CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

CONTENTS

Annexes

SECTION A. General description of project activity

A.1 Title of the project activity:

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Title of project activity : GIPPL Waste Heat based 11.5 MW Captive Power Project

Date and version of PDD : 12/12/2006 version 1

A.2. Description of the project activity:

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Purpose of project activity

The purpose of the project activity is to achieve efficient use of waste heat to generate 11.5 MW electricity. The electricity so generated shall mainly be used to meet the captive power requirement of GIPPL sponge iron Plant itself.

The project activity generates 11.5 MW electricity by generating steam using waste heat contained in the waste flue gases coming out from each After Burning Chamber (ABC) of 4 numbers 100 TPD Direct Reduced Iron (DRI) Sponge Iron Kilns. The heat contained in 27000 NM3/ h of waste gases approximately at 1000 deg c coming out of each ABC will be transferred to water and the heat converts water in to steam in 4 numbers Waste Heat Recovery Boilers(WHRBS) each producing 12 tonnes/h steam. Steam generated from 4 WHRBS is combined in a header which also receives 12.3 tonnes/h of steam from coal based FBC boiler (FBCB) so that total 60.3 tonnes/hr of steam at and 490 deg C will be fed into the steam turbo-generator (STG) to generate 15 MW.

This PDD is developed for the 11.5 MW electricity generated in STG using WHRB steam.

Steam consumed in STG = 60.3 tonnes/h
WHRB steam used = 48 tonnes/h
WHRB steam contribution = 48* 15/ 60.3 = 11.95 MW

However we have considered WHRB contribution as 11.5 MW by rounding on lower side to be conservative as steam generated in WHRB is influenced by uncertainties in flue gas conditions and have developed this PDD.

The reduction in GHG emission from facility of the project arises from the replacement / displacement of an equivalent amount of electricity to the extent of 11.5 MW electricity generated from steam which is produced from heat recovered from waste gases, which would have been otherwise generated and supplied by coal based FBCB based captive power plant.

The total CO_2 emission reduction for the entire crediting period of 10 years have been calculated as 545790 tonne CO_2 –equivalent. The other benefits being reduction of GHG emissions considering global scenario, Sustainable development through better energy efficiency and it also leads to improvement of local environment.

GIPPL will put in place the electronic metering system connected to DCS to calculate the actual power generated out of the CPP, the project activity WHRB electricity and accurately record the reduction in CO_2 emissions. GIPPL will ensure complete transparency in monitoring, recording and calculating reduction in CO_2 emissions.

Background of the company

GIPPL is a sponge iron manufacturing complex and the product is sponge iron. The company has established 4 Nos. Sponge Iron Rotary Kilns of 100tonnes / day capacity each a using Coal as fuel. The company has plans

where expansion of capacities of sponge iron manufacturing and additionally induction furnaces to manufacture steel billets etc will be added to the manufacturing facilities.

The company is implementing 15 MW captive power plant by setting up one15 MW STG to meet totally its internal requirement of electricity.

Sustainable development due to project activity

The project activity will lead to sustainable development due to the following positive aspects.

Social benefit to state

The project activity requires GIPPL to employ skilled manpower and professionals on permanent basis as the project activity involves 4 numbers WHR boilers and 1 number STG and other equipment and during project execution time provides temporary employment to skilled and unskilled labour in civil and erection activities.

Maharashtra state is facing more than 3000 MW power shortage leading to power starvation and hence the project activity enables the state grid to bridge this gap by company not taking power from grid. This helps the grid to supply power to other consumers and meet its social obligation.

Economical Benefits to State

The project activity has investment of more than 400 million rupees most of it in capital equipment purchase. The capital equipment purchase improves the employment opportunities in engineering industry. The state will generate revenue out of sales tax, excise levy and octroi paid on all purchases.

Maharashtra state is facing more than 3000 MW power shortage leading to power starvation and hence the project activity enables the state grid to bridge this gap by company not taking power from grid. This helps the grid to supply power to other consumers and create economical activity leading to economical benefits to state

Environmental Benefit

In the absence of the project activity the hot gases would have been let into atmosphere at 1000 deg c or cooled in a scrubber with no gain in any form but leading to water consumption and resultant water pollution due to fly ash mixing with water. The Project activity uses waste heat recovery based Power Plant by utilizing waste heat from flue gases coming from process and thus effectively saving environment of thermal pollution and water pollution. The project activity displaces power from coal based captive power and hence reduces CO_2 emission

The proposed waste heat based power generation activity does not consume coal or any fuel, thus there is no generation of any solid waste like fly ash which would otherwise be generated on consumption of coal. Hence the environment is also benefited by reduced solid waste problem.

Reduction of T & D Losses of Power

The electricity generated by the project activity will be used for in house consumption without T&D losses as the power generated is consumed is consumed in the same facility. The state grid is having around 30% T&D losses.

Reduction in SPM level in the Atmosphere and other additional Economic benefits

The proposed ESP shall remove the ash from flue gases which will be collected in ash hopper. This ash will be given free of cost to cement plants and brick manufactures for further economic benefit and use. The ash is used for production of fly ash bricks which replace the conventional fired clay bricks and this saves the soil erosion and pollution caused by fired brick industry.

A.3. Project participants:

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Name of the Party Involved (host) host party-	Private and/or Public entity (ies) Project Participant as applicable	Kindly indicate if the party involved wishes to be Considered as project participant (Yes/ No)
India (host) Ministry of Environment and Forest	Public entity Gopani Iron and Power (India) Pvt Ltd-- Private entity Lloyds Steel Industries Ltd- private entity	No

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

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A.4.1.1. Host Party(ies):

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India

A.4.1.2. Region/State/Province etc.:

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Maharashtra, India

A.4.1.3. City/Town/Community etc:

Village:Tadali, District: Chandrapur

A.4.1.4. Detail of physical location, including information allowing the unique identification of this project activity (maximum one page):

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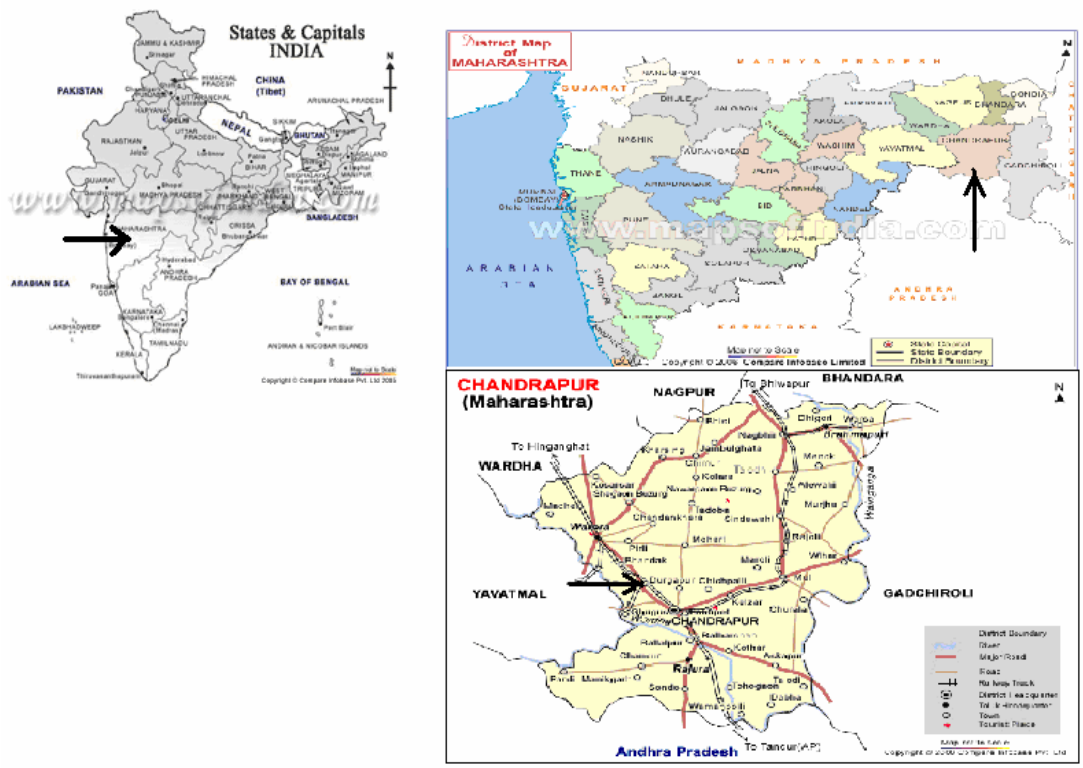
Physical Location:

The company is located in MIDC Growth Centre at village Tadali about 22 KM from Chandrapur town on Chandrapur-Hingaghat road. Plot no A-22. Latitude 19.59 E Longitude 79.11N


States & Capitals
INDIA
PAKISTAN
CHINA
(Tibet)
NEPAL
BHUTAN
BANGLADESH
ARABIAN SEA
BAY OF BENGAL
District Map
of
MAHARASHTRA
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KARNATAKA
CHANDRAPUR
(Maharashtra)
NAGPUR
BHANDARA
WARDHA
YAVATMAL
GADCHIROLI
CHANDRAPUR
Rajura
Andhra Pradesh

A.4.2. Category(ies) of project activity:

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The project activity is an electricity generation project utilising waste heat and falls principally in category –1 Energy Industries (Renewable /non renewable) as per Scope of Projects activities enlisted in the "list of sectoral scopes and approved base line and monitoring "methodologies" on the website for accreditation of "Designated Operational Entities".

The CDM PDD is based on approved methodology ACM0004 version 02 and sectoral scope 01 dated 3rd March 2006 "Consolidated Baseline methodology for waste gas and/or heat and/or pressure for power generation

A.4.3. Technology to be employed by the project activity:

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The Waste Heat Recovery (WHR) based Captive Power Plant at GIPPL is proposed to utilise the heat content of flue gases coming out of each ABC of Sponge Iron kilns. There are 4 WHR boilers. The details are as under:

PARAMETERS	WHRB(101,102 ,103,104) Data for each boiler
Capacity tonnes/hr	12
Steam pressure Bar a	75
Steam temperature deg c	490
Flue gas flow rate N m3/h	27000
Flue gas inlet temperature deg c	1000
Flue gas outlet temperature deg c	190
Boiler feed water temperature deg c	140
Sponge iron kiln number	1,2,3,4
Sponge iron kiln capacity TPD	100

The waste heat recovery boilers are based on designs of ERK Eckrohrkessel GmbH, Germany and the licence to manufacture these boilers is with Lloyds Steel Industries Ltd Engineering division. The process technology transfer is complete. The technology is environmentally safe and abides by Indian Boiler Regulation.

The Exhausted flue gases from each Rotary kiln shall be received at After Burning chamber (ABC) where the waste gas temperature likely to reach up to 1000 deg C by injecting atmospheric air. No auxiliary fuel is fired in ABC. The generated quantity and the temperature of flue gases are influenced by a number of operating parameters of the sponge iron plant. At the best operating levels this waste heat shall produce total of 12 tonnes/h of steam at 75 Bar abs pressure at 490^0C temperature in each WHR boiler. The boiler design is of single drum water tube with radiant chamber, along with convective super heater, economiser, attemperator and hoppers for ash collection as ash comes with flue gases.

The outlet boxes of the WHRB, leads to ESP to remove SPM from exhaust gases. The exhaust gas temperature shall be kept at 190^0C. The feed water temperature will be maintained at the inlet to economiser 140^0C.

The high pressure steam from 4 numbers WHRB is combined in a common header and total combined steam of 48 tonnes/hr is used to operate high efficiency extraction cum condensing multi stage Steam Turbine and Generator (STG) to generate 11.5 MW electricity. The details of STG are as under:

Inlet steam flow:		60.3 tonnes/h
Inlet steam pressure:		65 Bar a
Exhaust steam pressure:		0.1 ata
Exhaust steam temperature:		45 deg c
Turbine speed	:	7000 rpm
Power output	:	15 MW

Ash collected from both WHRB hoppers and ESP will be conveyed pneumatically to ash silo.

Other systems required are circulating water, Demineralised water plant, Instrument Air Compressor and Exhaust Steam Condenser.

