Executive Summary

of

Expansion of Iron Ore Beneficiation (63,000 TPA to 2,00,000 TPA), Sponge Iron (62,700 TPA (2x95 TPD) to 4,58,700 TPA by installation of additional 2X100 TPD and 2X500 TPD), Captive Power Plant (4 MW to 22 MW WHRB and New15 MW AFBC) and Installation of New Unit of Iron Ore Crushing and Screening Plant (2,00,000 TPA), Iron Pellets Plant (1.0 MTPA) and Coal Gasifier (40,000 Nm^3/hr)

Project by

LLOYDS METALS

M/s. Lloyds Metals and Energy Limited

at

MIDC Konsari, Village: Konsari, Tahsil: Chamorshi,

Dist: Gadchiroli, Maharashtra

Environmental Consultant
Pollution and Ecology Control Services
Accreditation no.: QCI/NABET/ENV/ACO/20/1530

EXECUTIVE SUMMARY

1.0 INTRODUCTION

Lloyds Metals and Energy Limited (LMEL), one of the biggest Sponge Iron manufacturers in Vidarbha region is a unit of Lloyds group. LEML had initially set up its first 500 TPD kiln with the rated capacity of 1,50,000 TPA by opting OSIL-Technology in the year 1994-95 at the Ghugus MIDC, District- Chandrapur (Maharashtra). Experiencing various technical constraints with deterioration in their inputs quality, LMEL has opted for conversion of its 500 TPD kiln from OSIL technology to well proven Lurgi technology. Later the unit has expanded by installing 4 X 100 TPD kilns(with Lurgi technology) in the year 2006 and achieved its production capacity of 2,70,000 TPA.

SEAC-I, Maharashtra has issued TOR to LMEL for the installation of Iron ore Beneficiation Plant of 63,000 TPA, Sponge Iron Plant of 190 TPD (2X95 TPD) and Captive power plant (WHRB) of 4 MW and Public Hearing has been carried out for the same and the final report has been submitted to SEAC-I Maharashtra for the grant of EC. Now, Standard Terms of Reference (TOR) has been issued vide letter F.no- J-11011/163/2020-IA II (I) dated 17th July 2020 for preparation of EIA/EMP report of expansion of Iron Ore Beneficiation plant from 63,000TPA to 2,00,000TPA, Sponge Iron 62,700 TPA (2x95 TPD) to 4,58,700 TPA by installing additional 2X100 TPD and 2X500 TPD), Captive Power Plant (WHRB) (4 MW to 22 MW and New 15 MW AFBC) and Installation of New Unit of

1) Iron Ore Crushing and Screening plant : 2,00,000 TPA
2) Establishment of Pellet Plant :1.0MTPA
3) Coal Gasifier: 40,000 Nm3/hr.

Table 1: Project at a Glance

Name of the Unit	**:**	Lloyds Metals and Energy Limited (LMEL),
Regd. Office	**:**	Lloyds Metals and Energy Limited, Plot No. A-1, A-2, MIDC Industrial Area, Ghugus, Dist: Chandrapur-442505
Plant Location	**:**	At MIDC-Konsari, Village: Konsari, Tahsil: Chamorshi, Dist: Gadchiroli, Maharashtra

Contact person	**:**	Mr. Prashant Puri
Tel No.	**:**	(+91)(07172)285103/285099/285398
Fax No.	**:**	(+91)(07172)285003
Present Proposal	:	• Expansion of Iron Ore Beneficiation from 63,000TPA to 2,00,000TPA, Sponge Iron 62,700 TPA (2x95 TPD) to 4,58,700 TPA by installing additional 2X100 TPD and 2X500 TPD), Captive Power Plant (WHRB) (4 MW to 22 MW and New 15 MW AFBC) and • Installation of New Unit of 1. Iron Ore Crushing and Screening plant : 2,00,000 TPA 2. Establishment of Pellet Plant :1.0MTPA 3. Coal Gasifier : 40,000 Nm3/hr
Land Area	**:**	125 Acres
Raw Materials for proposed expansion/ modernization & new units	**:**	1) Iron Ore fines, Bentonite, Binders, Flux for Pellet Plant and Coal for Fuel system in gasifiers. 2) Pellets and coal for sponge iron plant. 3) Coal and Char for power plant
Project Cost		Rs. 700 Cr.

S.N.	**Particulars**	**Details**
1.	Nature & Size of the Project	Expansion of Iron Ore Beneficiation plant (63000 TPA to 2,00,000 TPA), Sponge Iron 62,700 TPA (2x95 TPD) to 4,58,700 TPA by installing additional 2X100 TPD and 2X500 TPD), Captive Power Plant (WHRB) (4 MW to 22 MW and New 15 MW AFBC) and Installation of New Iron Ore Crushing and Screening Plant (2,00,000 TPA), Iron Pellet Plant (1.0 MTPA) with Coal Gasifier (40,000 Nm^3/hr) in existing premises of plant located at MIDC Konsari, Village Konsari, Tahsil Chamorshi, District Gadchiroli, Maharashtra
2.	**Location Details**	
ii	Village	MIDC, Konsari,
iii	Tehsil	Chamorshi
iv	District	Gadchiroli
v	State	Maharashtra.

vi	Co-ordinates	A 19°46'5.59"N 79°48'50.60"E B 19°46'7.76"N 79°48'45.57"E C 19°46'5.09"N 79°48'43.87"E D 19°46'12.26"N 79°48'29.62"E E 19°46'10.51"N 79°48'24.18"E F 19°46'14.04"N 79°48'19.21"E G 19°46'30.49"N 79°48'24.16"E H 19°46'18.75"N 79°48'57.13"E
vii	Toposheet No.	56M/9, 56M/10, 56M/13,56M/14
viii	Elevation above MSL	179 m
ix	Nearest Highway	SH-9 34 km NNW
x	Nearest Airport	Nagpur, 166 Km: NW
Xi	Nearest Railway Station	Kelzar ,34 Km : NW
Xii	Nearest Village	Konsari 0.5 Km : SSW
Xiii	Nearest Town	Chamorshi, 20Km.: NNE
Xiv	Nearest major water body	Konsari Lake, 0.7 km : SW Varti Wagu stream 3.0 Km: SW Uksa Wagu Stream: 4.5 Km: SE Vainganga River, 6.0 Km (NW-SW) Andhari River 7.5 Km SW Deotri Nala 4.0 Km S

2.0 PROJECT LOCATION

The expansion activity is proposed in the premises of existing plant located at MIDC Konsari, Village Konsari, Tahsil Chamorshi, of Gadchiroli District of state Maharashtra.

