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

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	28 July 2006	• All references to Project Design Document (CDM-PDD) sections A to E have been replaced with A to C. • Paragraph 6 of CDM M&P has been added to the Information note for Project Design Document (CDM-PDD). • In the Specific guidelines for completing the Project Design Document (CDM-PDD): o Section D is deleted and is replace with Environmental impacts o Similarly section E is deleted and renamed to Stakeholders' comments. o Section A.1 and A.2 were amended o Section A4.4 was deleted and replaced by section A4.4.1 amended

SECTION A. General description of project activity

A.1 Title of the project activity:

>>

ISL Waste Heat Recovery Project, India

Version: 08

Date: 25/10/2007

A.2. Description of the project activity:

>>

M/s Ind Synergy Limited (ISL) has established an integrated complex of sponge iron and power plant at village Kotmar and Mahapalli village in the East direction from Raigarh (CG). The present steel complex comprises of 100,000 tonnes per annum (TPA) of Sponge Iron with 140,000 TPA Semi finished Steel Capacity through Direct Reduced Iron (DRI) Induction Furnace (IF) route. As per the planned activity, ISL will implement 16 MW Waste Heat Recovery Boiler (WHRB) at the same complex.

The purpose of the project activity is to generate electricity by utilisation of the waste heat emanating from the DRI plant. The project activity of ISL will also lead to sustainable economic growth, conservation of natural resources and reduction in Green House Gas (GHG) emission. 16 MW power generated from the captive power plant will cater the loads of DRI plant, captive power plant and other utilities. The project activity would replace the cheap coal based power and utilize the waste heat for power generation, which would otherwise vent in the atmosphere. Therefore project activity helps in reducing Greenhouse Gas (GHG) emission into the atmosphere.

Project's Contribution to Sustainable Development

Social Well-being: - Project activity would lead to employment opportunities for skilled labour and professionals in the region for power plant construction and operation. Also with growing technological advancement the project activity would contribute to capacity building in terms of technical knowledge and managerial skills.

Economical Well-being: - The project activity generates employment opportunities during construction phase and operational phase. The project activity will boost business opportunity for local vendor, suppliers etc.

Environmental Well-being: - Coal is the available fossil fuel in the region, which is mainly used for power generation. The power generation from coal based thermal power station which would have led to greenhouse gas emission into the atmosphere. ISL would directly save further depletion of natural resources in the form of coal, thus increasing its availability to other important processes in future.

Technology Well-being: - The implementation of project activity is a demonstration of a clean technology and therefore employees and other stakeholders will be exposed to energy efficient and environment friendly technology.

A.3. Project participants:

>>

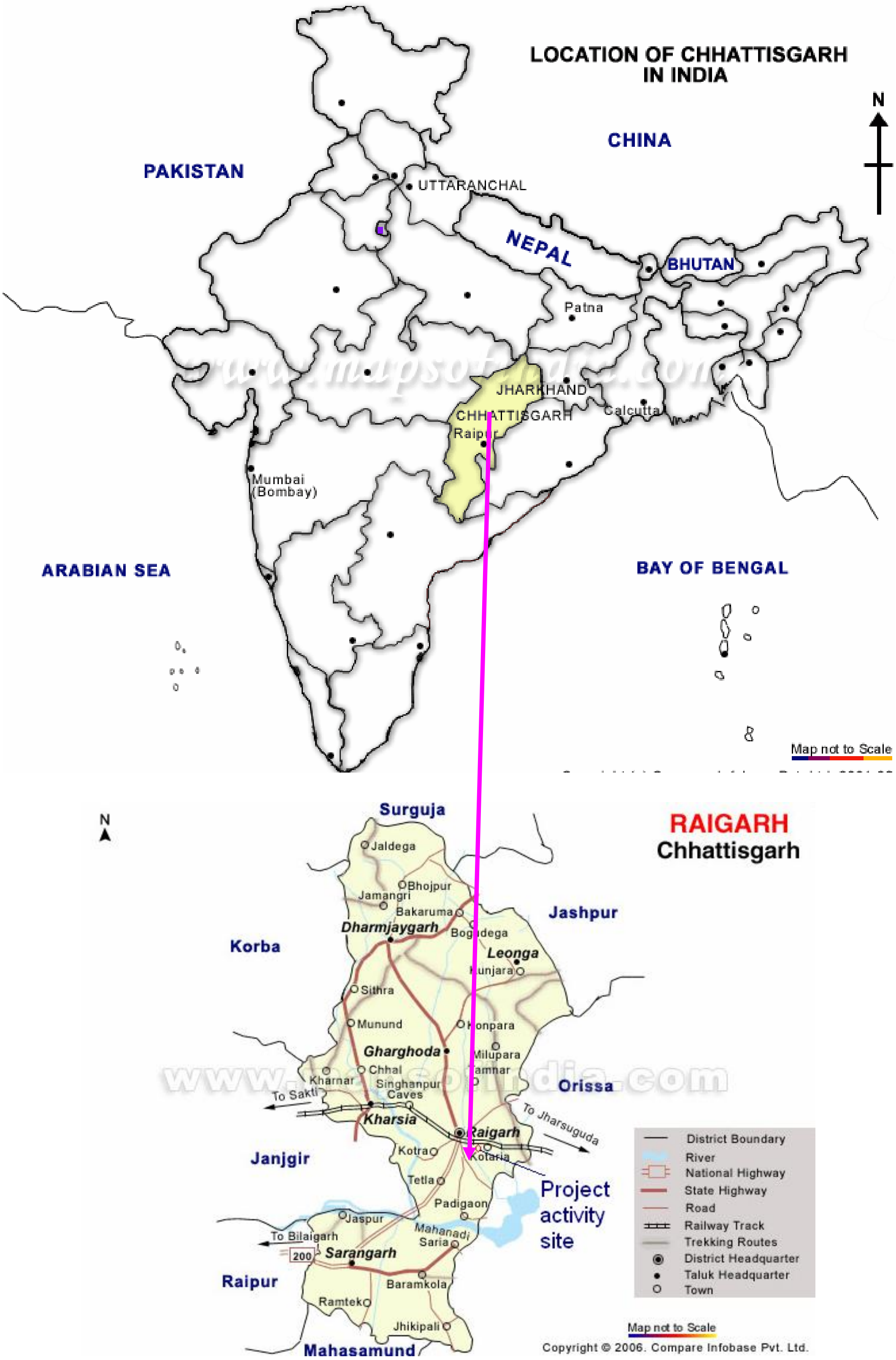
Name of Party involved (*) (host) indicates a host Party)	Private and/or public entity (ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wished to be considered as project partipant (Yes/No)
Ministry of Environment Forest (MoEF) Govt of India	Ind Synergy Ltd (Private Entity)	No