Steam from Exhaust of steam turbine rotor will be condensed in water cooled condenser.

Only Demineralised water will be used in boiler to avoid scale formation on boiler tubes. Make up water is de-aerated.

Total Waste water is recycled and reused after treatment.
The generated power shall be used to meet the captive power requirement of the company.

The technology is environmentally safe and abides all legal norms and standards for SPM, emissions.

The project activity is likely to operate maximum for 335 days in a year. No supplementary fuel is used in WHRBS.

A.4.4 Estimated amount of emission reductions over the chosen crediting period:

>> The crediting period considered from date of registration.

Years	**Annual estimation of emission reductions in tonnes of CO_2eq**
1st year	54579
2nd year	54579
3rd year	54579
4th year	54579
5th year	54579
6th year	54579
7th year	54579
8th year	54579
9th year	54579
10th year	54579
Total estimated reductions (tonnes CO2 e)	545790
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes CO2 e)	54579

A.4.5. Public funding of the project activity:

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No public funding from parties included in Annex-I is available for the project activity

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the project activity:

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Consolidated baseline methodology for waste gas and/or heat and/or pressure for power generation.ACM0004/ Version 02, Sectoral scope: 01, 3rd March 2006.

B.2 Justification of the choice of the methodology and why it is applicable to the project activity:

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This methodology applies to project activities that generate electricity from waste heat or the combustion of waste gases in industrial facilities.

The methodology applies to electricity generation project activities;

. that displaces electricity generation with fossil fuels in the electricity grid or displace captive electricity generation from fossil fuels,

.where no fuel switch is done in the process where the waste heat or pressure or the waste gas is produced after the implementation of project activity.

The methodology covers both new and existing facilities. For existing facilities, the methodology applies to existing capacity, as well as to planned increases in capacity during the crediting period. If capacity expansion is planned, the added capacity must be treated as a new facility.

The project activity meets the applicability as it meets the above conditions set out in approved methodology as explained below

Condition 1 that displaces captive electricity generation from fossil fuels

1. The project activity includes waste heat recovery from waste flue gases generated from 4 x 100 tonnes/day capacity Sponge Iron kilns through 4 WHRBS by producing 48 tonnes/h of steam. The steam will be utilised to generate 11.5 MW power in the turbine.
2. The STG is designed to generate 15 MW electricity using 60.3 tonnes/h steam.
3. As the WHRB steam quantity is 48 tonnes/h, the balance 12.3 tonnes /h of steam is generated in coal/coal char based FBC boiler. The FBCB has inbuilt capacity of 45 tonnes/h of steam generation. However GIPPL will not operate the FBCB to its capacity. The steam generated in FBC will be equal to required balance quantity of steam after fully taking into consideration of full quantity of WHRB steam. That is, at optimum working conditions WHRBS produces 48 tonnes/h of steam and hence coal based FBC will only generate balance steam required by STG which is 12.3 tonnes/h (60.3-48=12.3 tonnes/h) even though FBCB can generate 45 tonnes/h steam.
4. Hence WHRB steam directly results in replacing/reducing the consumption of coal in FBC boiler. Electricity generated using WHRB steam displaces the fossil fuel (coal) dependant electricity generation in captive power plant. By successfully operating the project activity, the project activity will displace equivalent of 11.5 MW electricity generated from fossil fuel in coal based captive power plant.
5. The FBC has inbuilt capacity only to take care of situation when WHRB steam is not available as WHRB steam generation is subjected to lot of uncertainty due to variation in flue gas quantity and temperature due to the uncertainties in the sponge iron kilns.

Condition 2 no fuel switch is done in the process where waste heat or pressure or Waste gas is produced after the implementation of project activity.

The waste heat containing flue gases get generated during the direct reduction of iron ore using coal as fuel. This is a very established manufacturing process and company is situated close to coal belt.

Hence there will be no fuel switch in sponge iron manufacturing process after implementation of the project activity.

The project activity is new facility being created.

The other conditions of methodology met by project activity are:

. The base line calculations for CO_2 emission reduction are in line with approved methodology and are calculated using IPCC values for EF CO2 as the same is conservative and boiler efficiency is considered as 100% (in line with option B under base line scenario of captive power generation) to arrive at captive power plant efficiency as per ACM 0004 methodology.

. By successful operation of project activity, the project activity will be able to displace/ substitute equivalent to 11.5 MW power units of fossil fuel based electricity in captive power plant with an average emission reduction of 54579 tCO2/annum (**Ref. Section-D)**.

. The project activity adds no additional GHG emission.

Hence it is concluded that the selected methodology meets the conditions set out in approved methodology

B.3. Description of the sources and gases included in the project boundary

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In line with methodology, the project activity is for the recovery of waste heat from flue gases for generation of steam for generating the electricity in STG of CPP.

In the base line scenario, if the WHRB steam is not available then the electricity would other wise have been generated by burning additional coal in coal based FBC boiler of captive power plant.

In line with methodology the project boundary comprises of the Waste Heat Recovery Boiler, Captive Power generating equipment, Auxiliary equipment, Power synchronising system, steam flow piping, flue gas ducts, where project participant has full Control.

	Source	Gas		Justification / Explanation
Baseline	Coal based Captive Electricity generation	CO2	Included	Main emission source
		CH4	Excluded	Excluded for simplification. This is conservative.
		N2O	Excluded	Excluded for simplification. This is conservative.
Project Activity	Heat of waste gas for electricity generation	CO2	Excluded	In absence of the Project Activity the hot gases would have been let to the atmosphere. No extra fuel or support fossil fuel is fired.
		CH4	Excluded	Excluded for simplification
		N2O	Excluded	Excluded for simplification

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

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As per methodology the baseline alternatives should include all possible options that provide or produce electricity for in house consumption and /or sale to grid/or other consumers. The project Participant shall exclude baseline options that:

. do not comply with legal or regulatory requirements or

. depend on key sources such as fuels, materials or technology that are not available on the site.

The project participant is required to provide evidence and supporting documents to exclude baseline options that meet the above mentioned criteria.

In B.2 we have explained how the project activity meets methodology conditions.

As highlighted in methodology we consider the following potential alternatives

1. Proposed project activity not undertaken as a CDM activity
2. Import of electricity from grid
3. New CPP based on other alternative fuels
4. A combination of 2 and 3
5. Alternative use of waste heat from flue gases
6. The continuation of the current situation

Detailed explanations of each alternative are given below:

1. Proposed project activity not undertaken as a CDM activity

In absence of the CDM benefit the proposed project activity possibly could not be implemented due to number of barriers such as Investment barrier, Technology barrier, financial barriers etc. as explained in B.5.

Presently 11.5 MW WHRB CPP is being implemented to meet internal power demand.

In absence of the proposed project activity the electricity requirement would have been met by Coal/coal char/coal fines based captive power plant.

2. Import of electricity from grid

As the power from MSEDCL grid is mainly fossil fuel based, the reduction of CO2 emissions is not achieved in this situation. The electricity purchase rate of approximately Rs.4.00 per unit is high compared to captive based power generation cost and company has to face likely power cuts by grid resulting in production loss as MSEDCL is facing more than 3000 MW shortage. MSEDCL generated report on power shortage is part of B.5. Hence, GIPPL is putting up 11.5MW captive generating capacity to reduce the dependency on the grid and avoid production losses due to power interruptions. This option meets all legal and statutory requirements.

3. New CPP based Diesel oil as alternative fuels

A CPP based on diesel oil/ furnace oil is an option which meets legal and statutory requirements. The Diesel or any petroleum fuel based power Plants are not feasible due to higher cost of generation compared to the coal based electricity cost and even the grid power tariff. Also this option will add GHG gas emissions to the existing scenario. Hence this option is not economically feasible.

4 New CPP based Gas as alternative fuels

Natural gas is not available in this area and hence ruled out as possible fuel.

5 New CPP based coal as alternative fuels

GIPPL has the requirement of 15 MW electricity. WHRB steam can only generate up to 11.5 MW at optimum working conditions. Hence GIPPL is establishing coal/coal char/coal fines based boiler to supply balance steam required(12.3 tonnes/h) in STG . This boiler has inbuilt capacity of 45 tonnes/h as WHRB steam generation is subject to variation. Coal is abundantly available fuel as the state lies close to the coal belt. In addition, company will be generating approximately 45000 tonnes of char/coal fines which can be used in FBCB .Char can be sourced from other sponge iron manufacturers at low cost. The generating cost of coal based CPP will be lower at approximately Rs 1.18/unit and generation will be regular and achieves 90-95 % PLF.

There is no legal compulsion for sponge iron plant to set up the power generation through a waste heat recovery system. In addition to this there is also no restriction to generate own power through a captive power plant based on 100 % coal or based on coal mixed with char/ coal fines. Hence coal; char/coal fines based captive power plant is economically most attractive.

6 A combination of 2, 3,4 & 5

GIPPL has been buying electricity from MSEDCL grid. As MSEDCL is facing acute shortage in electricity distribution, company is likely to face power cuts situation putting company into production losses. Company decided to put CPP to eliminate dependency on unreliable MSEDCL grid electricity by putting captive power plant . Hence a combination with grid power carries uncertainties which project participant wants to eliminate by putting CPP. Hence this option is not favoured.

7. Alternative use of waste heat from flue gases

The waste heat is not useful in any form of use in the existing plant as GIPPL does not have heating requirements in the process of manufacture of sponge iron.

8 The continuation of current situation

Currently the GIPPL is drawing power from MSEDCL grid. It can continue to do the same. However the company does not want to depend only on grid power as grid faces 3000 MW shortage of power and may introduce practice of power cuts which result in production losses.

In view of the above, a coal based captive power plant which can run on Char/ coal fines is the most economical and dependable option for GIPPL since WHRB based power is not consistent. Annualised generation cost of WHRB power is found to be higher than FBCB power due to poor PLF achieved in WHRB CPP.

Economical Analysis of alternatives

Alternative	**Capital Cost**	**Generation / Procurement Cost per unit**	**Comment**
1.project activity not as CDM activity but installed just as WHRB based power plant	Rs 45.00 million/MW	Annualized per unit generation cost is found higher than FBC boiler cost due to poor PLF Expected per unit	1.Various technology & financial barriers will hinder the implementation of the project.

		generation cost is approximately Rs 2.5/unit.	2. Generation cost will become higher due to poor plant load factor thus GIPPL would be preferring 11.5 MW coal based CPP .
2. import from grid	Rs.4.5 million line laying cost +30.0 million Rs. approx as deposit .	Approximately Rs.4.00/unit (including the weighted average of Demand Charge)	1. GIPPL may face power cuts due to acute shortage in grid power. 2.This option faces no barrier
3Alternative fuel HSD	Rs.15.00 Million/MW Reference study by Indian Institute of Management.	1.Rs 10.18 /unit MERC norm 2.Above Rs 4.5/- unit. Reference study by Indian institute of management. 3.Rs12.18/unit ref TISCO sustainability report	1.HSD prices escalate regularly and generating cost high. Economically not attractive. 2.This option faces no barrier
4 Alternative fuel GAS	Rs35.00 million/MW	-	Not an option as GAS is not available in this part of state.
5 Alternative fuel Coal+ Char/ coal fines	Rs.42.5 million/MW Reference study by Indian institute of management	1.Rs.1.18/unit reference MSPGCL average generating cost as they are the supplying grid. Reference MERC tariff order. 2.Rs1.64/unit as per TISCO sustainability report. 3.Rs1.78/unit as per IIM study	1. GIPPL is putting already coal/char/coal fines based 45 tonnes/h capacity FBCB capable of generating approximately 12 MW electricity. However GIPPL will operate this FBCB at lower capacity. 2. FBCB CPP will have lower capital cost, generation cost and higher PLF. 3. Hence economically most attractive. Considered as baseline.
6.Combination of grid and coal power	Rs.4.5 million line laying cost + 24 million Rs. approx as deposit + 42.5 million/MW for Coal power.	Approximately Rs.4.00/unit for grid power / Rs 1.18/unit reference MSPGCL coal based average power generation cost. Reference MERC tariff order.	1.GIPPL will be paying approximately Rs.4.00. per unit, which is much higher compared to their coal based captive generation cost. 2. GIPPL will have to take into account power shortage which might lead to power cuts and resultant production loss.