SIZE OR MAGNITUDE OF OPERATION

Details of proposed expansion of existing units with capacity enhancement / modernization and setting up of new units with final configuration are as follows:-

Sr.no.	Facilities	Before Expansion (TOR has been issued by SEAC-I, Maharashtra and final report submitted to SEAC-I Maharashtra)	After Expansion	Total after expansion
1.	Iron ore Beneficiation	63,000 TPA	1,37,000 TPA	2,00,000 TPA
2.	Sponge Iron Plant	2x95TPD(62,700 TPA)	2x100 TPD & 2x500 TPD (3,96,000 TPA)	4,58,700 TPA.
3.	Captive Power Plant	4MW (WHRB)	18 MW (WHRB) 15 MW (AFBC)	22 MW (WHRB) 15 MW (AFBC)
4.	Iron Ore Crushing & Screening Unit	-	2,00,000 TPA	2,00,000 TPA
5.	Iron Ore Pellet	-	10,00,000 TPA	10,00,000 TPA
6.	Coal Gasifier	-	40,000 Nm^3/Hr	40,000 Nm^3/Hr

Water Requirement

The total water requirement will be 6332 KLD which will be sourced by MIDC

Water requirement

Sr.No.	Purpose	Quantity (KLD)			Source
		Before Expansion	After Expansion	Total	
1	Sponge Iron Plant	280	1765	2045	MIDC water Supply
2	Iron Ore Beneficiation Plant	190	410	600	
3	Pellets Plant	-	700	700	
4	Gasifier System	-	300	300	

3	Power Plant	280	2370	2650	
4	Domestic	10	27	37	
Total		**760**	**5572**	**6332**	

Waste Water Generation and Utilization

Waste Water Generation and its Utilization

Sr.No.	**Purpose**	**Quantity (KLD)**		**Total Wastewater generation (KLD)**	**Utilization/Disposal**
		Before Expansion	**After Expansion**		
1	Sponge Iron Plant	06	33	39	Wastewater will be from cooling tower blow down. The entire waste water will be treated in Effluent Treatment Plant and treated waste water will be reutilized for cooling and dust suppression on roads and raw material yards as well as green belt development.
2	Power Plant	60	510	570	
3	Iron Ore Pellet Plant (Gasification System for Pellet Plant)	-	15	15	Phenolic waste water generated from gas cooling and cleaning system. It will be co-processed in After Burning Chamber of DRI Kilns
4	Domestic	8	21.6	29.6	Treated in STP and treated water will be utilized for green belt development
Total		74	579.6	653.6	

609 KLD Industrial waste water (sponge iron and power plant) will be treated in ETP and reused in the process. 15 KLD of Phenolic waste water generated from gas cooling and cleaning system of Gasification system, will be co-processed in After Burning Chamber of DRI Kilns. 29.6 KLD of Domestic waste water will be taken to adequately designed STP. The

treated water will be recycled for utilization in Green Belt Development. M/s LEML will be committed for ZERO Discharge of waste water. The Industry will install Effluent Treatment Plant (ETP). The waste water generated from various processes will be suitably treated and recycled for reuse within the plant premises

Power Requirement

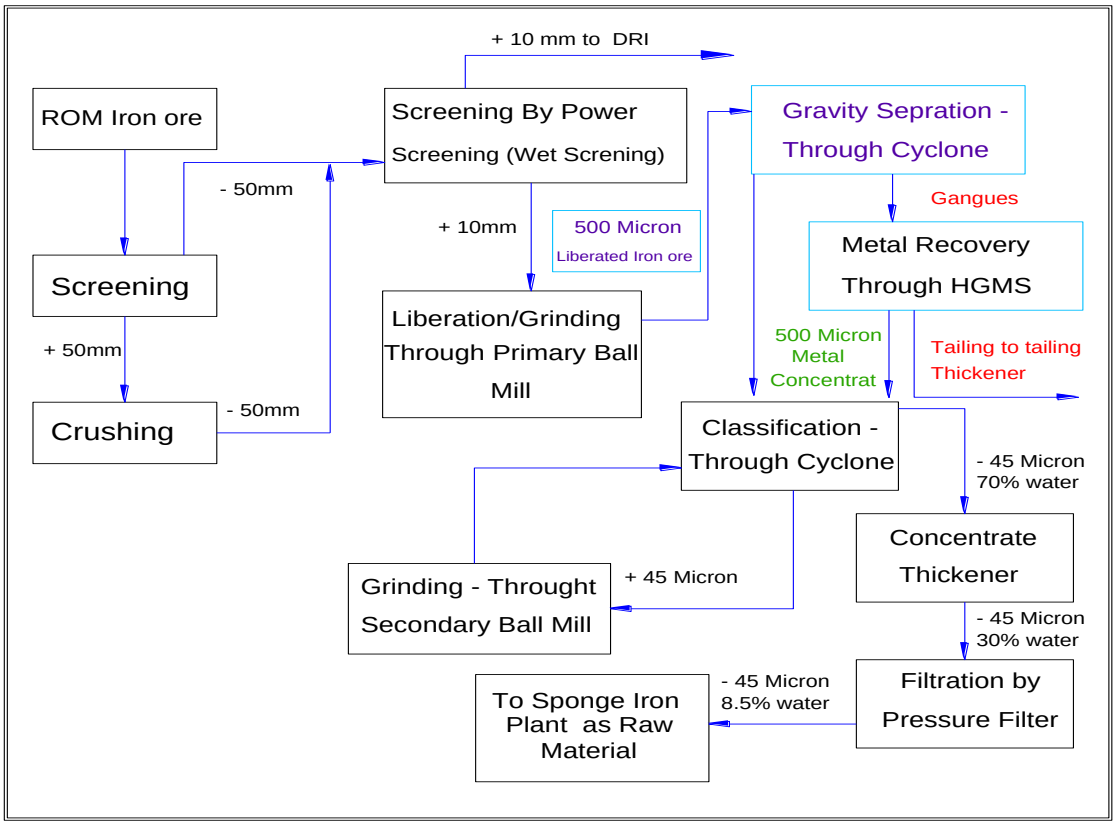
Power required for proposed expansion project is 45MW. Electric power will be supplied from own captive power plant and MSEB

