat boilers with auxiliaries
- Steam turbine and auxiliaries
- Deaerator and boiler feed pumps with associated system
- Electrics:
  * Generator
  * Transformer
  * Switchgear - main and auxiliary
  * Others like illumination, battery room etc.
- Water supply facilities
- Instrumentation and controls
- Auxiliary service systems:
  * Ash handling and disposal
  * Telecommunication
  * Fire fighting
  * Compressed air system
  * Miscellaneous

Salient Features

The boiler will be complete with unfired furnace chamber, steam and mud drums, super heater, convective evaporator, economiser, internal piping, blow down, attemperation and soot blowing systems and main steam piping to common headers. Supporting structures, platforms, stairs, insulation etc., shall be provided.

Steam Turbine and Auxiliaries
Salient Features

The TG sets will be complete with condenser, air evacuation system, 2x100% condensate pumps, generator cooling system, governing system and lubricating oil system, gland sealing with gland vent condenser, etc.

3.6 Raw Material required along with estimated quantity, likely source, Marketing Area of the final product/s, mode of transportation of the raw material and finished products.

3.6.1 Raw Material Requirement

Table 3.1: Raw Material Required for Sponge Iron Plant

SPONGE IRON		
DRI Production	51750	MT Per Year
Raw Material		
Pellet	173250	MT Per Year
Coal	111375	MT Per Year
Dolomite	4950	MT Per Year

Table 3.2: Raw Material Required for Induction Furnace

INGOT/ BILLETS		
Production	60000	MT Per Year
Raw Material		
DRI	72000	MT Per Year
Steel Scrap	12200	MT Per Year

Table 3.3: Raw Material Required for Rolling Mill

ROLLING PRODUCT		
Production	72000	MT Per Year
Raw Material		
Billets	74200	MT Per Year

3.6.2 Transportation of Raw Material / Final Products

The probable sources of major raw materials (indigenous/imported) for meeting the production requirements by road/sea/rail. The plant would produce both long and flat

products, which would have potential for sale in national as well as international markets.

3.7 Resource Optimization/Recycle & Reuse Envisaged in the Project

The plant has been designed with state-of-art technology for optimum consumption of energy & other resources. By product fuel gases would be reused within the plant as in-plant fuel and al so to produce power in the CPP.

3.7.1 Sponge Iron Unit

Nature	Uses
Char/Non-Magnetic	⊙ Char should mixed with coal and used as a fuel in Fluidized Bed Combustion Boilers for additional power generation other than WHRB. ⊙ Char can be sold to local entrepreneur for making Coal Briquettes.
Kiln Accretion	⊙ Kiln Accretion is heavy solid lumps and can be used as sub-base material for road construction or land fill.

3.7.2 Induction Furnace

Nature	Uses
Runners & raisers	It can reuse in Steel Melting as a Scrap.
Slag	It can be discharged into land filled.
Dust	It can be discharged into land filled.

3.7.3 Rolling Mill

Nature	Uses
Return Scrap	It can reuse in Steel Melting as a Scrap.

Process water will be recycled back in the process, hence zero discharge.

3.8 Availability of water its source, Energy / Power Requirement and Source

3.8.1 Water Supply

Iron and steel making is a heat intensive process wherein a considerable quantity of cooling water is required for control of metallurgical process as well as for recovery of

heat from unutilized heat. In order to conserve fresh water, water economy has been an underlying criterion for selection of plant and equipment.

Water recirculation systems have been planned to cater extensive recycling and reuse of return water from plant processes. The company has opted for Air Cooled Condenser for its proposed Power Plant which will minimize use of water. Industrial quality water as obtained from the source will be used in the secondary side of plate heat exchangers for cooling of process water in the primary side and also for direct cooling circuits. For the primary side, soft water will be re-circulated in closed circuits. Suitable treatment facilities have been planned for open contaminated circuits to render the return water from the unit reusable. Evaporative cooling towers will be provided for cooling industrial water in open circuit recirculation systems. Total water Requirement for the proposed expansion project is 1,500 KLD which will be met by the Bore wells in the project site.

3.8.2 Power Supply

Power Supply will be met from State Electricity Board (GESCOM), Substation of 12 MW and once the plant becomes operation, the power generated within the plant will be utilized back to the plant. The excess will be given to State/National Power Grid.