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

>>

Location of the project activity site is given in the map below:



Reference: www.mapsofindia.com

A.4.1.1. Host Party(ies):

>>
India

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

>>
Chhattisgarh

A.4.1.3. City/Town/Community etc:

>>
Village Kotmar - Raigarh

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

>>
The site is situated in the Northern Eastern part of the state of Chhattisgarh, which is about 14 km east from Raigarh. The plant site is approx 2 km from the Kotarlia railway station. The geographical location of the plant is 21° 55' 45'' North to 21° 56' 02'' North and 83 ° 29' 40'' East to 83 ° 30' 01'' East. The general elevation of the plain of the site in Raigarh district is about 222 M above MSL. The nearest airport is located at Mana village near Raipur at a distance of about 225 km from the project area.

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

>>
Sector: Energy
Category 1: Energy Industries (Renewable/Non renewable sources)

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

>>

The project activity involves implementation of WHRB for power generation utilizing waste heat from kiln operation. In the absence of the project activity, the power requirement of ISL would have been met by the low cost coal based power plant. An equivalent amount of CO_2 emissions would have resulted at the thermal power station to generate electricity to meet ISL's power requirements. The primary objective of the project activity is to generate electricity from waste heat of the hot flue gases and displace electricity from the planned coal based thermal power plant.

Therefore, there is an additional reduction of GHG emissions (CO_2) that would not occur in absence of the project activity since the plant would draw electricity from the coal based thermal power plants.

The waste heat recovery (WHR) system has been designed in conformity with latest concepts in power plant engineering. The salient features of the WHR system are described as below:

Waste Heat Recovery Boilers (WHRB):

Fuel:
The waste heat from waste gases emitting from DRI kilns are used in the WHRB. This waste heat will be utilized in the two waste heat recovery boilers (WHRB).

Waste Heat Recovery Boilers (WHRB):

The WHRB comprises of two 38 TPH boilers operating at 67.15 kgf/cm^2 pressure and 485 °C. The waste heat recovery boilers are semi-conductor natural circulation, single drum water tube unit designed to recover sensible heat of waste gas leaving DRI kiln for generation of steam. Economiser section of the boiler is non-steaming type with provision for re-circulation during start-ups, chemical cleaning etc. Super heater section is convection and radiation type and designed to maintain rated steam temperature at outlet over the control range of 60% to 100% MCR.