			3. Hence this combined option is not economically attractive. This option faces no barrier. 4.This option faces no barrier.
7.Alternative use of waste heat			GIPPL has no alternative use for heat energy.
8. continuation of current situation	Rs.4.5 million line laying cost + Rs.30.00 million approx as deposit for 11.5 MW.	Approximately Rs.4.00/unit (including the weighted average of Demand Charge)	This is same situation as Alternative2.This option faces no barrier

The analysis of the above 8 alternatives shows that the most economically attractive option available to GIPPL is to go for alternative-5 i.e. Coal, Char/coal fines based power plant .The methodology requires GIPPL to select the baseline which is economically most attractive and faces no barrier. GIPPL is putting coal based FBC boiler to meet the additional steam required by STG. Hence GIPPL selects coal based captive power plant as base line scenerio.

The project activity displaces CO2 emissions from the fossil fuel based captive power plant as fossil fuel consumption is directly reduced due to WHRB steam.

In line with methodology emission factor will be calculated as in ACM 0004.

Brief description of National Policy on the Environment and Energy Conservation.

(A) National Policy

MSPCB is the government department which gives clearances for manufacturing units and sets the pollution limits. The following are the limits set by MSPCB while clearing GIPPL captive power project.

SPM 100 mg/Nm3
SOx 2402 kgs/day
NOx 150 ppm

As per the prevailing Rules and Regulations it is not mandatory to establish WHRB Power Plant with Sponge Iron Plant. This can be brought out from clearances received by the company while establishing sponge iron kilns which do not specify any requirement of WHRB based CPP.

The Central Pollution Control Board New Delhi, had issued a draft policy on Environment Standard and Code of practice for Pollution Prevention of Sponge Iron Plants in November 2005 in which the board has proposed to the entrepreneurs having more than 100 TPD Kiln to establish the WHRB Power generation. The draft code admits that for the plants with less then 100 TPD capacities WHRB is techno economically not viable.

The above code is mainly the suggestive practice which the entrepreneurs can adopt and it is not the part of the Air (Prevention and Control of pollution) Act 1981. Hence this can not be considered as the legal requirement.

(B) Status of the Company

Name of manufacturing unit	capacity	NOC number	Consent valid till
Sponge Iron	2x100TPD	37/0/CC/ST Date 16-10-2004	30-09-2009
Sponge Iron	2x100TPD	BO/RONG/Chandrapur/459-05/O/CC-420 Date 31-10-2005	31-10-2010
Power Plant	15 MW	BO/PCI-II/RO-NG/EIC No NG-0813-06/E/CC-308 Date 17-10-2006	Consent to establish.

As company sought clearances from MSPCB with the mention of WHRB based CPP in the application and so MSPCB clearances mention WHRB, however there exists no regulation in the present laws to establish WHRB captive power plant. The earlier NOCs for 4 numbers sponge iron plants do not mention requirement any waste heat boiler based CPP.

In **Section B.5**; we have demonstrated the project activity is additional by using the tool for the demonstration of additionality.

Key methodological Steps followed in determining the baseline scenario

1. The methodology requires GIPPL to establish base line scenario by considering all possible options that provide or produce electricity for in house consumption and /or sale to grid and/or other consumers. The methodology also identifies eight possible alternative scenarios.

   We have discussed above each alternative and shown that the coal based captive electricity as base line scenario**.**

2. The methodology requires us to demonstrate the additionality of project activity using the "latest version of Tool for demonstration and assessment of additionality".

   We have shown the additionality of project activity using the "Tool for demonstration and assessment of additionality version-02 of 28 November 2005'' in Section B.5

3. The methodology applies to electricity generation project activities; that displaces electricity generation with fossil fuels in the electricity grid or displace captive electricity generation from fossil fuels, where no fuel switch is done in the process where the waste heat or pressure or the waste gas is produced after the implementation of project activity.

   We have established that project activity generates the electricity from waste heat and this electricity displaces captive electricity generation from fossil fuel and there is no fuel switch being done in the Sponge Iron Rotary kiln where the waste gases are produced.

In **Section B.5**; we have demonstrated the project activity is additional by using the tool for the demonstration of additionality.

Key Information and data used to determine the baseline scenario

Key information data are taken from the following sources to determine the baseline scenario:

1) IPCC value used for CO2 emissions factor of coal used in captive power generation (t C/TJ).
2) We have taken boiler efficiency of 100% based on net calorific values as a conservative approach as per Option B under "If baseline scenario is captive power generation".

These data are given in **Annex-3 under Base line information (Baseline calculations)**

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality): >>

Explanation of how and why the project activity is additional in accordance with the baseline methodology

It is required to describe how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of registered CDM activity the proposed CDM project activity is designed to generate power from the Waste Heat only contained in the Flue Gases emitting out of an established industrial manufacturing process i.e. ABC of Sponge Iron Kiln, only the waste heat in the flue gases will be utilised to generate power without adding any GHG emission whereas in the absence of the proposed project activity power requirement would have been met by generating captive electricity from coal. Hence project activity achieves reduction in CO2 emission due to coal burning in coal based FBCB of coal based captive power generation.

It is required to explain how and why the proposed project activity is additional and therefore not the baseline scenario in accordance to the selected baseline methodology.

As per the decision 17 / CP.7 AND 18/CP.9 a CDM activity is additional, if anthropogenic emissions of GHGs by sources are reduced below those that would have occurred in the absence of registered project activity. The tool for the demonstrations and assessment of additionality (version 2) of 28 November 2005 approved at the 22nd meeting of CDM executive board requires the project participant to demonstrate and assess additionality, as per the steps given below:

1) Identification of alternative to project activity.
2) Investment analysis to determine that the project activity is not the most or financially attractive.
3) Barrier analysis.
4) Common practice analysis.
5) Impact of registration of proposed activity as CDM project activity.

We have discussed realistic and credible alternatives available to project activity in B.4 and have come to conclusion that the-generation of power from Coal based Captive power plant is the baseline scenario. We hereby proceed to establish the additionality of proposed project activity using "the tool for the demonstration and assessment of additionality" (version 02) dated 28 November 2005.

We show that the project activity faces significant financial and investment barriers and in the absence of CDM finance these barriers would impact the project activity.

The base line methodology outlines five steps to demonstrate additionality.

STEP 0 - Preliminary screening based on the starting date of project activity

a.	Provided evidence of the starting date of CDM project activity	The board resolution of 15-10-2005 is considered as starting date of project activity. The company recognises that CDM crediting period starts after registration.
b.	Provide evidence that incentive from the CDM was seriously considered in the decision to proceed with the project activity.	The board discussed in detailed manner regarding CDM benefits during the meetings. We give below the Summary of the board meetings 1. The problem of shortage of power in the grid and likely power cuts and resulting production losses was discussed in the meeting of 15-03-2005. The managing director proposed the establishing of captive power generation. Lloyds Steel Industries Ltd (LSIL) was appointed as consultant. 2. LSIL made presentation before the Board on 30-06-2005 that waste heat available in flue gases from kilns can generate up to 11.5 MW. However in view of the expansion planned in induction furnaces LSIL suggested 15 MW captive power plant. LSIL suggested installation of coal/char/coal fines based FBC boiler for generating balance3.5MWpower,as approximately 45000 tonnes/annum char is generated during sponge iron manufacturing process. In view of uncertainties in WHRB steam higher inbuilt capacity in FBCB was recommended to maintain the electricity generation. 3 High project cost due to 5 boilers and instead only putting one FBC coal based boiler based captive power plant was discussed on 15-10-2005. LSIL informed the board regarding CDM and the fact that a project of WHRB based CPP from Chattisgarh state is in the process of getting validated for getting registered for CDM benefits. LSIL suggested that company can apply for CDM registration and CDM credits would make WHRB project viable. After deliberations it was decided to go in for WHRB based CPP along with coal based FBCB with higher in

		built capacity. Board also appointed LSIL as consultant for CDM activities. The extracts of the board meetings of will be made available to DOE.

STEP 1 - Identification of the alternatives to the project activity considered with current law and regulations

Step 1.a

	Identify realistic and credible alternatives Proposed activity not undertaken as CDM project activity. All other plausible and credible alternative Continuation of current situation	In section B.4 all the possible alternatives have been discussed for the alternatives recognised were: 1) Project activity not as CDM activity. 2) Import from Grid. 3) Alternative fuel HSD. 4) Alternative fuel Gas. 5) Alternative fuel coal + coal char + coal fines. 6) Combination of grid and coal power. 7) Alternative of Waste heat. 8) Continuation of current situation. GIPPL concluded coal based captive power plant is economically most attractive option and in line with approved methodology ACM 0004 have selected coal based captive power plant as base line scenario.

Step 1.b Enforcement of applicable laws and regulations:

1	Alternative shall be in compliance with legal and regularly requirements.	All the alternatives are in compliance with current legal and regulatory requirements.

Even though additionality tool provides to select one of the steps out of step 2 and step 3, GIPPL select to complete both steps.

STEP-2 Investment analysis

This step is to determine whether the project activity is the economically or financially less attractive than other alternatives without the revenue from sale of certified emission reductions (CERS).The following steps are given in the tool for demonstration and assessment of additionality (version 2) 28 November 2005

Sub step 2a Determine appropriate analysis method

As the project activity generates electricity for use of internal consumption. Hence gains from in house consumption are only notional. In line with additionality tool the IRR is taken as appropriate parameter and we select sub step 2b option III bench mark analysis of additionality tool.

Sub step 2b- Option III . Apply bench mark analysis

We identify IRR as suitable for our analysis. We have worked out IRR as project IRR, equity IRR and investment IRR for our analysis.

Bench Mark for equity IRR

A paper "Risk, return and investment horizon in emerging equity market: evidence from India (analysis of capital markets) From: Journal of Academy of Business and Economics Author: Baid, Rachana available on High Beam Research. Date 01-01-2003 indicates that return on the capital market for the holding period up to 23 years is in the range of 15.2% to 22.7% per year. According to the paper there is slight upward trend till twelfth year followed by decline thereafter. Hence we consider this as bench mark as this study was conducted specifically for Mumbai stock exchange.

Bench Mark for investment based IRR

Reserve Bank of India (RBI) specifies PLR from time to time to decide lending rates of banks. We consider PLR as our bench mark for investment based IRR. As the PLR varies between 11-12%, we have considered 11.5% as bench mark for investment based IRR.

Bench Mark for Project IRR

An independent report on " Minimum debt financing requirements for private power projects in India" by Hagler Baily Consulting .Inc Arlington puts the requirement of project IRR between 20-30% (page 31) done for USAID/New Delhi.

There is no independent Indian study available for bench mark for Project IRR. However the project is expected to have Project IRR of more than 20% to be financially attractive. This is arrived as follows:

= 11.5% on 70% debt based on RBI guidelines + 15.2% return on equity of 30%+ net profit of 10%
= 22.61%

Sub step 2c Calculation and comparison of financial indicators

Following assumptions are made in the calculations:

1 Debt to equity ratio assumed at 70:30 in line with "Tariff policy 2006 under Electricity Act 2003 of Government of India".

2 Depreciation as 5.28% for plant and machinery on straight line depreciation.

3 Interest on long term borrowings is computed at 12% .Contingency is provided at 10%.Spare parts at 2.5% of equipment cost.

4 WHRB electricity generation is calculated considering 335 days of operation and 60% PLF due to WHRB dependency on availability of rotary kiln flue gases with proper flow rate and temperature.

5 Sales realisation considered at Rs 2.65/unit for calculating IRR even though the gains are only notional as the power is for captive consumption only. This is based on price band given "Tariff policy 2006 under Electricity Act 2003".

6 Expected equity return as 15.2% in line with study paper "Risk, return and investment horizon in emerging equity markets .Evidence from India.(analysis of capital markets) From: Journal of Academy of Business and Economics Author: Baid, Rachana available on High Beam Research. Date :01-01-2003''indicates that return on the capital market for the holding period up to 23 years is in the range of 15.2% to 22.7% per year. We consider this as bench mark as this study was conducted specifically for Mumbai stock exchange.

The bench mark for investment based IRR is taken as PLR of 11.5% specified by RBI.
The bench mark for project IRR is taken as 20 % as calculated above.