3.9 Waste Generation and Management

3.9.1 Solid Waste

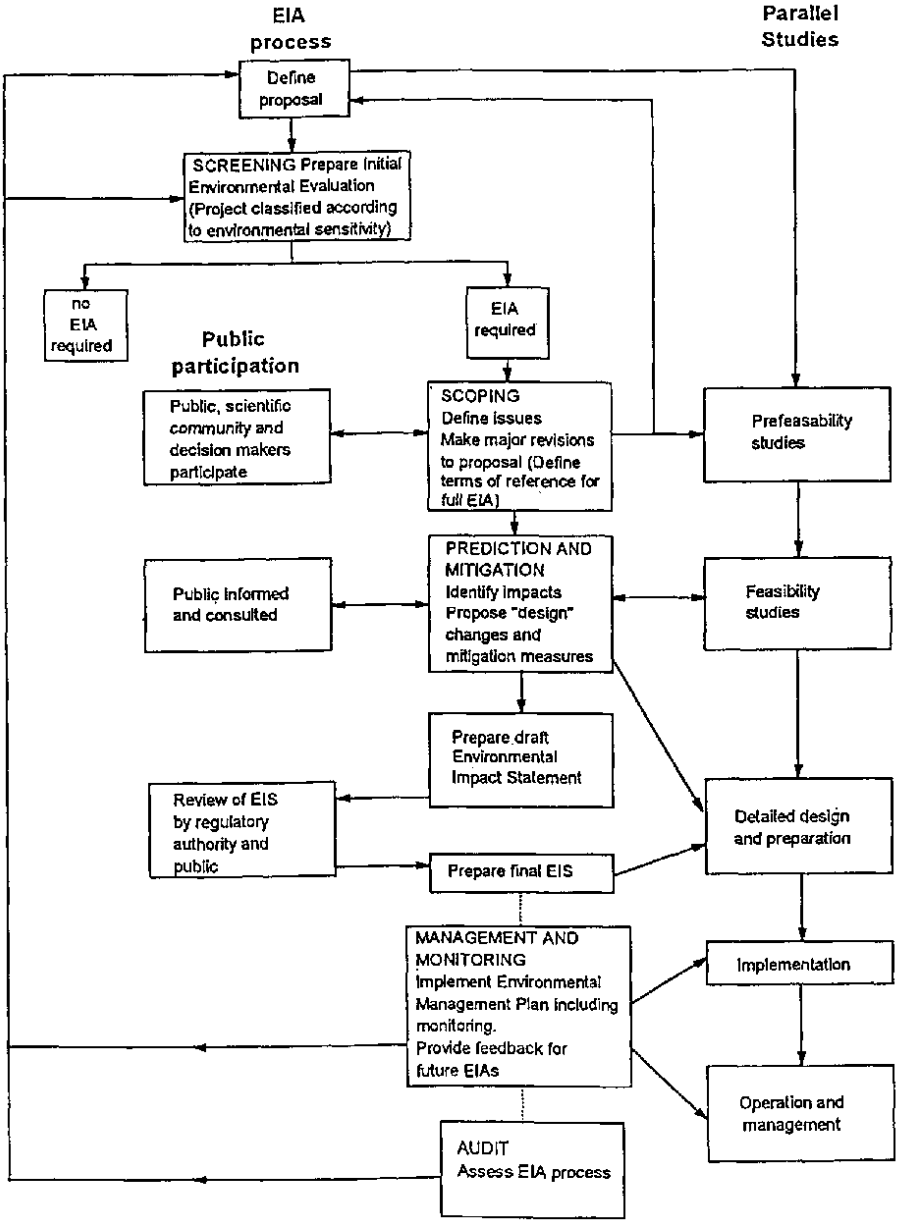
Partial solid waste resource optimization/Recycle & Reuse of in the project is explained in **section 3.7.** Partial solid waste management scheme and disposal is given in below table.

Plant	Waste	Scheme for Management / Disposal
Sponge Iron (DRI Kiln)	Dolochar	will be used in AFBC Boiler
Captive Power Plant	Fly Ash	Shall be sold to brick making factory
Billet Caster (viz, scales) and Rolling Mill (end cuts and miss rolls)	Solid wastes	Will be used in Induction Furnaces.
Induction Furnace	Slag	Will be used for Land filling / Road Construction purpose / paver block making.

3.9.2 Hazardous Waste

Plant	Waste	Scheme for Management / Disposal
Generator/ Lubricants	Used oil	Shall be sold to the CPCB approved recycler
Gasifier	Coal Tar	Shall be used in road making
DM and RO Plant	Used Ion Exchange Raisin	Shall be sent to the nearest TSDF site

3.10 Schematic representations of the feasibility drawing which give information of EIA purpose.



CHAPTER – 4

SITE ANALYSIS

4.1 Connectivity

4.1.1 Road Accessibility

Road connectivity is through National Highway - 63 located at distance of 8.0 Km from the Project Site.