Steam Turbine Generator:

The steam turbine comprises of two 8 MW uncontrolled extraction condensing steam turbine generator unit with throttle steam parameters of 67.15 kgf/cm^2 pressure and, 485 °C. The steam turbine is a single cylinder unit with two uncontrolled extraction for regenerative feed heating, designed for inlet steam parameters of 67.15 kgf/cm^2 pressure and at 485 °C before emergency stop valves and exhausting against condenser pressure of around 0.124 kgf/cm^2 The exhaust steam after the last LP will flow into the surface condenser. The turbine generator is provided with self-contained oil system for supplying lubricating oil to turbine and generator bearings as well as oil to the governing and control system. Lubricating oil is cooled by closed circuit cooling water system utilizing clarified water as cooling media. The generator has two pole, 3 phase, air-cooled machines preferably directly coupled to the steam turbines and have a nominal rating of 8 MW at 0.8 power factor (10 MVA). The generator delivers power at 11 KV±10%, 3 phase, 50 Hz.

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

>>

Years	Annual estimation of emission reductions in tonnes of CO_2e
2008	67185
2009	67185
2010	67185
2011	67185

2012	67185
2013	67185
2014	67185
2015	67185
2016	67185
2017	67185
Total estimated reductions (tonnes of CO_2e)	**671850**
Total number of crediting years	10
Annual Average over the crediting period of estimated reductions (tonnes of CO_2e)	**67185**

A.4.5. Public funding of the project activity:

>>

No public funding from the parties included in Annex – I countries is involved in the project activity.

SECTION B. Application of a baseline methodology

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

>>

Title: "Consolidated baseline methodology for waste gas and/or heat for power generation"

Reference: UNFCCC approved consolidated methodology ACM0004 / version 02,

Sectoral Scope: 01, 03 March, 2006

Title: "Consolidated methodology for grid-connected electricity generation from renewable sources"

Reference: UNFCCC approved consolidated methodology ACM0002 / version 06

Sectoral Scope: 01, 19 May 2006

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

>>

The methodology ACM0004 is applicable 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:

Applicability Criteria	Fulfilment by project activity
1. That displace electricity generation with fossil fuels in the electricity grid or displace captive electricity generation from fossil fuels, electricity.	The project activity is generating power using recovered sensible heat contained in the waste flue gases that would displace equivalent power generation from coal based thermal power plant. In absence of the project activity waste heat would have been released.
2. Where no fuel switch is done in the process where the waste heat or the waste gas is produced after the implementation of the project activity	No fuel switch is been done where waste gases are generated

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.

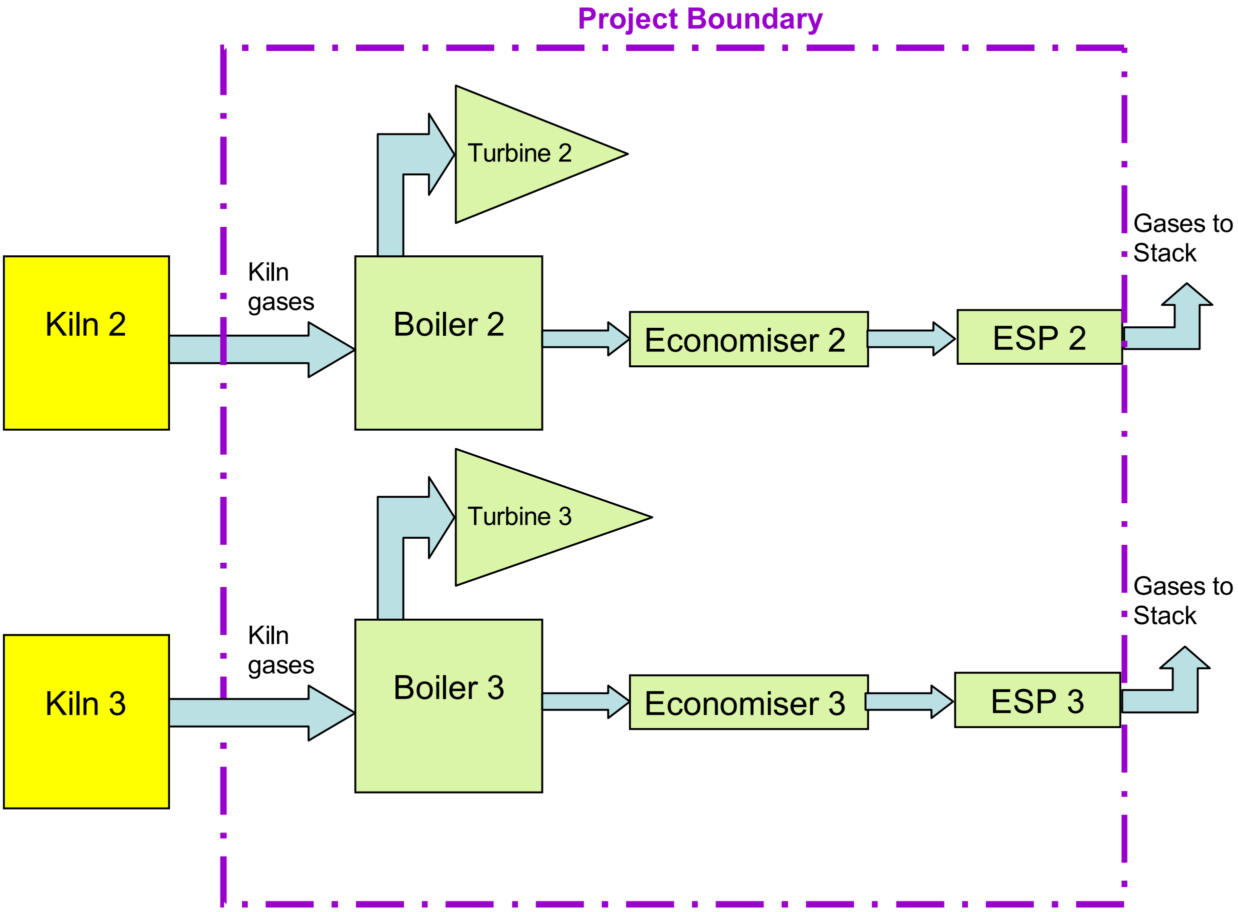
The present project activity is new project activity and there is no capacity expansion in planned during the crediting period. In case of any expansion new project activity will be considered for clean development mechanism.