7 PE multiple for calculating equity return considered as 7 which is acceptable norm for steel industry. Reference TISCO PE Multiple 6.9 as per Economic Times dated 30-11-2006.

8 Debt period is considered as 10 years and hence IRR calculations are done for this period.

The financial analysis has been carried out on excel sheets and will be made available to DOE. However the analysis results are as follows;

Parameter	WHRB Power	Bench mark	Remarks
Rate of return on without CDM credits IRR ,investment based Equity IRR Project IRR	 8.5% 6.4% 13.9%	 11.5% 15.2% 20%	WHRB power IRR is lower than bench mark. Hence WHRB project activity is not financially attractive.
Rate of return on with CDM credits considered at 10$ per CER IRR investment based Equity IRR Project IRR	 10% 9.6% 13.9%	 11.5% 15.2% 20%.	WHRB project activity is not able to cross the bench mark even with CDM credit. Hence WHRB project activity is CDM Project activity.

Sub-step 2d Sensitivity analysis

Additionality tool requires to show whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions. As gains are only notional, we consider

PLF variation to carry out sensitivity analysis as PLF is sensitive to flue gas conditions.

Table of sensitivity analysis

Variation in PLF	WHRB with CDM	Bench Mark
Investment based IRR		
0%	10%	
+5%	10.4%	11.5%
+10%	9.5% Effect of increased tax	
Equity IRR		
0%	9.6%	
+5%	10.5%	15.2%
+10%	8.6% effect of increased tax	
Project IRR		
0%	13.9%	
+5%	15.2%	20%
+10	16.3%	

Sensitivity analysis shows that even with an upward increase of 10% in PLF of WHRB CPP that the bench mark hurdle is not crossed.

STEP –3 Barrier analyses to show additionality.

Sub-Step 3a Identification of barriers that would prevent the implementation of the type of the project activity.

3.a.1	**Investment barriers**	
	Debt funding is not available for this type of innovative project activity.	When GIPPL approached for debt finance of stand alone WHRB project activity, the financial lenders advised that: 1) WHRB captive project does not fall under essential services. 2) As WHRB stand alone project is not economically feasible, Hence the finance can not be made available only for WHRB project. 3) It was advised by financial consultants that company should go for one coal based captive power generation as the same is most economically attractive, instead of 4 numbers WHRBS and 1 no FBCB. The financial lenders refusal / advice letter will be made available to DOE.
	No access to international capital markets due to real or perceived risks.	GIPPL have not received any foreign assistance and they are not in a position to access the international capital markets.
3.a.b	**Technological barrier**	

	Skilled and or properly trained labour not available	As per Joint Plant Committee report "Survey of Sponge Iron Industry 2005-06". 1. 77 units out of 147 coal based unit are going in for expansion in capacity. 2. Jharkhand, Chhattisgarh and Orissa are states where majority of expansion activities will be installed. Chattisgarh state and the most of the sponge iron plants in the state are located within 300 km and the local professionals normally migrate easily resulting in shortage of manpower for the company as the location of the company is in sensitive area . 3. Constraints faced by sponge iron industry are: a) Raw Material b) Power c) Finance d) Labour As so many units are expanding in the area, the availability of skilled technical personnel is a problem. Company has to hire the untrained personnel and impart the training as per training schedule. 4 As the company is located in sensitive area, the company experiences the reluctance of experienced professionals during recruitment.
	Lack of infrastructure for implementation of the technology	5 Company has to procure all the necessary equipment required for proper implementation of the project. Extra infrastructure of 132 kV is also required due to the requirement of remaining connected to MSEDCL grid and 11 km long 132 kV line from for wheeling of unused infringe power . This involves cost of 120 million rupees which is almost equal to the balance expansion activity of induction furnaces. GIPPL found this as totally uneconomical and have sought to install 33 k V line of 11 km long to enable reaching 33 k V MSEDCL grid. This involves additional expenses of 4 million rupees. 6 The Sponge Iron Rotary Kiln operation

	Raw material constraints, flue gas conditions variation resulting lower electricity generation.	is dependant on many factors such are Iron Ore quality, Coal quality etc., the flue gas temperature and quantity variations result in lowered steam generation and hence power generation. Due to the variations observed, the PLF of WHRB is low and is around 60% only.
	Grid agreement constraint	7 The Sponge Iron Kiln has to take shut down every 3-4 months due to the requirement of the manufacturing process. This results in 35 days shut down in a year and this results in WHRB shut down also and hence the power generation . 8 The company is required to be connected to grid for CPP healthiness and has to enter into agreement for stand by and infringe power. This acts as regulatory/ technological barrier due to grid connectivity rules which make company responsible for all acts and omissions.
	Boiler related constraint	9 If the temperature of flue gas exceeds 1000^0C , then the boiler trips as the higher temperatures are damaging to the boiler tubes. As no control is there on exit temperatures of kiln, this acts as technical barrier. 10 The inlet temperature to ESP has to be maintained at 190^0C, as the higher temperature of flue gas will damage ESP and lower temperatures create SOx pollution. Hence the boiler has to work at its design parameters as any disturbance in performance of boiler due to any reasons affects the ESP and also power generation. This acts as a technological barrier.
	Lack of management experience	11. GIPPL do not possess any previous experience in power plant. Hence the management is currently heavily dependant on third party consultant and experience the reluctance of professionals and other managerial manpower to join the company due to the location specific problem. This is technological barrier as lack of experience may result in malfunctioning and despair.

	Barriers due to prevailing practice.	
	Discuss the project activity in host country.	Government of India appointed joint plant committee to study sponge iron industry. Joint Plant Committee has submitted its report as " Survey of Indian Sponge Iron Industry 2005-06"which lists the following: 1) Out of 147 surveyed Sponge Iron Industry surveyed only 16 have captive power generation. Maharashtra has 18 sponge iron units. 2) Out of 16 units 6 units are registered with CDM EB and 5 companies have applied for CDM registration as they had put the project considering CDM benefit basis. 3) As CDM activity can not be treated as common practice, only 5 captive power generation units out of 147 sponge iron units constitute approximately 5% units putting CPP. 4) As the captive power generation based on WHRB is not sufficiently diffused in the regional/ country, WHRB based captive power project is not prevailing practice. JPC Report can be made available and details of units going is for CDM benefit can be checked from UNFCC website. CEA of government of India have brought a study of captive power plants in India in august 2005. As per the study the break up of various options in captive power plants are: FUEL NO OF CPPS Coal 66 HSD/FO 70 Biomass 41 NG/Naphtha 18 Hot gases 7 Waste heat 6 Hydel 2 Total 208 The study indicates waste heat forms approximately 3%.
	Regulatory Barriers	1) The company is facing acute problem as MSEDCL is the only grid and to remain connected to grid to take care of

		excess power the company is required to provide132kV installation. The cost involved is around 120 million rupees which company can not afford. Hence the company has to put express line for 33 kV to reach the transmission line at 33 kV. This is expected to cost 4 million rupees. Any agreement with MSEDCL makes company responsible for all the costs and all the liabilities. 2) The demand charges payable even if MSEDCL is not in position to supply power as a result of power shortage and resulting power cuts 3) Low or no payments made for infringe power by MSEDCL.

Sub Step 3.b. Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity).

As above the identified barriers are:

1) 3.a.a. investment barrier
2) 3.a.b technological barrier
3) 3.a.c prevailing practice barrier
4) 3.a.d operational barrier
5) 3.a.e regulatory barrier.

The identified other alternatives are:

1) Drawing power from existing MSEDCL grid (Alternative-2)
None of the above barriers act as barriers in this alternative and MSEDCL would be having no objections to continue to supply the additional demand of power as already and presently the required power is being provided by MSEDCL. But the grid power is costlier than coal based captive power. As well as the grid has the power crisis, which may lead to frequent power cuts.

2) CPP based on HSD/Gas (alternatives 3. and 4)
None of the above as a barrier in this alternative. However CPP based on HSD/Gas will have additional GHG emissions from the plant.

3) Alternative 5 CPP based on coal
None of the above barriers act as barriers in this alternative. This option is economically most attractive as increasing the existing capacity of coal based 15 MW CPP can be achieved with minimum cost.

4) Alternative use of Waste Heat from Flue Gases (Alternative 7) other listed alternatives like using Waste heat from flue gases for other use in the plant is not applicable as GIPPL has no such heat requirement in the plant. No other beneficial use of the Waste Heat is in practice in the region.

5) Continuation of the current situation, as shown above the continuation of current situation is to draw more power from grid. This option will face no barrier but company has to face power cuts imposed by grid.

STEP-4 Common practice analysis

We identify and discuss the existing Common practice through the following sub-steps which Complements additionality tests.

Sub-Step-4.a Analyse other activities similar to project activity.

Provide an analysis of any other activity implemented	As per JPC report as " Survey of Indian Sponge Iron Industry 2005-06" only 16 units our of 147 sponge iron units have captive power generation and out of these 6 units are registered with CDM EB and 5 are in the process of CDM registration. Only 5 units out of 147 have the CPP and this is only around 5%, hence can be concluded that WHRB captive power plants are not common practice in India. Information on CDM activity can be checked on UNFCCC web reference, This indicate that only 5 units out of 147 units have gone in for captive power generation without CDM strength and this constitutes less than 5% diffusion. CEA of government of India have brought a study of captive power plants in India in august 2005. As per the study the break up of various options in captive power plants are FUEL NO OF CPPS Coal 66 HSD/FO 70 Biomass 41 NG/Naphtha 18 Hot gases 7 Waste heat 6 Hydel 2 Total 208 The study indicates waste heat forms approximately 3%.

Sub-Step-4.b Discuss any similar options that are occuring

1.	Discussion of similar activities	The present project activity is 4 numbers WHRB based captive power plant for 4x100 TPD Sponge Iron Kilns. As per the available information 100 TPD sponge iron projects normally do not put WHRB project due to high cost. Even the Government of India proposed policy for sponge iron does not recommend any

		WHRB for capacities of 100 TPD kilns and lower.

JOINT PLANT COMMITTEE REPORT ON "SURVEY OF INDIAN SPONGE IRON INDUSTRY 2005-06"

Under the aegis of the Ministry of steel joint plant committee (JPC) was constituted by government of India.is the sole custodian of authentic database on the Indian iron and steel industry. The following are major findings:

Report in the "Survey of Indian Sponge Iron Industry 2005-06" has the following statement on Page-3 of 11.

"growth of domestic steel demand, vigorous growth in domestic steel production in secondary steel making sector, techno economic like relative low cost of investment, ease of setting of sponge iron plant, clear cut technology of direct reduction, better quality in end product, availability of mineral resources, abundant labour as well as professional/ technical expertise, frequent problem of scrap, all operating in the facilitating backdrop provided by a free market economy have boosted the growth of the industry"

Indian sponge iron industry summarised table given in JPC report

Table 1	**Indian Sponge Iron Industry : Both Coal & Gas Segments**					
	Data Collected		**Additional / Industry/ Field sources^**		**Total**	
	No of Units	**Capacity (Unit :mt)**	**No. of units**	**Capacity# (unit:mt)**	**No. of units**	**Capacity (unit:mt)**
Operating						
Coal	147	11	56	2	203	13
Gas	3	6	-	-	3	6
Total	150	17	56	2	206	19
Under commissioning (Coal)	58	6	167	12*	225	18
Brownfield Expansion : 77 out of 147 working coal based unit	-	7	-	-	-	7
^=State DI Offices; #=Estimated, *=included units in proposal/ planning stage						

Raw materials:

JPC survey list the following the main constraints faced by sponge iron industry, on Page 7 of 11.

"Analysis of the data shows that out of 147 units surveyed, raw material (availability and prices), accounts for the largest(96%) amongst the nature of constrains faced by a coal based sponge iron unit today, followed by power (cost), and to lesser extent finance (availability), and labour negligible".

JPC survey on page 5 & 6 of 11 :

"Coal Linkage: Analysis of the data shows that out of the 147 units surveyed, 60% has their own coal linkage. The state wise picture shows Orissa and Chhattisgarh tops the list with West Bengal close behind. But the scenario in the other states is not much encouraging, indicating the Indian coal based sponge iron producers are dependent on market sources for procuring this key raw material.