Iron Ore Beneficiation Plant

The beneficiation plant is being set up for proper beneficiation of the iron ore from our captive mines. The iron ore from Gadchiroli captive mines will be crushed to size in the crushing plant. This is a physical process to reduce the non-ferrous impurities. \

The low grade iron ore fines needs to be concentrated for upgradation of Fe content through the process of beneficiation. Such an upgradation is done by elimination of unwanted gangue materials mainly Silica (SiO2) and Alumina (Al2O3) and few other trace elements found in the iron ore.

Primarily, the method of beneficiating iron ore fines includes washing out and eliminating the gangue constituents at every stage of the beneficiation process. The process flow sheet diagram is given as below



Flow chart for Iron Ore Beneficiation

Sponge Iron manufacturing Process

The process of sponge iron manufacturing involves removal of oxygen from iron ore. Sponge Iron also called as Direct-Reduced Iron (DRI) is produced from direct reduction of iron ore (in the form of lumps, pellets or fines) by a reducing gas using fuel i.e. natural gas or coal. The reducing gas is a mixture majority of Hydrogen (H_2) and Carbon Monoxide (CO) which acts as reducing agent. This process of directly reducing the iron ore in solid form by reducing gases is called direct reduction. In this process coal will be used for producing reducer gas and the process will be carried out in a Horizontal Rotary Kiln. The finished product i.e. sponge Iron observed under a microscope, resembles a honeycomb structure,which looks spongy in texture. Hence the name is called sponge iron. The reduction of Iron Ore can be achieved by using either carbon bearing material, such as non-coking coal or a suitable reducing gas in the form of reformed natural gas. The processes employing coal are known as solid-reluctant of coal-based processes while those employing reducing gases are known as gas-based processes

$C + O_2 = CO_2$

$CO_2 + C = 2CO$

$Fe_2O_3 + CO = Fe_2O_3 + CO_2$

$Fe_3O_4 + CO = FeO + CO_2$

$FeO + CO = Fe + CO_2$

Non-coking coal and iron ore along with limestone in the required size range and quantityare continuously fed into the feed end of the inclined rotary kiln through a feed pipe. The materials move along the length of the kiln due to its inclination and rotation. Air is blown in through required number of air tubes suitably located along the length of the kiln. At the feed-end of the kiln air is blown in through nozzles for drying and pre heating of the charge. Initial heating of the kiln is carried through a central oil burner located at the discharge feed end. As the charge moves through the kiln, it is heated by the hot gases, which flow in the opposite direction to the charge (i.e. counter current flow). The initial part of the kiln (about 30%) is called the pre Heating zone, where moister in the charge and volatiles in the coal are removed / burnt off as waste gases.

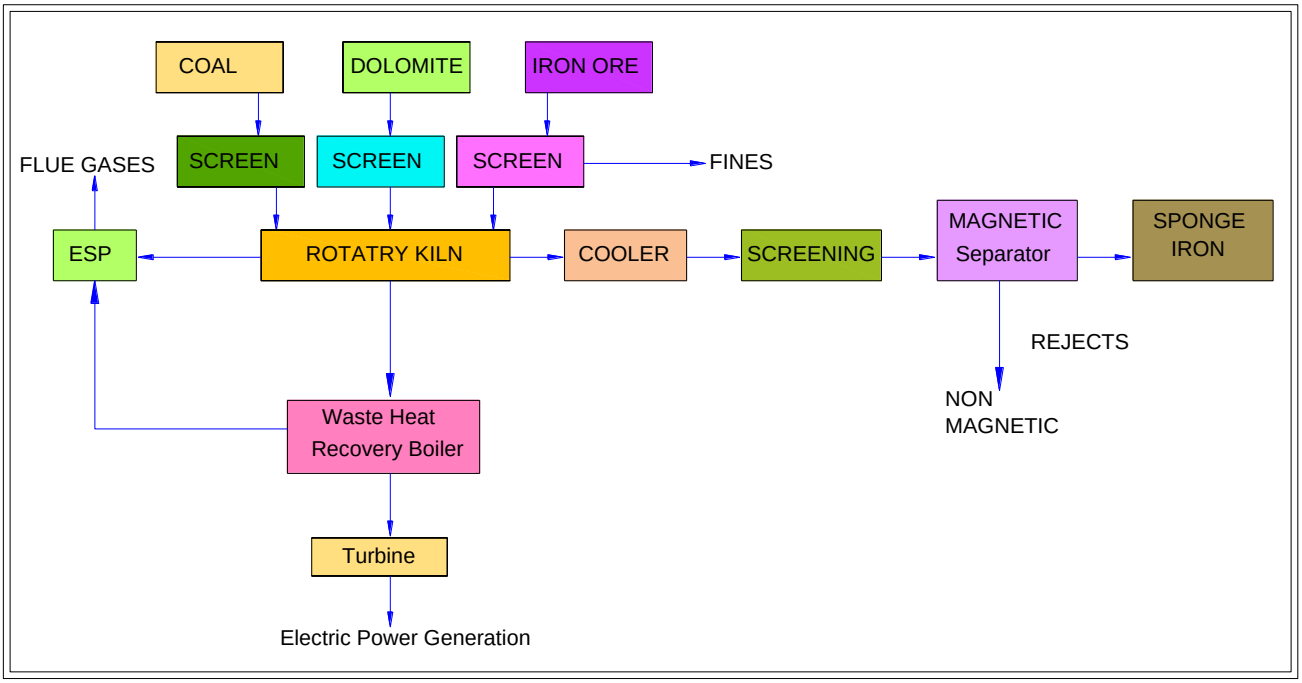
The required heat in this zone is provided by the combustion of the feed coal. The remaining portion of the kiln is called as the reduction zone. In iron ore is removed leaving metallic iron as per the following chemical reaction.

$$3FeO_3 + CO \text{ ----------} 2\ Fe_20_4 + CO_2$$

$$FeO + CO \text{ ----------} Fe + CO_2$$

The CO is generated for the above reaction according to $CO_2 + C$ above 900 deg. C, carbon monoxide will combine with the oxygen in the iron ore forming carbon dioxide and thus reduce the ore to metallic state. faster would be the oxygen removal.