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

As per ACM0004, for the purpose of determining GHG emissions of the project activity, project participants need to include:

- CO_2 emissions from combustion from auxiliary fossil fuels

As discussed earlier that there is no provision of auxiliary fossil fuel firing in the project activity so there are no project activity related emissions. The project boundary related to ACM0004 as applied to the project activity comprises of the WHRBs, turbo-generators, and the ESP as shown in the figure below-



The project boundary starts from supply of waste heat at the boiler inlet to the point of electricity generated for ISL. In the absence of the project activity the same quantity of electricity would have been generated from the coal based thermal power plant. The coal based electricity generation is having higher emissions per kWh of electricity with respect to western regional grid. Conservatively for the purpose of calculation of baseline emissions Western regional grid has been considered within the system boundary. Estimation of baseline emissions has been done based on data and information available from Central Electricity Authority (CEA)[1] sources as applicable.

The project proponent will not use any fossil fuel for 16 MW WHRB power generation unit. Thus there are no project emissions estimated due to the project activity. Only waste heat will be utilized for power generation, so it is assumed that no emissions will be generated due to combustion of waste heat for electricity generation. Conservatively baseline option selected for the project is to use grid electricity. The major baseline emission will be carbon dioxide gas which is the main emission source to be considered for the project. The methane and nitrogen oxide emission in the baseline are excluded for simplification and also because it leads to conservative approach of emission reduction estimation.

	Source	Gas		Justification/Explanation
Baseline	Grid electricity	CO_2	Included	Main emission source
		CH_4	Excluded	Excluded for simplification. This is conservative.
		N_2O	Excluded	Excluded for simplification. This is conservative.
Project Activity	On-site fossil fuel consumption due to the project activity	CO_2	Excluded	There is no usage of coal or any other fossil fuel for project activity
		CH_4	Excluded	There is no usage of coal or any other fossil fuel for project activity
		N_2O	Excluded	There is no usage of coal or any other fossil fuel for project activity
	Combustion of waste hot flue gas for electricity generation	CO_2	Excluded	It is assumed that this gas would have been burned in the baseline scenario
		CH_4	Excluded	Excluded for simplification
		N_2O	Excluded	Excluded for simplification

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

>>

The methodology as applied to the project activity involves the identification of alternative baseline scenarios that provide or produce electricity for in-house consumption excluding options that:

- do not comply with legal and regulatory requirements; or

[1] http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

- depend on key resources such as fuels, materials or technology that are not available at the project site.

The possible alternative baseline scenarios are as follows:

Alternative 1: The project activity not undertaken as a CDM project activity

ISL may have set up a waste heat recovery based electricity generation at its facility for meeting in-house requirements. This alternative is in compliance with all applicable legal and regulatory requirements. However, this alternative faces a number of barriers making it predictably prohibitive. Hence this option is not a part of baseline scenario.

Alternative 2: Import of electricity from the grid

In absence of project activity, the project proponent would have imported electricity from the grid. An equivalent amount of CO_2 emissions would take place at the thermal power plants supplying power to grid. This alternative is in compliance with all applicable legal and regulatory requirements and can be a part of baseline scenario.

Alternative 3: Coal based captive power generation on-site.

An equivalent coal based captive power plant put up at ISL. This alternative is in compliance with all applicable legal and regulatory requirements it is dependant on the availability of coal. Chhattisgarh have abundant coal supply in the region. This option is one of the scenarios considered for baseline.

Alternative 4: Diesel based captive power generation on-site

An equivalent diesel based captive power plant put up at ISL. This alternative is in compliance with all applicable legal and regulatory requirements and could be one of the scenarios considered for baseline.