Iron Ore: Analysis of thee data shows that out of 147 units surveyed, iron ore from mines, be it captive (virtually nil) or leased (minimal), plays an insignificant part in meeting iron ore requirements of the domestic coal based sponge iron segment. In other words, this indicates that in case of iron ore also, Indian coal based sponge iron producers are dependent on market sources"

Captive power generation

On page-7 of 11 of JPC report under the heading "captive generation facility"

"Analysis of the data shows that out the 147 units surveyed, the number of units with captive power generation facility is quite low; total of such units being only 16, with maximum concentration occurring in Chhattisgarh (8 units)"

Expansion

"77 out of 147 coal based units are going in for expansion of existing capacity."
Jharakhand, Chhatisgarh and Orissa are states where majority of this fresh capacity will be installed

JPC report is enclosed as part of proof for the following barriers

1. Investment barrier due to shortage of iron ore and coal and market variation
2. Common practice analysis/prevailing practice.
3. Technogical barrier due to shortage of technical manpower due to heavy expansion in sponge iron industry.

MSEDCL Report on Power situation and load shedding.

We give below the write up from official site of MSEDCL (www.mahadiscom.in) for information on power situation and load shedding.

1. Why Load Shedding ?

Electricity demand in Maharashtra (MSEDCL's area) has been rising at a very high rate in the last two years. In 2004-05, the peak demand went up from 11357 MW to 12749 MW over 2003-04 which is a jump of 12.26% as compared to earlier average increase of 2.74% (See **Annexure-I**)

While the demand has been increasing, the generation capacity has remained steady with maximum availability of 9300 MW. This had resulted in a peak gap of 3449 MW in 2004-05.

In 2005-06, the peak demand recorded in May 05 was 12987 MW which is again a jump of 238 MW over the previous year. This had resulted in a shortage (load shedding) of 3687 MW in May 05.

2. Sudden Jump of Demand in October 05 :-

In the month of October 05, the peak evening demand which had come down to 10,000 MW in September has in the last ten days gone up to 12,200 MW. This is a jump of 2,200 MW in a period of 7 to 8 days. Over and above this is the requirement of Mumbai in which Tata Power had been drawing MSEDCL's power in peak hours increasing the load shedding in MSEDCL's areas.

3. Why availability has not increased in proportion to the drawl ?

Closure of the Dabhol Plant of 2150 MW in 2001 and subsequent non-start of Bhadravati (1082 MW) and Patalganga (447 MW) IPP Projects is the main reason behind non-increase of availability of power. Because of the closure of Dabhol plus non-start of IPP Projects and seeing the increase in demand in 2003, MSEDCL decided to go in for Parli (250 MW), Paras (250 MW) Projects and Ghatghar (250 MW Peaking/Irrigation) Projects.

Any thermal project takes from 3 to 4 years before commissioning. These projects are thus expected to become available in 2006-07 and will thus provide major relief against load shedding.

4. What is MSEDCL's plan to improve the power availability in Maharashtra ?

Looking at the growth in demand, the existing deficit of 3500 – 4000 MW could possibly go up to 10,000 MW by 2010-11 if efforts are not made to increase availability.

Power is an essential component in the economic growth of a State. As per the Economists, an investment of Rs.1 Cr. in the power sector results in a Rs.20 Cr. growth in the economy. In light of this, it has been decided to have a goal of surplus power in Maharashtra by 2010-11. The following action plan for an addition of 17,212 MW has been prepared for Maharashtra in the next 5 to 7 years :-

(1) Projects under Construction - 750 MW

(2) Projects for which tie-up has been - 2872 MW

made with NTPC & Inter-State Projects

(3) Revival of Dabhol Project under - 2150 MW
Ratnagiri Gas & Power Pvt.Ltd.
(A company owned by NTPC, GAIL,
IFIs & GoM)

(4) Projects planned by MAHAGENCO - 7540 MW

(5) Long term power to be purchased by - 4000 MW
MSEDCL through competitive tenders
From IPPs. 17312 MW

5. Immediate Measures being undertaken by MSEDCL to reduce load shedding.

MSEDCL is also trying to manage the demand through Demand Side Management Measures e.g.

(i) Akshya Prakash Yojana :

This is a scheme under which a village (Goathan) can avoid load shedding in the evening by reducing the load voluntarily to 20% of the existing load. About 500 villages in Western Maharashtra have already adopted this scheme and are thus free from load shedding in the evening (A booklet on this scheme is enclosed).

(ii) Voluntary Load Reduction Scheme in Small Cities :-

Under this scheme, during the evening peak, the load is reduced to 33% through self control measures by the citizens. When the load decreases to less than 33%, load shedding in the city is removed in the evening.

(iii) Single Phase Supply in Goathans :

Main suffering of the public due to load shedding is in the evening hours. In order that atleast basic light is available in the households, single phase transformers are being fixed in village goathans. Single phase supply during evening peak has been today made available in about 700 villages. By 15th Nov., about 10,000 villages are expected to get light in the evening hours in the goathans under this scheme.

(iv) Scheme of Separate Feeders for Goathans :-

With the same purpose of providing evening lighting to village goathans, separate feeders are being set up for the goathans. Under this scheme also about 10,000 villages will be covered, but the process of completion will take about 8 months to one year.

(v) Increased availability of power in 6 to 12 months :-

- Parli Project (250 MW) is expected to be completed by April 2006.

- Dabhol Project (2150 MW) – First Block is expected by May 2006 and the rest is expected between Oct. 06 to Dec. 06.

- Paras Project (250 MW) is expected to be completed by August 06.

- Ghatghar Peaking Project (250 MW) is expected to be completed by April 06.

Thus, tremendous relief in load shedding is expected by middle of next year.

(vi) Other DSM Measures :

(a) Encouragement to CFL for saving of electricity.

(b) Introduction of capacitors on agriculture pumps and drinking water supply schemes.

(vii) Purchase of Expensive Power from Outside the State :-

MSEDCL has been making efforts to purchase power from other States although they are at very high rates. Total purchase of power from outside has also got corridor availability i.e. transmission availability constraints.

MSEDCL had twice invited tenders but there was no response from any State or any Power Trader. Power has thus become a completely sellers' market as the deficit States like Chattisgarh, M.P., U.P., Delhi, Haryana & Punjab have all been trying to get as much power as possible from the few surplus States like West Bengal &

Orissa. Through extensive negotiations with Power Traders like PTC, NVVN etc., MSEDCL was able to buy about 805 MW of peak power at rates ranging from Rs.3.50 per unit to Rs.4.30 per unit in October.

(viii) Theft Reduction Drive :-

MSEDCL has undertaken a massive theft reduction drive. In the last three months since its inception, more than 15000 theft cases have been caught. With the support of the Police Deptt., it is possible to substantially reduce the power which goes towards theft.

6. Principles of Load Shedding as decided by MERC :

Earlier, the Principles for Load Shedding (i.e. which category of consumers on which areas will get how much load shedding) was being decided by MSEDCL. Later, as per a Supreme Court Judgement, the load shedding principles have been prepared by MERC. A summary of the load shedding programme is as follows :-

The divisions are ranked in four groups **A, B, C, D** as below

	Group	**Weighted average loss and collection efficiency level(DCL 70/30)**		
		Rural	**Major Urban**	**Other Urban**
1	Group **A**	0% to 28%	0% to 25%	0% to 25%
2	Group **B**	>28% to 38%	>25% to 35%	>25% to 35%
3	Group **C**	>38% to 53%	>35% to 50%	>35% to 50%
4	Group **D**	Above 53%	Above 50%	Above 50%

The group wise hours of load shedding carried out to meet the existing system demand are as below

	Load shedding hours		
Groups	Rural	Major cities	Other Urban
A	5	1	2
B	8	2	4
C	8	2	4
D	8	2	4

A copy of MERC order on load shedding is also available on MERC's Website http://www.mercindia.com/.

7. Some other Frequently Asked Questions about Load Shedding :-

Q(a) Why can't load shedding be done during the day time instead of the evening ?

Ans. The peak deficit between demand and supply is the highest in the evening hours (6.00 p.m. to 10.00 p.m.). As electricity can't be stored, the maximum load shedding has to take place in the evening hours.

Q(b) Why can't we use Koyna water for power generation where the dam is full because of excellent monsoon ?

Ans. There is a limitation given by the Inter-State Water Tribunal that only 67.5 TMC of water, out of 100 TMC capacity of Koyna dam, can be used for power generation. The water which is used for power generation goes towards the sea whereas the water which is not used for generation goes to fill up the dams in Karnataka. With the limitation of 67.5 TMC, Koyna generation is limited to 3 to 4 hours per day. As the peak demand is in the evening, Koyna generation is mainly done during these hours.

Q(c) What are the steps which can be taken by the citizens to reduce load shedding ?

The citizens can go in for Akshya Prakash Yojana in rural areas and Voluntary Urban Load Reduction Scheme in Urban areas as mentioned above. Citizens can also contribute by using less electricity during the morning peak (6.00 a.m. to 10.00 a.m.) and evening peak (6.00 p.m. to 10.00 p.m.) Steps like avoiding the use of ACs, ironing and other three phase usages during these time periods can bring a relief in load shedding.

8. Efforts being made by MSEDCL towards giving better services to consumers :-

Since the inception of the Company in June 2005, MSEDCL has prepared an action plan to focus on facing the following issues :

(1) Need to give uninterrupted and reliable service to the consumers.

(2) Deteriorated Infrastructure.

(3) Cash Loss of nearly Rs.1000 Crores.

(4) High T&D Losses (35.2%) and low collection efficiency (90%)

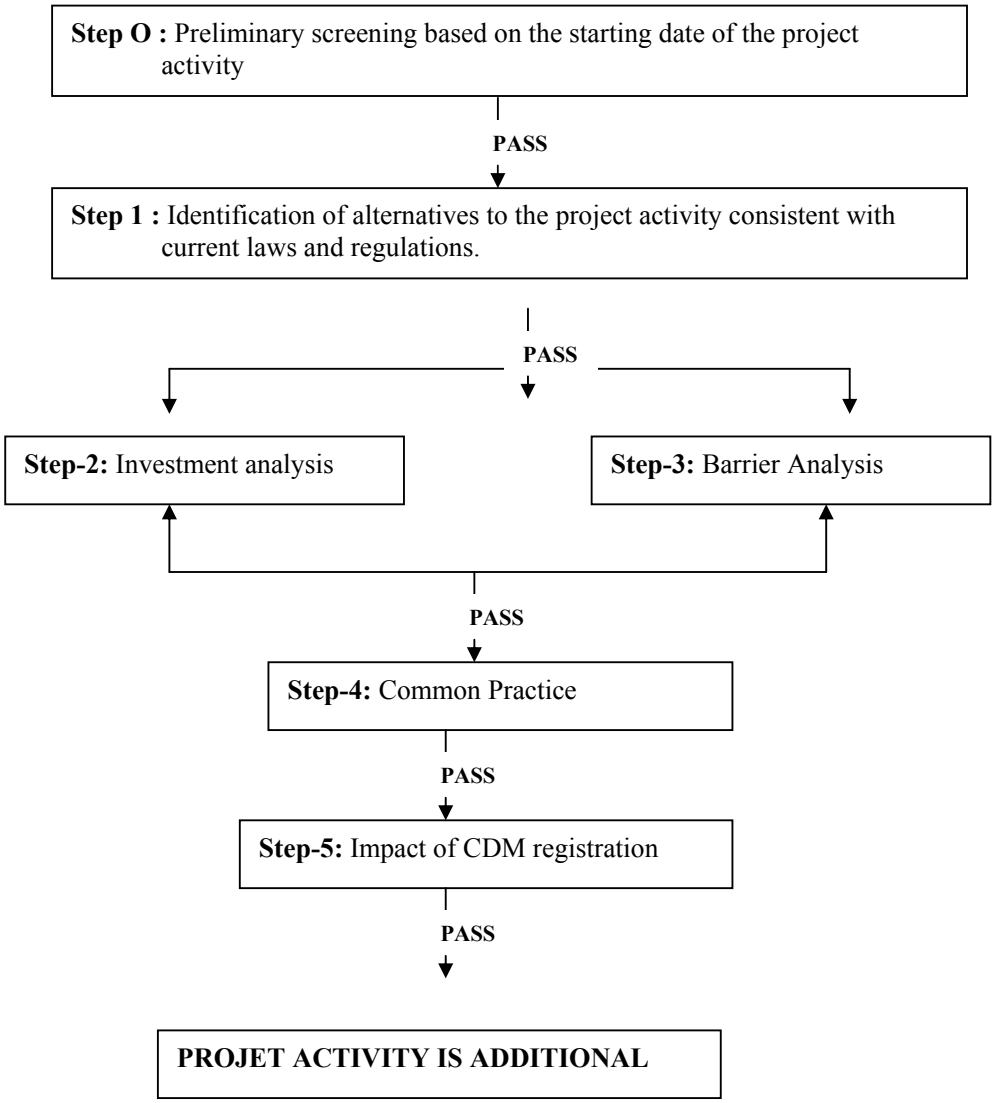
A Mission Statement and a Ten Point Action Plan has been prepared in this regard. The Action Plan focuses on proactive planning of the Sub-division-wise load plans and construction work plans for five years. Training of employees, use of latest technological tools like e-tendering, AMR, SCADA and energy accounting through transformer metering, facilities like Call Centres, ATMs are some of the thrust areas of the Action Plan. The progress on these will be measured through 18 key performance indicators which are being put on the Internet. We are hopeful that within two years, we will be able to tackle all the issues and turnaround the Company

The above article has been added in this part to prove the barrier due to non availability of grid power forcing the company to put captive power plant to eliminate the dependency on grid power.