After the removal of oxygen and grater is the metallization of sponge iron. Metallization levels can roughly be checked by density of the sponge iron. It can also be judged by the metallic luster if a sample is rubbed against a rough surface.



Block Diagram of Sponge Iron Manufacturing Process

After the iron ore has been metallic to the desired level, sponge iron and residual char are discharged from the kiln into a rotary drum type cooler. In the cooler sponge iron is cooled to below 250 deg. C before the material is discharged on to a belt conveyor.

If the sponge iron were exposed to air at high temperatures (i.e. above 250 deg C) it would tend to re oxidize. It is therefore, necessary that the temperature of the product at the point of discharge from the cooler is as close as possible to the ambient temperature. The reduction process occurs in solid state. The crucial factor in this reduction process is the controlled combustion of coal and its conversion to carbon monoxide to remove oxygen from the iron ore.

The overall process extends to a period of 10 to 12 hours inside the kiln. During this time, iron ore is optimally reduced and the hot reduced sponge iron along with semi-burnt coal is discharged to a rotary cooler for indirect cooling to a temperature of around 12 °C. Sponge iron being magnetic in nature, the discharge from cooler main drive consisting of sponge iron, chars & other contaminations are routed through electromagnetic separators, to separate other

impurities from sponge iron. The product is then screened in size fractions of lump (+3mm) and fines (0-3 mm). Separate bins are installed to preserve its quality, reduce re oxidation and facilitate faster loading on to the trucks.

Power Generation

Waste heat recovery system to generate Power

In Sponge Iron manufacturing, flue gases are generated with a temperature of 900-1000 C during the process. This heat is cooled without utilizing heat by supplying the air by using FD fans. The heat content in the flue gas is enough to generate the power by installing the waste heat recovery system i.e. boiler. The high temperature flue gases are pass through the boiler for generate the steam and that can be used in turbine to generate the power.

Background

All sponge Iron Manufacturing Industries in India are coal based industries and flue gases are generated during the process which have higher temperature i.e.900-1000 Deg C. These industries are operated throughout the year. At present all industries are not utilizing the heat from the flue gases and cooled by FD/GCT system before sending to ESP. Thus power generation using generated flue gases are one of energy conservation opportunities in sponge iron plants by installing waste heat recovery system.

Energy Conservation Potential

In 500 TPD coal based sponge iron plants, during the process at least 120000 m^3/hr flue gases are generated and having the temperature of 900-1000C. The heat from the flue gas is recovered using Waste Heat recovery Boiler and generates at least 11 MW power. The total power generated in sponge iron plants are depends on installed capacity of sponge iron plants.

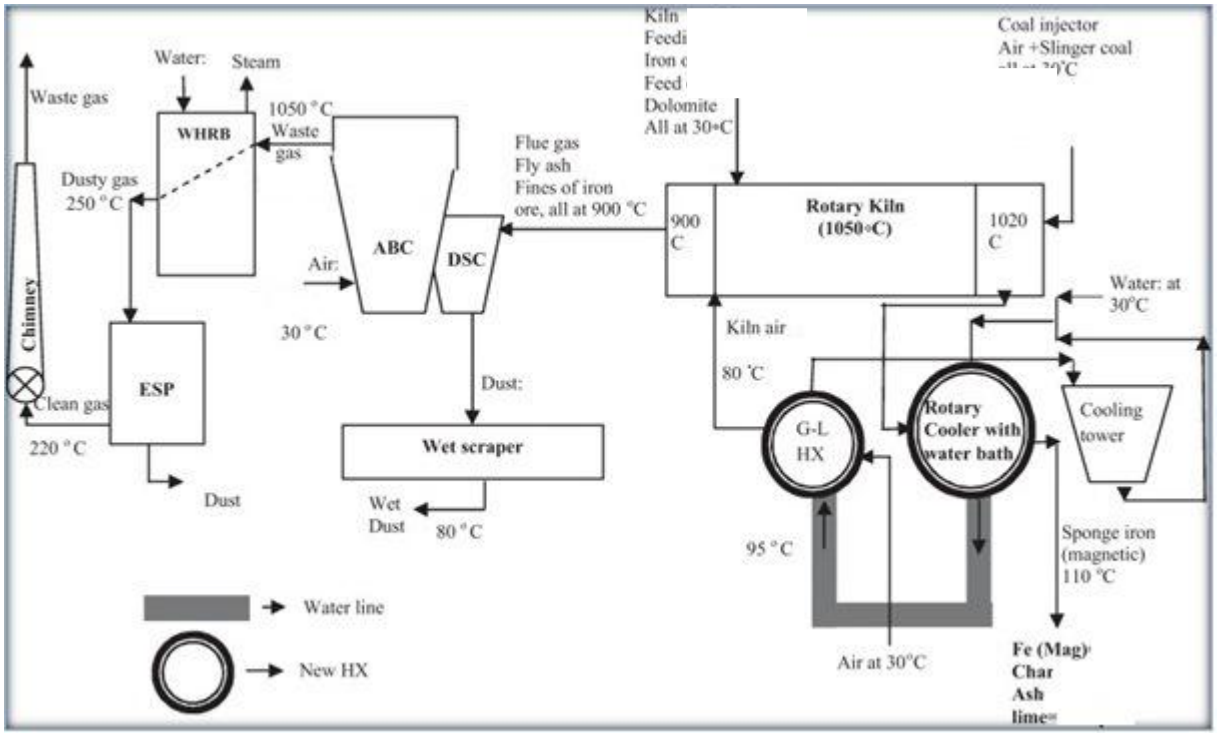
Technical Specifications

Process Details

The waste gases generated from the Rotary kiln is passed through the boiler to generate the steam. The generated steam is used for generation of power. The temperature available in flue gasses is enough to generate the required steam for power generation through boilers. The

boiler is a bi-drum, water tube boiler.