Alternative 5: Gas based captive power generation on-site

ISL may generate its own power using natural gas based captive power plant. Although this alternative is in compliance with all regulatory and legal requirements it is not a realistic alternative due to non availability of natural gas distribution network in Chhattisgarh. Therefore, alternative 5 may be excluded from baseline scenario.

Alternative 6: Considering other uses of waste heat or gas

This alternative is in compliance with regulatory and legal requirements. There is no requirement of waste heat at the plant. Thus this option is excluded from the baseline scenarios.

Among all these alternatives the one that does not faces any prohibitive barrier and is the most economically attractive should be considered as the baseline scenario. Thus from the above identified alternatives it can be found that alternative 2, 3 and 4 are the most likely alternatives for the baseline scenario.

As per ACM004, the most economically attractive alternative should be considered as the baseline scenario. The analysis was based on the report published by Central Electricity Authority (CEA): *"Report of Expert Committee on Fuels for Power Generation", Planning Wing, Central Electricity Authority, Government of India, February 2004"*. The analysis is shown in Table given below:

Table: Analysis of different scenarios considered

Alternative 2: Import of electricity from the grid	
Capital Cost of Power plant (Rs Crore/MW)	0
Cost of generation at 80 % PLF (Rs/KWh)	More than INR 4/kWh
Conclusion	Economically attractive option for capital investment (zero capital investment) and unattractive in long operation (High cost of power)
Alternative 3: Coal based captive power generation on-site	
Capital Cost of Power plant (Rs Crore/MW)	4.0
Cost of generation at 80 % PLF (Rs/KWh)	1. INR1.77[2]/kWh (Average cost of coal based power generation based on report prepared for the plant). 2. Based on expert committee report the average power cost is 1.58 INR/kWh (At 80 % PLF and 200 km between the source and load centre). In the project activity site coal is available in huge quantity in very close vicinity.
Conclusion	Economically unattractive option as per the capital investment but most lucrative with respect to cost of power.

[2] The average cost of power generation is based on the power generation cost of coal based power plant at the site. The working is submitted to DOE.

Alternative 4: Diesel based captive power generation on-site	
Capital Cost of Power plant (Rs Crore/MW)	3.5
Cost of generation at 80 % PLF (Rs/KWh)	5.96 (At load centre)
Conclusion	Economically unattractive option

Source: *"Report of Expert Committee on Fuels for Power Generation", Planning Wing, Central Electricity Authority, Government of India, February 2004"*

Thus alternative 3: Coal based captive power plant on site is the most lucrative scenario and is a baseline scenario. The project proponent has thought of this option and obtained necessary environmental clearances for the same as well (The clearances have been submitted to DOE).
For emission reduction calculations the project proponent uses the emission factor of the grid because it is less than emission factor of coal based captive power generation.
The approach adopted in emission reduction calculation is conservative.

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):

>>

Additionality tool

Tool for the demonstration and assessment of additionality (ver 03) is used for assessment of additionality in the project activity.

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a. Define alternatives to the project activity:
Sub-step 1b. Consistency with mandatory laws and regulations:

As discussed in above, there were six possible alternatives available with the project proponent to provide this service among which two were feasible. They are:
Alternative 1: The project activity not undertaken as a CDM project activity
Alternative 2: Import of electricity from the grid – continuation of current scenario
Alternative 3: Coal based captive power generation on-site – Baseline scenario due to lowest per kWh cost
Alternative 4: Diesel based captive power generation on-site
Alternative 5: Gas based captive power generation on-site
Alternative 6: Considering other uses of waste heat or gas

These alternatives are in compliance with all applicable legal and regulatory requirements. There is no legal binding on ISL to implement the project activity. In India it is not mandatory for such units to implement waste heat recovery based power generation plants from waste heat of the kilns.

Step 2: Investment analysis
To conduct the investment analysis, the project proponent is required to use the following steps:

Step 2a: Determine appropriate analysis method
The project activity is generating the electricity and will receive the revenue other than CER revenue. Therefore Option I –Simple Cost analysis would not be appropriate method to apply. There are two options remaining – investment comparison analysis and benchmark analysis.
Both the analysis method can be used in for the project activity. For investment comparison analysis the financial data of other probable options is required. Due to unavailability of such data for all options project proponent has done benchmarking analysis. The project developer has chosen benchmark analysis (Option III) to understand the financial feasibility of the project. The IRR for the project activity is calculated for the project activity and the same is compared with the benchmark. According to guidance provided in the tool for demonstration and assessment of additionality on the IRR (equity or project IRR), the project activity should calculate the project IRR.
According to additionality tool ‘For the benchmark analysis, the IRR shall be calculated as project IRR. If there is only one potential project developer (e.g. when the project activity upgrades an existing process), the IRR shall be calculated as equity IRR’.
The project activity is using the benchmark analysis and there is not only one project developer (Other than ISL one more company IPL was also interested in the project activity) and the project activity is not up-gradation of the existing process therefore project IRR is calculated for the project. Moreover the bank appraises such type of projects on project IRR basis only. The supporting for the same is submitted to DOE.