STEP – 5. Impact of CDM registration:

1) As explained in the above steps, through CDM registration project participant hopes to lower the risks of the investment associated with this kind of Project Activity .
2) The possible income generated through sale of CERS will help in achieving sustainable Power generation in WHRB despite technical and other barriers.
3) The other benefits are
   * help the grid to build its gap in its demand and supply of electricity.
   * A successful CDM project activity will encourage other companies embedded in prevailing practice to put up the WHRB based power plant or other renewable clean energy systems as CDM project activity.
4) An additional Social benefit will be clean environment in the area of Project activity resulting in to environmental improvement all around the Project site.
5) Earning of foreign exchange for the Country and sale proceeds of CERS will enable company to resource the efficiency improving technology from international experts.

Flow Chart : Additionality Scheme



B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>> Selected methodology is ACM 0004 Version 02 03 March 2006.

The project activity meets the applicability conditions of baseline methodology, namely.

1. Project activity generates 11.5 MW electricity from waste heat, without adding any GHG emission.
2. The project activity displaces CO2 emissions from the fossil fuel based captive power plant.
3. There will be no fuel switch in rotary kiln that produces flue gases with waste heat after completion of project activity.

B.6.2. Data and parameters that are available at validation:

(Copy this table for each data and parameter)

Data / Parameter:	**E_{GEN} / Electricity**
Data unit:	kwh
Description:	Gross Electricity generated.
Source of data used:	calculated
Value applied:	100%
Justification of the choice of data or description of measurement methods and procedures actually applied :	The electronic meter provided at the outlet of turbine. The meter reading will be available on DCS continuously and same will be transferred to log book to be maintained by shift engineer , approved by shift in charge as the daily report. Electricity generated by WHRB project activity will be calculated by Gross Electricity by WHRB = metered reading of gross generation of CPP x quantity of WHRB steam/ total steam quantity entering STG
Any comment:	nil
Data / Parameter:	**E_{AUX} / Electricity**
Data unit:	kwh
Description:	Auxiliary Electricity consumed.
Source of data used:	Electronic meter
Value applied:	100%
Justification of the choice of data or description of measurement methods and procedures actually applied :	The electronic meter provided for measuring total auxiliary consumption. The meter reading will be available on DCS continuously and same will be transferred to log book to be maintained by shift engineer , approved by shift in charge as the daily report. Auxiliary Electricity consumed by WHRB project activity will be calculated by auxiliary Electricity consumed by WHRB = metered reading of gross auxiliary consumption of CPP x quantity of WHRB steam/ total steam quantity entering STG
Any comment:	nil
Data / Parameter:	**EG_y / Electricity**
Data unit:	kwh
Description:	Net Electricity supplied to facility.
Source of data used:	Calculated
Value applied:	100%
Justification of the choice of data or description of measurement methods and procedures actually applied :	$E_{NET}=E_{GEN}-E_{AUX}$

Any comment:	Nil
Data / Parameter:	Steam quantity by WHRBS
Data unit:	M3/h
Description:	Flow of WHRB steam to STG
Source of data used:	Metered
Value applied:	100%
Justification of the choice of data or description of measurement methods and procedures actually applied :	The electronic meter provided at the outlet of WHRB common header. The meter reading will be available on DCS continuously and same will be transferred to log book to be maintained by shift engineer , approved by shift in charge as the daily report. Electricity generated by WHRB project activity will be calculated by Gross Electricity by WHRB = metered reading of gross generation of CPP x quantity of WHRB steam/ total steam quantity entering STG
Any comment:	nil
Data / Parameter:	Steam quantity at the inlet to STG
Data unit:	M3/h
Description:	Flow of total steam to STG
Source of data used:	Metered
Value applied:	100%
Justification of the choice of data or description of measurement methods and procedures actually applied :	The electronic meter provided at the outlet of turbine. The meter reading will be available on DCS continuously and same will be transferred to log book to be maintained by shift engineer , approved by shift in charge as the daily report. Electricity generated by WHRB project activity will be calculated by Gross Electricity by WHRB = metered reading of gross generation of CPP x quantity of WHRB steam/ total steam quantity entering STG
Any comment:	nil
Data / Parameter:	Steam pressure
Data unit:	Bar g
Description:	Steam pressure entering STG
Source of data used:	measured
Value applied:	100%
Justification of the choice of data or description of measurement methods and procedures actually applied :	The electronic meter provided at the outlet of turbine. The meter reading will be available on DCS continuously and same will be transferred to log book to be maintained by shift engineer , approved by shift in charge as the daily report.
Any comment:	Data used to calculate steam density
Data / Parameter:	Steam temperature
Data unit:	Deg C
Description:	Steam temperature at the inlet to STG
Source of data used:	Measured
Value applied:	100%
Justification of the choice of data or description of measurement methods	The electronic meter provided at the outlet of turbine. The meter reading will be available on DCS continuously and same will be transferred to log book to be maintained by shift engineer , approved by shift in charge as the daily report.

and procedures actually applied :	
Any comment:	Data used to calculate density of steam

B.6.3 Ex-ante calculation of emission reductions:

>>

We have followed the approved baseline methodology ACM0004 for formulas used is estimating base line emissions:

If the baseline scenario is determined to be captive power generation or either (existing new) ,the Emissions factor for displaced electricity is calculated as follows;

Calculation of emission factor for captive power baseline :

$EF_{captive, y} = EF_{CO2},i / Eff_{captive} X 44/12 X 3.6 TJ/1000 MWh$

Where.

$EF_{captive}$	:	Emission factor for captive power generation (tCO_2/MWh)
$EF_{CO2}.i$	:	CO_2 emission factor of fuel used in captive power generation tC/TJ
$Eff_{captive}$	:	Efficiency of captive power generation (%)
44/12	:	Carbon to Carbon Dioxide conversion factor
3.6/1000	:	TJ to MWh conversion factor

To estimate boiler efficiency, project participants may chose between the following two options

Option A

1. Measured efficiency prior to project implementation
2. Measured efficiency during monitoring.
3 Manufacturers nameplate data for efficiency of existing boilers

Option B

Assume a boiler efficiency of 100% based on the net calorific values as a conservative approach

GIPPL have opted for OPTION B to be conservative.

Leakage

There is no leakage in the project activity

Emission Reductions

The project activity mainly reduces CO_2 through substitution of coal based captive electricity generation by WHRB based electricity.

$ER\ y = BE\ y – PE\ y$

Where,

ER y = Emission reduction by the project activity during a given year y.

BE y = Baseline emissions by the project activity during a given year y.
PE y = Project emission by the project activity during a given year.

Where the baseline emissions
BE y in tCO2 = EFcaptive, y X EG y
EG y = E GEN –E AUX = Net electricity supplied by project activity
PE y= 0 The project emissions are assumed to be Nil as the CPP is based on waste heat recovery from waste flue gases with no auxiliary fuel being used.

Leakage considered as zero.

Calculation of Baseline Emission Factor provided in excel format.

EFcaptive,y = 1.081133360 tCO_2e/MWh
Base line emission factor will be constant as Ex ante based and fixed for the entire credit period. As the flue gas temperature and flow rates greatly influence steam generation and hence electricity generation, the expected plant load factor (PLF) has been considered as 60% to be conservative in emission reduction calculations.

Calculation of Net Emission Reduction:

Installed capacity of power generation	11.5 MW
Number of working days/year	335
number of working hours/day	24
Gross generation of electricity at 100% PLF	91080 MWh
Gross Generation at 60% PLF	55476 MWh
Auxiliary consumption	9%
Net Generation (Gross Generation – Auxiliary consumption)	50483.16 MWh
Emission Factor (EFcaptive,y)	1.081133306 tCO_2e/MWh
Emission Reduction/Year	54579 tCO_2e/Year

B.6.4 Summary of the ex-ante estimation of emission reductions:

>

year	Estimation of project activity emissions (tonnes of CO2 e)	Estimation of base line emissions (tonnes of CO2 e)	Estimation of leakage (tonnes of CO2 e)	Estimation of overall emission reductions (tonnes of CO2 e)
1st	0	54579	0	54579
2nd	0	54579	0	54579
3rd	0	54579	0	54579
4th	0	54579	0	54579
5th	0	54579	0	54579
6th	0	54579	0	54579
7th	0	54579	0	54579
8th	0	54579	0	54579
9th	0	54579	0	54579
10th	0	54579	0	54579
Total (tonnes CO2e)		545790	0	545790

B.7 Application of the monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

(Copy this table for each data and parameter)

Data / Parameter:	
Data unit:	kwh
Description:	Gross electricity generated
Source of data to be used:	calculated and data recorded in log book
Value of data applied for the purpose of calculating expected emission reductions in section B.5	100%
Description of measurement methods and procedures to be applied:	Log book maintained based on DCS data which receive data from meters
QA/QC procedures to be applied:	Log book signed by plant manager daily. Meter provided for gross generation by CPP is calibrated regularly
Any comment:	
Data / Parameter:	
Data unit:	kwh
Description:	Auxiliary electricity used.
Source of data to be used:	calculated and data recorded in log book
Value of data applied for the purpose of calculating expected emission reductions in section B.5	100%
Description of measurement methods and procedures to be applied:	Log book maintained based on DCS data which receive data from meters
QA/QC procedures to be applied:	Log book signed by plant manager daily. Auxiliary consumption Meter is calibrated regularly
Any comment:	

Data / Parameter:	
Data unit:	kwh
Description:	Net electricity supplied to facility.
Source of data to be used:	Calculated.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	100%

Description of measurement methods and procedures to be applied:	Log book maintained based on DCS data which receives data from meters
QA/QC procedures to be applied:	Log book signed by plant manager daily.
Any comment:	
Data unit:	M3/h
Description:	Steam generated by WHRBS at the outlet of WHRB steam header
Source of data to be used:	Measured and data recorded in log book
Value of data applied for the purpose of calculating expected emission reductions in section B.5	100%
Description of measurement methods and procedures to be applied:	Log book maintained based on DCS data which receive data from meters
QA/QC procedures to be applied:	Log book signed by plant manager daily. Meters calibrated regularly
Any comment:	
Data unit:	M3/h
Description:	Steam flow entering to STG
Source of data to be used:	measured and data recorded in log book
Value of data applied for the purpose of calculating expected emission reductions in section B.5	100%
Description of measurement methods and procedures to be applied:	Log book maintained based on DCS data which receive data from meters
QA/QC procedures to be applied:	Log book signed by plant manager daily. Meters calibrated regularly
Any comment:	
Data unit:	Deg C
Description:	Steam temperature at inlet to STG
Source of data to be used:	Measured and data recorded in log book
Value of data applied for the purpose of calculating expected emission reductions in section B.5	100%
Description of measurement methods and procedures to be applied:	Log book maintained based on DCS data which receive data from meters

QA/QC procedures to be applied:	Log book signed by plant manager daily. Meters calibrated regularly
Any comment:	
Data unit:	Bar g
Description:	Steam pressure at inlet to STG
Source of data to be used:	measured and data recorded in log book
Value of data applied for the purpose of calculating expected emission reductions in section B.5	100%
Description of measurement methods and procedures to be applied:	Log book maintained based on DCS data which receive data from meters
QA/QC procedures to be applied:	Log book signed by plant manager daily. Meters calibrated regularly
Any comment:	

B.7.2 Description of the monitoring plan:

>>

(A) Purpose

To define the procedures and responsibilities for GHG Performance, monitoring, measurement and reporting of data and dealing with uncertainties and covers the responsibilities regarding plant operation and maintenance.