The super heater in boiler is designed for an outlet temperature of 490 deg C. The gases leaving the kiln would enter a super heater. The gases leaving the super heater would enter a set of boiler bank tubes are expanded into the steam and water drums. The gases after passing across the boiler bank would enter a bare tube economizer. This is an inline counter flow economizer and heats up the feed water going to the drum.



Power Generation

The gases are reduced to around 180 Deg C for the economizer. After the economizer, the gases are let into a Bag Filter which is provided to reduce the dust emission level. An ID fan has been provided to take care of the gas draft losses in the system. The steam turbine is of multistage horizontal spindle condensing type turbine. The turbine is provided with gear unit capable of continuously transmitting the necessary power and designed for speed reduction ratios for the turbine

Availability of Technology /Equipment

Power generation from waste heat gases Technology is proven in sponge Iron plants and operating successfully in many sponge Iron plants in India. The technology is available and

manufacturing in India by few major companies.

Benefits

The following benefits are expected by Installing waste heat recovery Power plant using flue gases during the process in sponge iron plants.

- Heat from flue gases is used for power generation. No other raw material is required for power generation
- Reduction in environment Pollution
- Generated power can be used in SMS which is high power requirement industry. This will save the energy cost.
- Reduce the GHG emissions.

Iron Ore Crusher & Screening Facilities

Iron Ore Crusher and Screening is proposed to be setup. The ROM from Gadchiroli captive mines will be received in dumping yard. The received ROM would be in the size range upto 1000 mm. The ROM will be fed into the Ground Hopper by dumpers/trucks.

Crushing Unit

- The material will be fed to Ground Hopper and then to Grizzly Feeder
- From Grizzly Feeder material will flow in two ways;
- One flow will pass from Grizzly Feeder of 400 TPH subjected to another Grizzly Feeder and goes to Jaw Crusher
- After crushing in Jaw Crusher the material goes to Vibrating Screen where it will separate to sizes 0-10 mm, 10-40 mm and 40-80 mm.
- 0-10 mm is the Product-1 which in turn goes to Loading Hopper.
- 10-40 mm is the Product-2 subject to smooth Roll Crusher to make the size to 0-10 mm as Product-3 and goes to Loading Hopper.
- 40-80 mm the oversize material goes to Cone Crusher for further crushing which after crushing takes back to Vibrating Screen.
- Another flow of material passes from Grizzly Feeder subject to Primary Jaw Crusher and after crushing the material flows to Vibrating Screen where it will separate to sizes 0-10 mm, 10-40 mm and 40-250 mm.
- 0-10 mm material is the Product-1 and 10-40 mm is the Product-2.

- 40-250 mm takes back to Primary Jaw Crusher for further crushing through Grizzly Feeder.

Screening Unit

- The material will be fed to Ground Hopper and then to Vibrating Screen.
- After screening, the material will separate to 0-10 mm Product-1, 10-25 mm Product-2 and 25-250 mm Product-3.
- Product-3 of size 25-250 mm will pass to the Ground Hopper of Crushing Unit for reducing the size of the material

Iron Ore Pellet Plant with Gasification System

The company is proposed to establish iron ores pellet plant in existing plant premises for production of 1.0 MTPA pellet using iron ores fines source from captive mines of Gadchiroli.

Iron Ore Pellet Plant

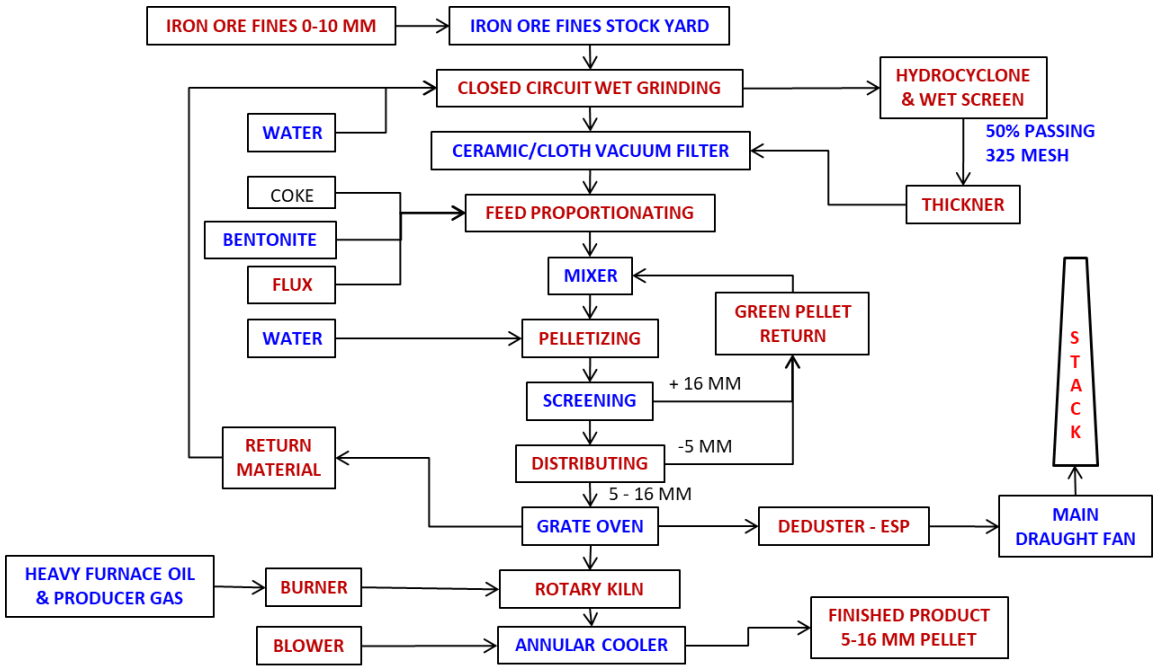
In order to make entire technological level, environment protection level, advanced stage and suitable for operation and maintenance, it is designed to have some new material, new technology, new process, new equipment and new structure, with aim at improving reliability, reducing investment, extending life campaign, lowering operation cost, facilitating maintenance and replacement.