4.1.2 Rail Accessibility

The nearest railway station is Ginigera railway station which is about 8.0 Km from the site. No problems are envisaged in accessibility and transportation of heavy equipment to site by rail.

4.1.3 Sea Port

The eastern port of Chennai is 710 km and western port of Goa i s 272 km. Mumbai is about 697 km on the North West.

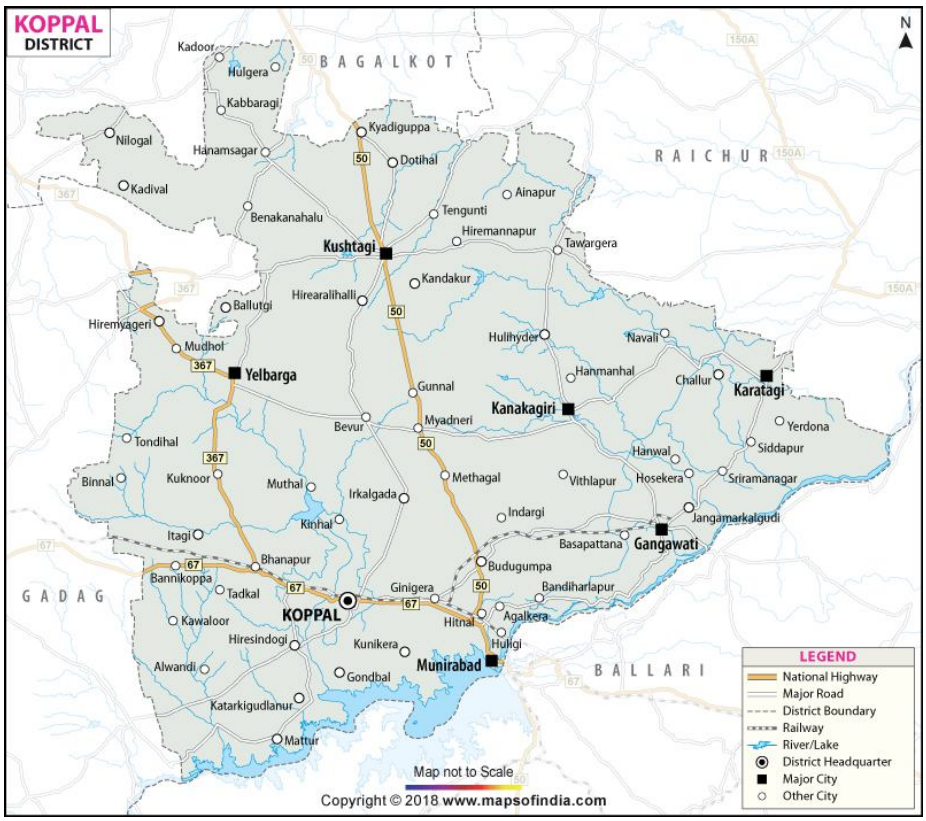


Figure 4.1: Road and Railway Connectivity of Koppal District

4.2 Land Form, Land Use and Land Ownership

The proposed expansion project is setting up of the brown field project is located within the jurisdiction of Chikkabaganal & Kunikeri Village of Koppal Taluk & District in Karnataka. The existing plant is situated between 76^0 13' 49.19" E Longitude & 15^0 17' 21.73" N Latitude.

The land is agricultural land and converted into industrial purpose and is currently in the ownership of BASJIPL. Proposed expansion is located over an area of about 41.50 acres within the overall plant area, utilizing the existing infrastructure and utilities.

4.3 Topography

The study area falls in the Tungabhadra river basin. The area is marked with undulating topography with granite hills and a few chains of hills composed of Dharwar schists. The main tock types found in the region are;

- **Pleistocene and Recent:** Reddish, light green, reddish brown and black soils
- **Precambrian: Kaladgi series:** Sandstone and conglomerate basic dyke
- Archaean
- **Penisular Complex**: Granite porphyritic, red syenite, pink genesis, Gray genesis
- **Dharwars:** Chlorit schists, Talc chlorite schist

4.3.1 Hydrogeology

The joints and other openings in the gneiss and granite, the pore spaces in the zone of weathering and bedding planes of the metamorphosized sediments determine the rate of percolation of the water into sub-surface and the yield of wells in the regions. Black cotton soils allow water to infiltrate slowly, whereas red loams/sandy soils have relatively higher percolation rate which is due to high porosity and permeability. Occurrence of groundwater thus, is mainly controlled by water table conditions. The recharge of groundwater is mainly due to the rainfall which is scant in the region. Therefore, depth of water table in the area is between 7m to 10 m below the surface.