Step 2b: Option III. Apply benchmark analysis

The project proponent conducted an investment analysis of the project activity with the Internal Rate of Return as the financial indicator. ‘Internal Rate of Return’ is one of the known financial indicators used by banks, financial institutions and project developers for making investment decisions.

ISL calculated the project activity’s internal rate of return (IRR) (project IRR[3]) and compared it with the general lending rate in the country[4]. Since the project proponent had to use several sources in order to raise

---

[3] According to additionality tool; if some other promoters are also available for the project then project IRR should be calculated. One company was discussing with project promoter for the installation of WHRB power plant. The communication of the same has been submitted to DOE.
[4] According to tool for demonstration and assessment of additionality ver 03 the benchmark can be ‘Estimates of the cost of financing and required return on capital (e.g. commercial lending rates and guarantees required for the country and the type of project activity concerned), based on bankers views and private equity investors/funds’ required return on comparable projects;. Commercial lending rate from RBI published report is considered as the bench mark. This is varying between 10.25 to 12% (variation from

the capital necessary to implement the project activity, and each of these sources expected different returns, the benchmark is considered minimum prescribe commercial lending rate from bank i.e. 10.25%[5].

Sub-step 2c – Calculation and comparison of financial indicators

The financial internal rate of return of the ISL project activity without CDM revenues is 9.10 % which is much lower than the 10.25% benchmark for the ISL project activity as required by the investors. The financial internal rate of return of the ISL project activity without CDM revenues was calculated based on the following assumptions:

1. The electricity price is considered as per kWh generation cost in the coal based power plant at the site. The detailed working for the same with the supporting of fuel cost is submitted.
2. The cost of generation is calculated to be 0.94/unit before the starting of the project which includes INR 0.36/kWh depreciation (The cost of generation is considered from the financial audit report of the year prior to start of the project activity). The escalation in the generation prices is kept at 6.5% which is the escalation of WPI in India. In actual operation the electricity generation cost increase more than 10% per year in waste heat recovery boiler.
3. The capacity utilization is taken as 80% through out the lifetime of project activity.
4. Among the installed capacity of 16 MW, 1.6 MW will be consumed for in-house consumption. (Auxiliary power consumption in power plant).
5. Annual operating days is 300 days.
6. The life of the project will be 15 years.

The calculation of units of power generation is given below:	
Installed Capacity(MW)	16.00
Auxiliaries usage	1.6
Balance Capacity	14.4
Capacity Utilisation	80%
Power Output	11.5
Generation of Power/year	82944000
Units in Million (‘000000)	82.944

The internal rate of return of the ISL project activity with CDM revenues is 13.99% (Attached as Enclosure 1). Therefore the project activity would only be financially viable if the project activity attains

year 2002-03 to 2004-05) in the time of decision making. Conservatively 10.25% is considered for the benchmarking.

[5] Table 74 : structure of interest rates column 8 year 2004-05.

CDM revenue through sale of the emission reductions. The financial internal rate of return of the ISL project activity with CDM revenues was calculated based on the following additional aspects:

1. CER is equivalent to INR 350.

All financial data used to arrive at the internal rate of return of the ISL project activity with and without CDM revenues would be provided to the DOE in the process of Validation.

Sub-step 2d. Sensitivity analysis (only applicable to options II and III):

The most important parameter for the project sustainability is the quantity of electricity generated. Based on quantity of generation sensitivity of the project is calculated and shown in the table below:

Increase or decrease in electricity generation	**Project IRR**
2% increase in electricity generation	9.54%
5% increase in electricity generation	10.20%
2% decrease in electricity generation	8.65%
5% decrease in electricity generation	7.98%

It is clear from the table that the project IRR of the project is below minimum benchmark (10.25%) inspite of 5% increase in electricity generation. It is evident that the project activity is financially unfavorable.

Step 3: Barrier analysis

This step is not used for the project activity.