(B) Scope

This procedure is applicable to WHRB power project of GIPPL.

(C) Responsibilities

Shift Engineer (Operations): Responsible for proper operation of the mechanical equipment and reporting hourly and eight hourly data of steam generated from WHRB, steam fed to turbines, parameters of steam and flow meter reading of the captive power plant. The report is then sent to the Manager (O & M) for his review.

Shift Engineer (Electrical): Responsible for proper operation of electrical equipment and taking meter reading for electricity generation and wheeling shift-wise. The report is then sent to the Manager (E&I) for his review on a daily basis.

Shift Engineer (maintenance): Responsible for proper maintenance management. The report is then sent to the Manager (plant) for his review on a daily basis

Manager (Plant): Responsible for operation, maintenance and management of plant will be reviewing the monitored parameters shift-wise and presenting a daily executive summary report, duly signed by himself, to the General Manager (Plant).

General Manager : Responsible and in charge of complete operation, maintenance and management of all plant and CDM related matters

He will be in charge of all CDM related matters and CDM officer will be directly reporting to top management.

CDM officer: He will be reporting to General Manager and will be responsible for preparing required documentation and reviewing the accuracy of various reports with counter checks along with project developer. He will be responsible for internal audit regarding CDM project matters.

Annexure 4 gives details of monitoring plan.

B.8 Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)

>> Preparation of this documents has been done by "Lloyds Steel Industries Ltd Engineering division." whose address is

Date of completion of baseline: 06-12-2006

Shri R.M.Alegavi
Vice President(Technology)
Lloyds Steel Industries Ltd
Engineering division
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B Wing, Sane Guruji Marg
Mahalaxmi
Mumbai 400011
Tel No 91-22-30418111,30418221 Fax No 91-22-30418260
rmalegavi@lloyds.in,rmalegavi@hotmail.com

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>> 15-10-2005

C.1.2. Expected operational lifetime of the project activity:

>> 15 Years

C.2 Choice of the crediting period and related information:

C.2.1. Renewable crediting period

Not applicable

C.2.1.1. Starting date of the first crediting period:

>>

Not appplicable

C.2.1.2. Length of the first crediting period:

>>

Not appplicable

C.2.2. Fixed crediting period:

10 years

C.2.2.1. Starting date:

>> 1st March 2007 / date of registration

C.2.2.2. Length:

>> 10 years

SECTION D. Environmental impacts

>>

D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

>>

11.5 MW power based on waste heat recovery based steam generation (WHRB) and steam turbines. There are no additional GHG emissions other than the existing GHG emissions in the absence of project activity.

The installation of WHRB and CPP requires approvals of IBR (Indian Boiler Regulation) and Maharashtra state pollution control Board (MSPCB) and both the approvals will be received before the Commissioning of project activity.

Environmental impact is negligible as the project activity benefits the local, regional and global environment by,

1. Reducing the thermal pollution which could have been caused by emitting waste gases at 1000^0C into atmosphere. Project activity recovers the waste heat and save; energy and reduces thermal emission by controlling gas temperature below 200^0C.
2. Generates electricity without adding any additional GHG emissions.
3. Waste water generation is minimised . The generated waste water shall be used for plantation to create green belt.
4. Noise level from equipments shall be kept within legal limits.
5. The project will not generate on its own any Fly Ash during Power generation from the project activity. But ash contained in flue gases will be collected in ash hoppers provided in WHR boiler
6. The proposed ESP shall remove the ash from flue gases which will be collected in Ash hopper. This ash will be given free of cost to cement plants and brick manufacturers for further Economics benefits and use. The ash used for production of bricks saves the valuable productive soil, also it reduces the Air Pollution caused by the conventional brick kilns, due to the coal burning. The Ash consumed in Cement making reduces the limestone and coal consumption, thus natural resources are saved.

GIPPL have carried out EIA Study.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>>

Environmental impact are considered in significant as enumerated in D1, No adverse impact on environment will be there due to project activity.

Noise Pollution

Equipments like Boiler and STG shall be provided with noise depressing facilities to dampen and to reduce the noise level within allowed limits.

Thermal Pollution:

The heat shall be recovered in the boiler and the flue gases be let out by stack of 70 m height below 200^0C and hence thermal pollution shall be reduced considerably.

Air emission:

An ESP provided at the outlet of boiler effectively reduces the flue dust level below the acceptable legal standard is 100 mg/nm^3.

Impact on Water environment

Blow down water shall be used for plantation. Sources of waste water are DM Plant and Blow down.

All the waste water will be neutralized before using for plantation.

Monitoring of waste water will be done to limit pH, BOD and COD levels within the stipulated levels.

No discharge will be there outside the premises. Hence due to the zero discharge condition, no adverse impact will be there in the water regime.

Solid waste management

Ash collected from bottom of hopper of ESP shall be transported to Ash Silo equipped with bag filters to ensure clean air.

Ash collected shall be supplied to cement manufacturing/ brick manufacturing units.

Safety Management

To ensure safe working conditions:

1) All moving parts shall be provided with guards/ hoods.
2) Insulation of all hot parts shall be done.
3) Full fledged maintenance department shall ensure the healthy condition of equipments.
4) A disaster management plan already exists to handle crisis situation.

All efforts will be done to create clean environment.

Parameters like Noise, Fugitive Emission as well as point source emissions will be monitored regularly.

Conclusion:

Project activity is environment friendly and creates employment and other benefits and promotes sustainable developments.

SECTION E. Stakeholders' comments

>>

E.1. Brief description how comments by local stakeholders have been invited and compiled:

>>

GIPPL identifies the following as stake holders to keep the transparency in the operational activity of the project promoter and thereby meeting local/ environmental regulations

1) Local Authority (Member of Legislative Assembly of Maharashtra)
2) Local authority of Village –Tadali gram panchayat

3) Maharashtra State Electricity Distribution Co Limited MSEDCL
4) Maharashtra State Pollution control Board, Maharashtra (MSPCB)
5) Ministry of Commerce and Industry.

E.2. Summary of the comments received:

>>

GIPPL inserted the advertisement in local news paper requesting comments on the project activity from local stake holders.

GIPPL management apprised the representatives of village Panchayat of village-Tadali about the project activity.

The meeting was called by GIPPL to explain the company's expansion activity. The company officials explained the project activity of waste heat recovery boilers and captive power plant. The questions were invited and given below is the summary of questions raised and clarification provided.

Question	Reply by GIPPL
1 How the village is benefited	1 As waste heat is recovered and flue gases will be entering atmosphere at lower temperature,the environment of village will improve. 2 Expansion activity will increase employment opportunities
2 Criteria for local people employment	Project will require qualified technicians, professionals, skilled and unskilled labour. Local people will be given preference if qualified technicians who have required qualification and experience are available. In case of commercial jobs where specific professional qualification is not required all efforts will be made to employ only local people.
3 Dust emission problem	Project does not generate any ash as it is only waste heat based. However the dust from incoming flue gases is separated in ESP being provided. Hence the dust emission will be as per government environment rules
4 Plans for village development	Company informed that they will be pleased to contribute to sustained development of the village. The company will provide scholarships to Local boys and girls in their educational career. The company will provide a bore well for providing water to villagers The company will make efforts to coordinate with gram panchayat in any manner that will help the villagers.

The sarpanch and villagers expressed their happiness as the project activity will contribute to environmental and other needs of the village. They wished the company the success in their expansion activity.

Similarly GIPPL management apprised MLA regarding the project activity who also appreciated and expressed no objection for the project activity.

Permission have been sought from the State agencies like MSEDCL, MSPCB, etc. wherever required legally and have been received and other State agencies have been apprised of the project activity.

E.3.	**Report on how due account was taken of any comments received:**

>>

The comments mainly centred on employment for local people and village development. The company proposes a regular interaction with village panchayat and provide the necessary assistance in village development. The company has an active policy to help local boys and girls
by providing scholarships for education.
All the stake holders appreciated the energy efficient environment friendly project activity which has sustainable contribution to the development.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Gopani Iron and Power (India) Private Limited
Street/P.O.Box:	MIDC growth centre
Building:	A-22
City:	Tadali
State/Region:	Maharashtra
Postfix/ZIP:	442406
Country:	India
Telephone:	91-7172-237706
FAX:	91-7172-23707
E-Mail:	
URL:	
Represented by:	Jignesh Gopani
Title:	Managing Director
Salutation:	Mr
Last Name:	Gopani
Middle Name:	
First Name:	Jignesh
Department:	
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Direct FAX:	91-22-23401361
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Personal E-Mail:	jgopani@hotmail.com

Organization:	Lloyds Steel Industries Limited
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Building:	B Wing, 2nd floor, Modern Centre
City:	Mumbai
State/Region:	Maharashtra
Postfix/ZIP:	400011
Country:	India
Telephone:	91-22-30418111
FAX:	91-22-30418260
E-Mail:	
URL:	
Represented by:	Mukesh Gupta
Title:	Chairman
Salutation:	Mr
Last Name:	Gupta
Middle Name:	
First Name:	Mukesh
Department:	
Mobile:	
Direct FAX:	91-22-30418111
Direct tel:	91-22-30418260
Personal E-Mail:	mrgupta@lloyds.in

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding is available from Annexure-I country.

ANNEX 3

BASELINE INFORMATION
Base line information (sources of information)

1. IPCC default values forCO2 Emission factor for fuel used in captive power generation EF CO2 as a conservative approach. Justification for this has been provided in excel sheets.

2 Turbine Manufacturers data for steam requirement per MW electricity generation.

3 Boiler efficiency considered as 100% as per OPTION B of methodology under “if base line scenario is captive power generation”

Annex 4

MONITORING INFORMATION

To define the procedures and responsibilities for GHG Performance, monitoring, measurement and reporting of data and dealing with uncertainties.

The document covers the responsibilities regarding plant operation and maintenance.

(B) Scope

This procedure is applicable to WHRB power project of GIPPL.

(C) Responsibilities

Shift Engineer (Operations): Responsible for proper operation of the mechanical equipment and reporting hourly and eight hourly data of steam generated from WHRB, steam fed to turbines, parameters of steam and flow meter reading of the captive power plant. The report is then sent to the Manager (O & M) for his review.

Shift Engineer (Electrical): Responsible for proper operation of electrical equipment and taking meter reading for electricity generation and wheeling shift-wise. The report is then sent to the Manager (E&I) for his review on a daily basis.

Shift Engineer (maintenance): Responsible for proper maintenance management. The report is then sent to the Manager (plant) for his review on a daily basis

Manager (Plant): Responsible for operation, maintenance and management of plant will be reviewing the monitored parameters shift-wise and presenting a daily executive summary report, duly signed by himself, to the General Manager (Plant).

General Manager: Responsible and in charge of complete operation, maintenance and management of all plant and CDM related matters

He will be in charge of all CDM related matters and CDM officer will be directly reporting to him

CDM officer: He will be reporting to General Manager and will be responsible for preparing required documentation and reviewing the accuracy of various reports with counter checks along with project developer. He will be responsible for internal audit regarding CDM project matters.