- Drying, Preheating, Baking, Cooling etc are carried on different equipments including travel grate machine, rotary kiln and annular machine, leading to uniform quality of product and reliable and simplified equipment.
- Each set of equipment can be controlled individually and adjusted conveniently, which is strongly adapted for raw material, particularly hematite.
- Good adaptability for fuel. Low fuel consumption, power consumption and low operation cost.
- Rotary kiln is step-less adjusted by speed reducer and AC frequency converter to enable operation smooth and stabilized.
- To adopt advanced air flow system, fully recovering sensible heat of high temperature flue gas generated from annular cooler, making utilization of thermal

energy to the maximum extent, and lowering thermal consumption of pellet.

- Main operation process are centralized controlled and adjusted by computer, main technological process are monitored and administrated by industrious TV with high automatic control level.
- High attention is put on the protection of environment, which purify the dust contained waste gas by use of high effective dust catcher to discharge into the air after reaching standard discharge norm.
- Dust is collected in centralized manner, which can be fully recovered and utilized.

Flow Sheet of Pellet Plant



Coal Gasification

Coal Gasifiers of 40,000 Nm3/hr is estimated for pellet plant. Coal gasification process is one of the cleanest technologies currently available. In the process of coal gasification, water gas is produced with zero fugitive emission. The coal gasification process stands better in comparison to other fuels and there is about 50% reduction in the air emissions.

The Coal Gasification Facility consists of:

- Coal sizing.
- Coal conveying from ground hopper to top of battery of coal Gasifiers.

- Coal Gasifiers.
- Gas cleaning system consisting of gravity settlers, cyclones and electrostatic tar precipitator.
- Insulated gas piping.
- Process water system.
- Ash handling consisting of ash conveyor and storage hopper
- Instrumentation, automation & control for the entire facility

3.0 DESCRIPTION OF THE ENVIRONMENT

ENVIRONMENTAL MONITORING PROGRAMME

Baseline Environmental status in and around the proposed activities indicates the existing quality of Air, Noise, Water, Soil and Socio-economic environment. The baseline environmental quality for the study period of September to December 2020 has been assessed within 10 km radial distance from the proposed plant site.

But all surrounding area are sensitive areas due to Naxalite activities, so the monitoring was not possible for 13 weeks in such locations, monitoring in these locations was done only for six weeks. The schedule of environmental monitoring programme is presented in below **Table**

SCHEDULE OF ENVIRONMENTAL MONITORING PROGRAMME

Environmental Component	**Monitoring period**	**Number of sampling Stations**	**Parameters**
MICRO - METOROLOGY	15-09.2020 to 15.12.2020	01	Temperature, Relative Humidity, Rainfall, Wind Speed, Wind direction
AIR QUALITY	15-09.2020 to 15.12.2020	08	PM_{10} , $PM_{2.5}$, SO_2, NOx, CO
WATER QUALITY	October 2020	08 Surface & 08 Ground	Parameters as per IS-10500:2012 and IS-2490:1982
NOISE LEVEL	October 2020	08	L_d, L_n & L_{dn}
SOIL QUALITY	October 2020	03	Physico & Chemical characteristics as per Indian Standards (IS 2720)

Air Environment

The ambient air quality monitored at 8 locations selected based on predominant wind direction, indicated the following ranges;

PM_{10} : 41.8 to 55.8 $\mu g/m^3$.

$PM_{2.5}$: 19.0 to 32.8 $\mu g/m^3$

SO_2 : 10.9 to 18.7 $\mu g/m^3$

NO_x : 17.4 to 29.9 $\mu g/m^3$

Industrial Area Residential, Rural Area (CPCB Norms)	PM_{10}	$PM_{2.5}$	SO_2	NOx
	100 $\mu g/m^3$	60 $\mu g/m^3$	80 $\mu g/m^3$	80 $\mu g/m^3$

The concentrations of PM_{10}, $PM_{2.5}$, SO_2 and NO_x were found within the National Ambient Air Quality Standards (NAAQS).

At present, there is not a single unit is installed for any product at project site. Further, there is no air polluting industries surrounding the project site except cotton industry (4.5 km away). The Observed concentration of PM_{10}, $PM_{2.5}$, SO_2, NOx at all location are may be due to the other activities like vehicular, biomass burning, road dust etc. All observed values are below the NAAQ standards for Industrial/ Residential/ Rural areas at all locations.

Water Environment

A total 16 samples including eight surface & eight ground water samples were collected and analyzed. The water samples were analyzed as per Standard Methods for Analysis of Water and Wastewater, American Public Health Association (APHA) Publication.

It was observed that the characteristics of the surface and ground water samples were found to be within the permissible limits stipulated standard for drinking water (BIS 10500 – 2012) except the total coliforms in surface water samples which may be due to the human activities observed during sampling and requires disinfection before use for drinking purpose.

Noise Environment

Noise levels are in the range of 32.1 – 56.6 dB (A)) at all eight stations. Maximum levels of

noise have recorded in day hours which are natural as our most of activities have done in day hours. Noise levels measured at all eight stations (N-1, N-2, N-3, N-4, N-5, N-6, N-7 and N-8) are low and well within limit of either 65.0 dB(A) for Residential Area or 75.0 dB(A) for Industrial Area as given in MoEF&CC Gazette notification for National Ambient Noise Level Standard.