4.4 Existing land use pattern (agriculture, non agriculture, forest, water bodies – including CRZ), shortest distances from the periphery of the project to periphery of the forests, national park, wild life, sanctuary, eco sensitive areas, water bodies (distance from HFL of the river), CRZ. In case of notified industrial area, a copy of Gazette notification should be given.

Existing land is already broken and 1 x 100 TPD & 1 X 75 TPD of sponge iron plant is under operation and obtained approval for induction furnace and captive power plant **but not implemented due to Financial Problem.**

There is no forest, national park, wild life sanctuary, eco sensitive areas in surrounding 10 Km of the plant boundary. However, project site is located at a distance of 2.0 km (aerial distance) from the Tungabhadra Reservoir.

4.5 Existing Infrastructure

Required infrastructure like office building, canteen, laboratory, weighing bridge, storage yard for raw material and finial product, etc., is available.

4.6 Soil Classification

The soil is generally formed due to slow process of weathering of rocks. The normal mineral compositions of plant are altered by alteration in soil condition. Existence of flora & fauna depends upon the quality of soil in the area. The soil characteristics like physical, chemical, erosion index, soil fertility has bearing on the surrounding environment. Therefore the quality of soil play a major role in planning proper mitigative measures like plantation program and green belt development by the project proponent and also for the construction of building for different purposes. The normal mineral composition of plants is altered by alteration in soil condition. Soil could well represent the topsoil cover, which is rich in nutrient content.

4.7 Climatic Data from Secondary Sources

The area has a Tropical hot and dry. In July and October heavy rainfall is intense, and there are often showers into November. Yearly rainfall is 572 mm, average temperature of 37 °C (99 °F), ranging from 11 to 18 °C (53 to 65 °F), with the highest temperatures occurring in April and May, Relative Humidity is about 40%.

4.8 Social Infrastructure available

The project site is located approximately 1.5 km from the human settlement (village: Kunikeri). Basic amenities of life are easily available in the area. Primary health centre, school, drinking water, electricity, communication, road network, transportation facility is available in the vicinity. The existing infrastructure is sufficient to cater the additional load due to the proposed expansion project.

CHAPTER 5

PLANNING BRIEF

5.1 Planning Concept (type of industries, facilities, transportation etc) Town and country planning/ Development authority classification.

The proposed brown field expansion project would be sited near Chikkabaganal & Kunikeri Village, Koppal Taluk & District. The total land area of the project would be about 41.50 acres within the overall land area available with BASJIPL.

5.2 Population Projection

The population break-up of all the villages falling with-in the buffer-zone, as per 2011 census data is given below, it is seen that the total population with-in the buffer-zone is 37,512 vide census of 2011.

The proposed expansion project as per applicable regulations would employ local workers. However due to foreseen employment opportunities in the proposed project and increase in ancillary economic activities, growth in mi grant population is anticipated during construction stages.

5.3 Land Use Planning

The total area for steel plant would be about 41.50 acres, consisting of tentatively the following:

- Built up facilities in terms of buildings, shops, yards etc :
- Roads way corridors
- Drainage channels
- Green Cover
- Others:

33% of the total area is earmarked for green belt development. The layout would also house canteen, administrative buildings, workshops, laboratories, stores, in-plant roads, etc.

5.4 Assessment of Infrastructure Demand (Physical & Social)

The following infrastructure development in the area is being carried out to support the growth of the steel plant and for its sustainable operation.

- Provision of safe potable water facilities in surrounding villages is being implemented by BASJIPL.
- Provision of medical facilities in the project influence area with special emphasis on primary health care through private Mobile Health Units, Government Public Health Centers and medical camps.
- Industrial and Vocational training to local youth groups (both girls & boys) for diversification of skills and enhancement of livelihood.
- Provision of social infrastructure like that of community toilets, playgrounds, community halls with basic amenities.

CHAPTER – 6

PROPOSED INFRASTRUCTURE

6.1 Industrial Area (Processing Area)

The plant location has been chosen close to the industries. The site located in the Chikkabaganal & Kunikeri Village of Koppal Taluk & District. The average elevation 549 MSL and is geographically located at E: 76^0 11' 49.28" Longitude & N: 15^0 19' 27.77" Latitude. The nearest railway station is Ginigera Railway station, which is at a distance of 8.0 Km. The Road connectivity is through NH - 63 located at distance of 8.0 Km from the plant. Hence the transportation to various sites of finished products is easy and economical.