Serial No.	Activity
1.0	**GHG Performance Parameter**
1.1	The following meters will be monitored : • Gross generation of electricity by the CPP • Auxiliary consumption. • Steam availability from WHRB boilers. • Steam flow entering to STG. • Temperature and pressure of steam entering STG. • Net electricity generation from waste heat recovery.
1.2	**Plant operation and maintenance**: plant manager will be responsible for total plant operation and maintenance of all project equipment and monitoring equipment.
2.0	**Metering System**
2.1	The metering system for the waste heat based CPP shall consist of • In house metering system of GIPPL (for metering the generation of power,

auxiliary consumption)

- Flow meters for monitoring steam flow from WHRBS
- Flow meter for steam inlet to turbine .
- Steam Temperature gauge for WHRB boiler outlets and at inlet of TG
- Steam Pressure gauge for WHRB boiler and at inlet of TG

3.0 **Calibration of the Metering System once a year**

3.1 All the metering devices shall be calibrated at regular intervals so that the accuracy of measurement is ensured .

4.0 **Reporting of the Monitored Parameters/ Authority and Responsibility of monitoring and reporting**

4.1 **In-house Metering System GIPPL**

The Shift Engineer (Electrical) shall monitor hourly and eight hourly data on total generation, auxiliary consumption, net electricity available. The hourly data shall be recorded in the generation log book and the eight hourly data shall be recorded in the plant log book. The complete and accurate records in the plant log book shall be signed by the Shift Engineer (Electrical). Both of these reports shall be sent to the Manager (Plant)

The Steam flow meter reading, temperature and pressure gauge and DCS will measure the respective parameters and reporting will be done shift wise by shift in-charge (operations) based on the online measurements.

5. **Uncertainties and Adjustments: procedure for identifying and dealing with uncertainties**

5.1 The hourly, eight hourly, daily and monthly data shall be recorded at various points as stated above. Any observations (like inconsistencies of report parameters) and/or discrepancies in the operation of the power plant will be documented as "History" in the daily report prepared by the General Manager (Plant) along with its time of occurrence, duration and possible reasons behind such operational disruptions. Necessary corrective actions will be undertaken at the earliest.

The collected metered readings will be cross checked with steam qty based calculations. In case of deviations correction measures like recalibration of meters will be carried out.

Furthermore, as a safety measure, the total power generating system shall be equipped with an Automatic Alarming System which gives a prior indication of any fluctuations in the operating parameters of the power plant thereby enabling the operators to take necessary preventive measures.

These measures will be undertaken in order to detect and minimize the uncertainty levels in data monitoring.

6.0 **Experience and Training**

6.1 All the Shift Engineers (Electrical and Instrumentation, Operations) shall be qualified engineers/ technologists. All the operators of the boiler power plant shall be IBR certified and NPTI certified engineers, and they shall also undergo an exhaustive on-the-job training program including plant operations, data monitoring and report preparation. The technical staff will also be trained by OEM representatives.

6.2 **Emergency Preparedness Plan**

The total power generating system of the waste heat based CPP will be equipped with an "Automatic Alarming System" which helps the operators to take necessary preventive actions before any kind of non-functioning of the power plant which may results. GIPPL shall have a fire fighting system in place.

In addition to the above the following standard procedures for tackling emergencies arising from,

- Blackout
- Low boiler drum level/ low feed water level
- High flue gas temperature from sponge iron kiln.
- Load throw off
- Boiler Tube leakage.

Boiler tripping at alarm systems will be at place.

Review of CDM related matters

CDM officer will carry out all necessary CDM related documentation and also he will undertake internal audit of these data and requirements along with project developer. He will be reporting to General Manager

Reference

Project Design Document, maintenance manuals , standard OEM procedures and CDM documentation.

Records

The following reports will be part of records :

a. Calibration report of electricity meters
b. Calibration report on other instruments
c Daily shift record (production). Log sheets.
d Daily shift record (electrical).Log sheets.
e Report to top management
f CDM reports

All reports will be signed by shift engineer/ concerned officer, plant manager and General Manager

The methodology requires monitoring the following

1. Net electricity generation from the proposed project activity
2. Data needed to calculate the emissions factor of captive power generation

GIPPL have the monitoring plan with the aim that complete integrity and transparency shall be maintained in the following manner.

1. Data monitoring and maintaining records of readings /printouts of readings from installed instrumentation;

2 Calculation of emissions reductions

Dedicated personnel with defined responsibilities will be made available. A third party monitoring of the data and calculations will also be carried out for maintaining accuracy.

The following data will be submitted to concerned authorities

1. Monthly report on power generation
2. Monthly report on auxiliary consumptions
3. Monthly report on Steam generation
4. Monthly report on Steam consumptions

Section- D gives reporting tables to be followed.

Monitoring of Steam

1. Monitoring of steam

Steam generated by project activity is fed into a common header of CPP and this header receives steam from WHRBS and FBC boiler and the combined steam from Common Header is fed into the steam turbine generator to generate 15 MW power.

2. The purpose of monitoring of steam

To exactly define how much steam is generated from 4 WHRBS project activity and how much of the steam is consumed in Steam turbine generator. This data will be used to calculate exact electricity generated by WHRBS project activity. This is essential to establish CO_2 reduction emission by the project activity.

3. Calculation of Net Power Generated from WHRB Project Activity:

<u>To achieve the above we follow the steps below (as per project monitoring plan given in the schematic diagram enclosed</u>

(A) Flow of Steam fed from WHRBS = F1

(B) Flow of Steam fed to STG = F2

(C) Gross Electricity Generated = E GROSS
(Records from Me_1 meter reading)

(D) Auxiliary Load / self power consumed by the WHRB/FBCB (Recorded from Me_2 meter reading) = E_{AUX}

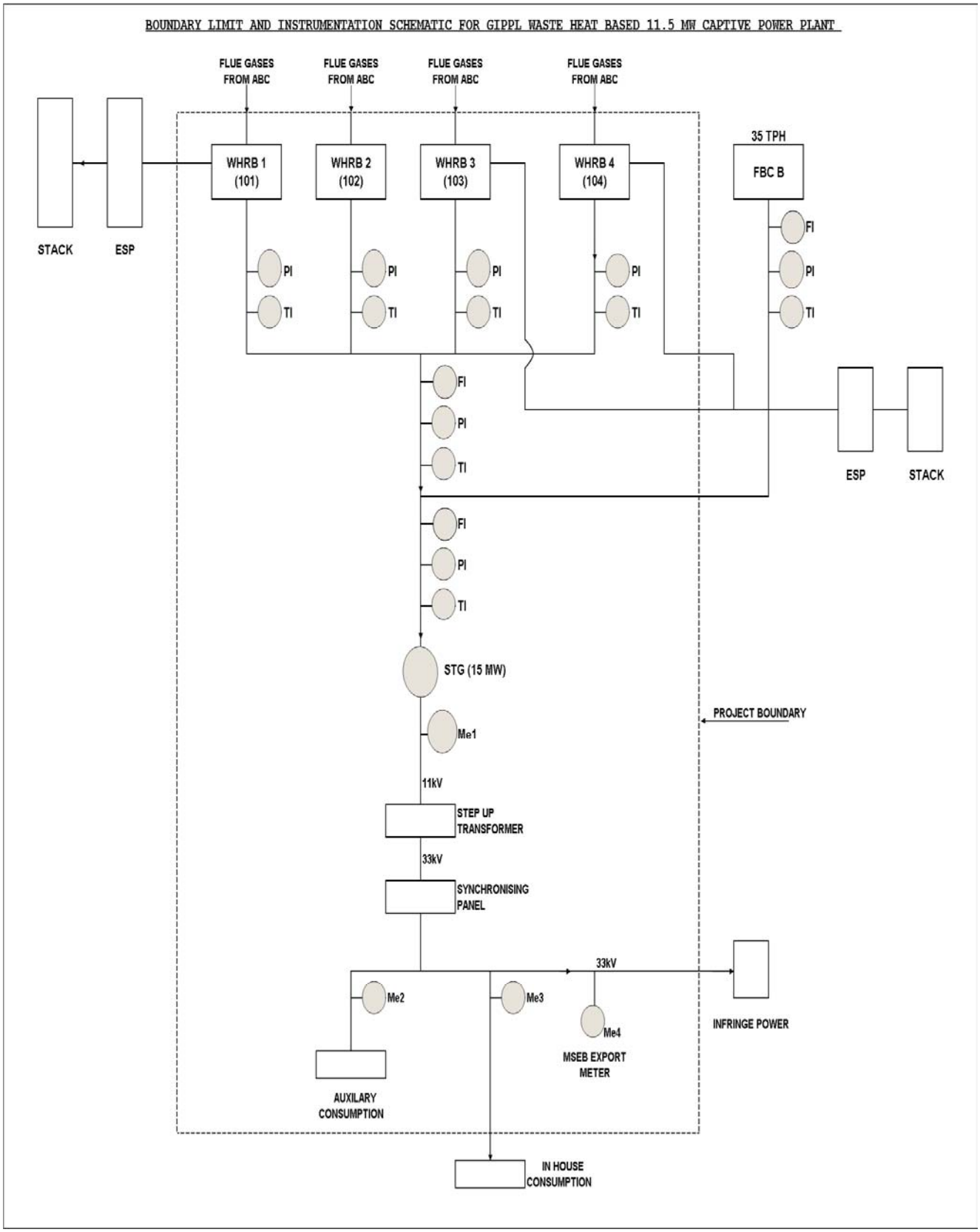
(E) Net Electricity Generation by CPP E NET = D– E
(Gross Elec. Generated- Aux. Load)

(F) Multiplication factor for calculating WHRB electricity = M

= F1 / F2

(G) Net Electricity Generation from WHRBS EG y = M X E NET

Flow quantities (F_1 & F_2) are determined from the metered and recorded steam flows at DCS.


BOUNDARY LIMIT AND INSTRUMENTATION SCHEMATIC FOR GIPPL WASTE HEAT BASED 11.5 MW CAPTIVE POWER PLANT
FLUE GASES FROM ABC
FLUE GASES FROM ABC
FLUE GASES FROM ABC
FLUE GASES FROM ABC
35 TPH
WHRB 1 (101)
WHRB 2 (102)
WHRB 3 (103)
WHRB 4 (104)
FBC B
STACK
ESP
FI
PI
TI
ESP
STACK
STG (15 MW)
Me1
PROJECT BOUNDARY
11kV
STEP UP TRANSFORMER
33kV
SYNCHRONISING PANEL
33kV
Me2
Me3
Me4
INFRINGE POWER
MSEB EXPORT METER
AUXILARY CONSUMPTION
IN HOUSE CONSUMPTION

Appendix I : Abbreviation

ABC	After Burning Chamber
Annex	Annexure
CPP	Captive Power Plant
CEA	Central Electricity Authority.
CER	Carbon Emission Reduction
CPCB	Central Pollution Control Board
CDM	Clean Development Mechanism
DCS	Digital Control System
DM	De-Mineralized
DRI	Direct Reduced Iron
ESP	Electro Static Precipitator
EIA	Environmental Impact Assessment
FBC	Fluidized Bed Combustion
FBCB	Fluidized Bed Combustion Boiler
GHG	Green House Gas
HSD	High Speed Diesel
HT	High Tension
IBR	Indian Boiler Regulation
IRR	Internal Revenue Return.
JPC	Joint Plant Committee
kwh	Kilo Watt hour
LSHS	Low Sulphur Heavy Stock
LSIL	Lloyds Steel Industries Ltd
MSEDCL	Maharashtra State Electricity Distribution Company Ltd
MERC	Maharashtra State Regulatory Commission
MPCB	Maharashtra Pollution Control Board
MWh	Mega Watt hour
MW	Mega Watt
NM^3/h	Normal Meter Cube per Hour
PLF	Plant Load Factor
PLR	Prime Lending Rate.
PDD	Project Design Document
Qty	Quantity
RBI	Reserve Bank of India
STG	Steam Turbine Generator
SPM	Suspended Particulate Matter
tCO_2	Tonnes Carbon-dioxide
tCO_2eq	Tonnes Carbon-dioxide equivalent
TISCO	Tata Iron & Steel Co Ltd
TPD	Tonnes Per Day
Tones/h	Tonnes per hour
T&D	Transmission and Distribution
TG	Turbine Generator
WHR	Waste Heat Recovery
WHRB	Waste Heat Recovery Boiler