Land Environment

Samples collected from different land use classifications indicating the soil Sample were Reddish Brown and Red in colour. All the major nutrients were present, namely, nitrogen's presence is very less to better, phosphorus is good in quantity and potassium is very less to average in quantity. The results also show that the soil needs to be replenished with nutrients like nitrogen and potassium

4.0 ANTICIPATED IMPACTS & MITIGATION MEASURES

The Cumulative GLC for PM_{10} comes out to be 0.790 µg/m^3 and for SOx is 5.81 µg/m^3 and for NOx it is 4.20 µg/m^3 in East Direction. The predicted ground level concentrations obtained when superimposed on the baseline concentrations will be within the prescribed NAAQ Standards.

The emissions due to transportation of vehicles in the study area were determined from fuel-based emission factors and number of vehicles plying on roads in the area. Loading and transportation of raw materials are the significant sources of emissions.

The majority of trucks (95%) plying in the study area are manufactured in India as per the standard norms hence it is assumed that emission from these trucks will be similar, as emission norms are same for the vehicle used in India and is mandatory for the manufactures to follow emission norms under the Motor Vehicle Act. The present project proposal is envisaged for expansion, within the premises of the company.

Impact on Noise Levels and Mitigation Measures

During operation, the major noise generating sources are crushing mill, auto loading section, electric motors etc. These sources will be located far off from each other. Under any circumstances the noise level from each of these sources will not exceed 75 dB (A).

Noise levels generated in the project site will be confined to the noise generating plant units

hence the impact of noise levels on surroundings will be insignificant

Mitigation Measures

The noise levels will not exceed the standards stipulated by Central Pollution Control Board at any point of time. The equipments will have inbuilt noise control devices. The measured noise level produced by any equipment will not exceed 75 dB(A) at a distance of 1.0-m from its boundary in any direction under any load condition. The noise produced in valves and piping associated with handling compressible and incompressible fluids will be attenuated to 75 dB(A) at a distance of 1.0 m from the source by the use of low noise trims, baffle plate silencers/line silencers, acoustic lagging (insulation), thick-walled pipe work as and where necessary. The general mitigation for the attenuation of the noise are given below:

- Encasement of noise generating equipment where otherwise noise cannot be controlled
- Providing noise proof cabins to operators where remote control for operating noise generating equipment is feasible.
- In all the design/installation precautions are taken as specified by the manufacturers with respect to noise control will be strictly adhered to;
- High noise generating sources will be insulated adequately by providing suitable enclosures;
- Use of lagging with attenuation properties on plant components / installation of sound attenuation panels around the equipment
- Other than the regular maintenance of the various equipment, ear plugs/muffs are recommended for the personnel working close to the noise generating units;
- All the openings like covers, partitions will be designed properly
- Inlet and outlet mufflers will be provided which are easy to design and construct.
- All rotating items will be well lubricated and provided with enclosures as far as possible to reduce noise transmission. Extensive vibration monitoring system will be provided to check and reduce vibrations. Vibration isolators will be provided

to reduce vibration and noise wherever possible;

- The insulation provided for prevention of loss of heat and personnel safety will also act as noise reducers.

Impact on Water and mitigation Measures

The total water requirement will be 6332 KLD which will be sourced by MIDC. 609 KLD Industrial waste water (sponge iron and power plant) will be treated in ETP and reused in the process. 15 KLD of Phenolic waste water generated from gas cooling and cleaning system of Gasification system, will be co-processed in After Burning Chamber of DRI Kilns. 29.6 KLD of Domestic waste water will be taken to adequately designed STP. The treated water will be recycled for utilization in Green Belt Development. M/s LEML will be committed for ZERO Discharge of waste water. The Industry will install Effluent Treatment Plant (ETP). The waste water generated from various processes will be suitably treated and recycled for reuse within the plant premises

Terrestrial Ecology

Biological Environment

The district is economically backward. There are many Rice Mills in the district as the Paddy is the main agriculture product.

There shall not be any loss or reduction of species and habitat due to the project site. Project site is located in existing plant premises No site clearance or vegetation will be removed.

During the EB study No Endemic, Rare, Endangered and Threatened (RET) species of flora and fauna were found in the study area.

There shall not be any impairment of ecological functions such as (i) disruption of food chains, (ii) decline in species population and or (iii) alterations in predator-prey relationships. Plant will be equipped with Air Pollution Control Device, No waste water will be release from production process, and green belt will be developed for noise

Solid Waste Generation

The solid waste generated from each technological process units and modes of disposal is given in the table below and detail of waste utilization is given in following table

Table --: Solid Waste Management in Pellets plant Iron

Solid Waste generation	Total Quantity (TPA)	Utilization/ Disposal
Sponge Iron		
Char & Dolochar	47,520	It will be used in own captive power plant (AFBC) & sold to secondary users viz. nearby power plant if required.
ESP Dust	47,520	It will be used for brick manufacturing and land filling
Power Plant		
Ash	27720	Land filling / leveling and supply to brick manufacturing units/ cement plants
Iron Ore Beneficiation Plant		
Tailings	60,000	Tailings from beneficiation plant will be used in embankments, road formation, filling of low-lying areas and as additives in cement manufacturing.
Iron Ore Pellet Plant with Gasification System		
Ash	57275	Sold to Brick manufacturer/cement plant
Tar	4000 KL	Utilization in kilns of pellet plant.

Impact on Socio-Economic Environment

M/s LEML will be provide employment 795 workers. The local persons have been given preference in employment as per the qualification and technical competencies. In order to mitigate the adverse impacts likely to arise in the proposed project activities and also to minimize the apprehensions to the local people, it is necessary to formulate an affective EMP

for smooth initiation and functioning of the project. The overall impact on the socio economic environment will be significant.

5.0 ENVIRONMENTAL MONITORING PROGRAMME

Source \ Stack Monitoring:

The emissions from the stacks will be monitored through MoEFCC/NABL Accredited Laboratory for exit concentration of Particulate Matters, SO_2 and NO_X as per statutory requirement for each stack by using stack sampler.

All the main stacks are equipped with Online Continuous Stack Emission Monitoring system along with remote calibration facilities for gaseous analyser for real time measurements of exit concentration from the stacks. The Online Continuous Stack Emission Monitoring systems will be connected with the server of the CPCB and MPCB.