The production facilities in the proposed expansion will be located within the existing plant area of 41.50 acres.

6.2 Residential Area (Non- Processing Area)

BASJIPL is having existing housing for workers which will be expanded. Canteen is also proposed to set up.

6.3 Green Belt

Company is committed to develop dense green belt area in project site as per government rules. Green belt is proposed to develop 33% of the total area. Following are the species of trees which are planned to be plant.

- Ashoka trees
- Neem trees
- Mango trees
- Gul-mahor

6.4 Social infrastructure

Basic amenities of life are easily available in the area. Primary health centre, school, drinking water, electricity, communication, road network, transportation facility is available in the vicinity.

6.5 Connectivity (Traffic and Transportation Road/Rail/Metro/Water Ways etc)

BASJIPL is well connected to other parts of the country by Road and Rail.

6.6 Drinking water Management (Source & Supply of water)

Required water shall be obtained from bore well within the project site.

6.7 Industrial Waste Management

In the process of steel process and non-process wastes and effluents are generated and the sane has been discussed in **Chapter - 3.**

6.8 Solid Waste Management

The major solid wastes generated in the proposed expansion project, its management and disposal has been discussed in **Chapter - 3.**

6.9 Power Requirement and Supply/Source

Power Supply will be met from State Electricity Board, Substation of 12 MW and once the plant becomes operation, the power generated within the plant will be utilized back to the plant. The excess will be given to State/National Power Grid.

CHAPTER 7

REHABILITATION AND RESETTLEMENT (R & R) PLAN

The proposed expansion project is a brown field project with all the proposed facilities coming up with in the existing land area of the existing plant complex.

The project entails use of existing water allocation, power facilities. Further, all the solid wastes are proposed to be recycle or sold.

In view of this, there are no R & R issues.

CHAPTER – 8

PROJECT SCHEDULE AND COST ESTIMATION

8.1 Project Implementation Schedule

The Schedule of Implementation for all Plants is as follows.

Table 8.1: Project Implementation Schedule

Sr. No	Plant	Time Period
1	Sponge Iron (MTPA)	14 Months
2	Steel Billets/Ingots (MTPA)	10 Months
3	TMT Bars (Rolling Products)	14 Months
4	Captive Power Plant (CPP)	12 Months

8.2 Project Cost Estimation

The estimated capital cost for the land, plant & equipment worked out for all the facilities are presented in **Table 8.2.** The total project cost is **145.00 Crores** for proposed expansion project.

Table 8.2: Details of Project Cost Break-up

Sl. No.	Particulars	Total
1	Land & Site Development	1.250
2	Buildings	18.70
3	Plant and Machinery	91.50
4	Misc. Fixed Assets	1.350
5	Contingencies	5.640
6	Preoperative Expenses*	9.560
7	MMWC	17.00
	Total Cost of the Project	**145.00**

CHAPTER 9

ANALYSIS OF PROPOSAL

9.1 Financial and Social benefits with special emphasis on the benefit to the local people including tribal population, if any in the area.

9.1.1 Financial Benefits of the Project

The financial benefits accrued from the project would improve the profitability of the promoter company, but also strengthen the economy of the state due to revenues from taxes and duties derived from sale of value added products. Installation additional facilities in terms of state-of-art steel plant with captive power plant, add huge impetus to the growing economy of the state and the country.

9.1.2 Social Benefits

The proposed brown field expansion in a relatively backward part of the state of Karnataka would help in

- Further enhance local direct and indirect employment opportunities in the project influence area
- Promote the development of ancillary industries, medium-small scale trade & commercial establishments, local entrepreneurship and diversification in skill set
- Generate local income, boost the local purchasing power and promote an increase in land prices & rent
- Contribute to the local economy and the state revenue.

The peripheral development activities that would be undertaken by the proposed expansion project will focus on vulnerable communities in the project influence area. The project would bring forward an overall socio-economic development with emphasis in the areas of employment, education, training, health and infrastructure.

for METAMORPHOSIS Project Consultants Pvt. Ltd.,

Dr. Shanth A. Thimmaiah
EIA Co-ordinator

for Baba Akhila Sai Jyothi Industries Pvt. Ltd.,

BABA AKHILA SAI JYOTHI INDUSTRIES PVT. LTD. Hyderabad

Krishna Murthy
Authorized Signatory