Step 4: Common Practice Analysis

Based on the information about activities similar to the proposed project activity, the project proponent is supposed to carry out common practice analysis to complement and reinforce the barrier analysis. The project proponent is required to identify and discuss the existing common practice through the following sub-steps:

Step 4a: Analyze other activities similar to the proposed project activity

The upturn in the general economy and the steel sector has resulted in the expansion and setting up of many sponge iron industries in India and in particular in Chhattisgarh state. There are around 147 sponge iron plants in operation in India[6]. The study conducted by the Joint Plant Committee (JPC) published in year 2005-06, under the aegis of the Ministry of Steel, Government of India, indicates that out of the 147 units surveyed, the number of units with captive power generation facility is quite low: total of such units being only 16. In Chhattisgarh state 38 coal based units are in operation of which only 8 units have captive

[6] http://jpcindiansteel.org/execsum.pdf (The document is attached with the PDD)

power generation. These eight plants having waste heat recovery based power generation in Chhattisgarh state are:

1. Jindal Steel & Power Limited (JSPL)
2. Prakash Sponge Iron Limited
3. HEG
4. Monnet
5. Ispat Godavari
6. Nalwa Sponge Iron Limited
7. Vandana Global
8. Raipur Alloys

These 8 units having waste heat recovery based power generation have been implemented after taking CDM revenues into consideration except for the 3 plants namely - JSPL, HEG and Prakash which had waste heat recovery based power generation facilities implemented without CDM revenues. Prior to the year 2000, only three units were having waste heat recovery based power generation system namely

Unit/Plant	**Process**	**Capacity, Mt/yr**
Jindal Steel & Power Limited	Jindal	0.62
HEG	SIIL	0.06
Prakash	SL/RN	0.40

Of all the coal based technology for DRI kilns SL/RN technology of Lurgi GmbH, West Germany has been the most successful one. Sponge Iron India Limited (SIIL) has absorbed the imported (SL/RN) technology and through R&D efforts improved the equipment design. Jindal has developed the indigenous coal based technology and as per available statistics only two plants have been based on this technology namely Jindal & Monnet. The two main operations where the technologies differ are techniques for feeding/blowing coal and introduction of air for the process. This would essentially mean that the flue gas quality and quantity would differ thereby impacting the power generation potential. The wide spread acceptability of SL/RN technology would ensure that the plant based on this technology are less susceptible to breakdowns or closure and thus the associated WHRB in plants based on the said technology would also be functional.

Although these units had installed waste heat recovery based power generation on the kilns it was not being practised in the other 35 units operating in the region. This was essentially due to the fact that although these units had taken the risk of installing theWHR units they were facing barriers and therefore the other sponge iron manufacturers did not follow such practice. Moreover these units were able to take such risk owing to the following facts:

1. Jindal Steel & Power Limited (JSPL) - JSPL is the largest coal based sponge iron manufacturing facility in the world (http://www.jindalsteelpower.com/). The company has strong financials to undertake the risks associated with such kind of project activities. The technology for the DRI kilns has been developed by JSPL themselves and for the further expansion after 2000 they have considered CDM revenues for the

implementation of the waste heat recovery based power generation. This clearly indicates that there are barriers associated with such kind of project activities.

2. HEG - Set up in 1977, HEG is a diversified company with interests in Graphite Electrodes, Steel & Power. From a modest investment made in 1977, the company reported a turnover of Rs. 6500 million (US$140 million) in fiscal 2006. A Flagship of the LNJ Bhilwara Group, HEG is Asia's leading graphite electrodes manufacturer and exporter (http://www.hegltd.com/). HEG has only two small 100 tpd kilns operating. HEG Limited had started their captive power plant operations in 1997 with wheeling facility to its group company. Further, in view of the constant regulatory barriers associated with wheeling, HEG Ltd. eventually stopped wheeling to its group companies and has instead set up a coal based power plant at the group company premises.

3. Prakash - Prakash industries Ltd , part of "Surya Roshni" group was started in the year 1980. The company had setup Rotary Kilns based on SL/RN technology of Lurgi ,Germany Recognizing the potential to tap the waste gases let out by the Sponge Iron kiln, the company also installed a power Co generation plant with Waste Heat Recovery Boilers ***in collaboration with Lurgi ,Germany***. Installing first Boiler in the country based on utilization of hot gases (http://www.prakash.com/profile.php).
Thus based on this information it can be safely concluded that the barriers associated with such kind of project activities has restricted the sponge iron units fromgoing ahead with such kind of project activities.

These projects have been taken after taking CDM into consideration.

Step 4b: Discuss any similar options that are occurring

The above analysis shows that the proposed project activity is not a common practice amongst plants facing similar techno-economic circumstances in the region. Moreover plants which have opted for waste heat recovery systems have done so only on the basis of CDM funding.

It is ascertained that the project activity would not have occurred in the absence of the CDM simply because no sufficient financial, policy, or other significant incentives exist locally to foster its development in Chhattisgarh /India and without the proposed carbon financing for the project ISL would not have taken the investment risks in order to implement the project activity.

B.6. Emission Reduction

>>

B.6.1. Explanation of methodological choices:

>>

As discussed in section B.4, alternative 2 and alternative 3 are the most likely alternatives for the baseline scenario. Although alternative 3 is economically attractive but it generates more quantity of GHG emissions per kWh of electricity generated with respect to western regional grid. Thus conservatively emissions from alternative 2: Import of electricity from the grid is considered as the baseline emissions.