Performance Analysis of Pollution Control Equipment

The performance analysis of all the pollution control equipment is being carried out once in three months. The same monitoring frequency shall be maintained at all the pollution control equipment.

Ambient Air Quality Monitoring

Ambient air quality monitoring at 4 locations in and around the plant will be carried out by NABL accredited lab on regular basis and reports are being submitted to MPCB regularly.

Ground Water and Waste Water Quality Monitoring

Ground water quality & Waste water quality samples will be collected and analyzed by NABL accredited lab. Reports are being submitted to MPCB, CPCB and MoEF.

Plant will be maintaining zero liquid discharge and as per guidelines issued by CPCB flow meter with camera is also installed and connected with CPCB server.

Monitoring of Rain Water Harvesting

Piezometer with Telemetry shall be provided within 100 m of water extraction structure on existing and on-going Rain Water Harvesting Project.

Noise Environment

Noise levels will be monitored at various locations of the plant for day and night time as per

the CPCB guidelines.

Fugitive emission

Monitoring of Ground level dust concentration/Fugitive emission along with gaseous pollutants viz SO_2, NOx will be carried out periodically. Dust concentration and gaseous emission levels from all the fugitive sources are well within prescribed limit and it is being regularly monitored.

Necessary control measures are being adopted to keep the secondary fugitive emission within limits.

6.0 ADDITIONAL STUDIES

The additional studies as per the ToR issued by MoEF&CC are Public Consultation, Social Impact Assessment, Risk Assessment, & Disaster Management Plan.

7.0 PROJECT BENEFITS

The proposed expansion will result in improvement of infrastructure as well as upliftment of social structure will further strengthen the existing facilities. The people residing in the nearby areas will be benefited directly or indirectly as per their educational qualification. It will also help in development of infrastructure such as road transport, educational facilities, water supply and sanitation. Based on the social impact assessment study following activities will be carried out under CER. In addition to this, after public hearing, based on the requirement CER Fund will be spent. As per the Office Memorandum No. 22-65/2017-IA.III dated 20th October 2020 based on the issued raised at the time of public hearing the CER will be detailed in the Final EIA Report.

8.0 ENVIRONMENTAL MANAGEMENT PLAN

Environmental Management Cell

A separate environmental management cell will be established to implement the management plan. The group will be headed by a Chief General Manager. The group will ensure the suitability, adequacy and effectiveness of the Environment Management Program. The functions of Environmental Management Cell will be:

- Obtaining consent order from State Pollution Control Board.
- Environmental monitoring.

- Analysis of environmental data, preparations and submission of report to statutory authorities, & Corporate Office.
- To co-ordinate with statutory bodies, functional groups of the plant units & head office.
- Interactions with plant official for modification programme if any to improve pollution control devices / systems.
- Environmental Appraisal (Internal) and Environmental Audit.

The following mitigation measures will be undertaken for the proposed project

AIR POLLUTION

The major pollutants of air in a proposed plant are the particulate matters from the various stacks and fugitive emissions due to material handling. The automatic process equipments will be employed for the raw material feeding system. Stacks of adequate height along with ESP for sponge iron and pellet plant is proposed for proper dispersion of flue gases. Plantation along the internal roads in the plant premises will be strengthen and all the internal roads shall be concreted / asphalted to reduce the fugitive dust due to vehicular movement. Dust collected from ESP's and Bag Filters (dedusting units) will be reused. The plant will be further equipped with Natural Draft Exhaust Fans attached to shed for ventilation. The gases generated from Sponge Iron project will be re-used to generate electricity. The fuel for AFBC power plant is Coal and Char/Dolochar. The following pollution control measures will be installed. At all the points, Dust Collectors/ dust suppression systems will be installed. Water sprinklers will be provided across the plant.

WATER POLLUTION

The total water requirement will be 6332 KLD which will be sourced by MIDC. 609 KLD Industrial waste water (sponge iron and power plant) will be treated in ETP and reused in the process. 15 KLD of Phenolic waste water generated from gas cooling and cleaning system of Gasification system, will be co-processed in After Burning Chamber of DRI Kilns. 29.6 KLD of Domestic waste water will be taken to adequately designed STP. The treated water will be recycled for utilization in Green Belt Development. M/s LEML will be committed for ZERO Discharge of waste water. The Industry will install Effluent Treatment Plant (ETP). The waste water generated from various processes will be suitably treated and recycled for reuse within the plant premises

NOISE POLLUTION

Regular maintenance of the various equipment, ear plugs/muffs will be provided for the personnel working close to the noise generating units. Further all the openings like covers, partitions will be designed properly to abate noise pollution.

SOLID WASTE DISPOSAL AND MANAGEMENT

The solid waste generation from the proposed Pellet plant will be ash generation will be sell to authorized vendors/brick manufacturing unit. The tar generation from plant will be reutilized pellet plant manufacturing plant. The ash generated from the CPP will also be sell to authorized vendors/brick manufacturing unit. Tailings from beneficiation plant will be used in embankments, road formation, filling of low-lying areas and as additives in cement manufacturing. The char/dolochar from sponge iron will be used in captive power plant & sold to secondary users viz. nearby power plant and ESP dust will be sell to authorized vendors for brick manufacturing/landfilling purpose.

GREEN BELT DEVELOPMENT

Out of 125acres 33% (41.25acres) land will be developed as green belt. Adequate green belt will be developed in plant premises. Locally available types of trees as specified by the Pollution Control Board will be planted, which are resistant to pollutants.

9.0 CONCLUSION

It can be concluded that there would be negligible impact in the buffer zone due to the proposed expansion. The project shall contribute to the socio-economic development, strengthening of infrastructural facilities like medical, educational etc. The plant shall be operated keeping "Sustainable Development" of the region in mind.

Further, management is committed to contribute towards improving socio-economic status of the surrounding local community.

Environmental monitoring is a successful tool for the management for implementation of adequate & effective environmental measures. It also helps the management to take mid-course correction, if required based on the environmental monitoring results. Considering the above overwhelming positive impact on the community, there shall be overall development of the area.