Project Emissions
Not applicable. As per the methodology ACM0004 project emissions are applicable only if auxiliary fuels are fired for generation start-up, in emergencies, or to provide additional heat gain before entering the waste heat recovery boiler. Since in the project activity there will be no auxiliary fossil fuel firing / consumption involved, thence no project emissions.

Leakage
The waste heat will be sourced from DRI unit situated within the project complex. There will be no other auxiliary fuel used in the project, so no leakages have to be considered for its transportation.

Baseline Emissions
Electricity baseline emission factor of Western Regional Grid (EF_y) is calculated as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) factors according to the following three steps. Calculations for this combined margin are based on data from official sources (where available) which is publicly available.

STEP 1. Calculation of the Operating Margin emission factor
The Simple OM emission factor ($EF_{OM,simple,y}$) is calculated as the weighted average emissions (in tCO_2equ/MWh) of all generating sources serving the system, excluding hydro, geothermal, wind, low-cost biomass, nuclear and solar generation.

$$EF_{OM,y} = \frac{\sum_{i,j} F_{i,j,y}.COEF_{i,j}}{\sum_{j} GEN_{j,y}}$$

where
- $F_{i,j,y}$ is the amount of fuel i (in a mass or volume unit) consumed by relevant power sources j in year(s) y,

- j refers to the power sources delivering electricity to the grid, not including low-operating cost and must run power plants, and including imports to the grid,

- $COEF_{i,j\,y}$ is the CO_2 emission coefficient of fuel i (tCO_2 / mass or volume unit of the fuel), taking into account the carbon content of the fuels used by relevant power sources j and the percent oxidation of the fuel in year(s) y, and

- $GEN_{j,y}$ is the electricity (MWh) delivered to the grid by source j.

The CO_2 emission coefficient COEFi is obtained as

$$COEF_i = NCV_i \cdot EF_{CO2,i} \cdot OXID_i$$

where:
- NCV_i is the net calorific value (energy content) per mass or volume unit of a fuel i,
- $OXID_i$ is the oxidation factor of the fuel (see page 1.29 in the 1996 Revised IPCC Guidelines for default values),
- $EFCO_{2,i}$ is the CO_2 emission factor per unit of energy of the fuel i.

Where available, local values of NCV_i and $EFCO_{2,i}$ should be used. If no such values are available, country-specific values (see e.g. IPCC Good Practice Guidance) are preferable to IPCC world-wide default values.

The Simple OM emission factor ($EF_{OM,simple,y}$) is calculated separately for the most recent three years (2002-03, 2003-04 and 2004-05) and an average value has been considered as the OM emission factor for the baseline ($EF_{OM,y}$). The OM factor has been calculated ex-ante and fixed for entire crediting period.

$$EF_{OM,y} = \sum_{y} EF_{OM,simple,y} / 3$$

Where y represents the years

STEP 2. Calculation of the Build Margin emission factor

The Build Margin emission factor ($EF_{BM,y}$) has been calculated as the generation-weighted average emission factor (tCO_2/MWh) of a sample of power plants m of WREB. The sample group m consists of either

- The five power plants that have been built most recently, or
- The power plants capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

Project proponent should use from these two options that sample group that comprises the larger annual generation. The calculation for Build Margin emission factor is furnished below:

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} \otimes COEF_{i,m}}{\sum_{m} GEN_{m,y}}$$

where

Fi,m,y, COEFi,m and GENm,y - Are analogous to the variables described for the simple OM method above for plants m.

STEP 3. Calculation of the Emission Factor of the Grid (EFGrid)

The electricity baseline emission factor of Western Regional Grid, EFy is calculated as the weighted average of the Operating Margin emission factor ($EF_{OM,y}$) and the Build Margin emission factor ($EF_{BM,y}$):

$$EF_y = w_{OM} \cdot EF_{OM,y} + w_{BM} \cdot EF_{BM,y}$$

where the weights w_{OM} and w_{BM}, by default, are 50% (i.e., $w_{OM} = w_{BM} = 0.5$), and $EF_{OM,y}$ and $EF_{BM,y}$ are calculated as described in Steps 1 and 2 above and are expressed in tCO_2/MWh. The emission factor has been calculated ex ante and fixed for the entire crediting period.

STEP 4: The baseline emission is calculated as: $BE_y = EG_y * EF_y$

where,

BE_y = Baseline Emissions due to displacement of electricity during the year y (in tons of CO_2)

EG_y = Net quantity of electricity supplied to the manufacturing facility by the project during the year y in MWh

EF_y = Emission Factor of the grid (in tCO_2/ MWh) and y is any year within the crediting period of the project activity

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

Data / Parameter:	EF_y
Data unit:	tCO_2/MWh
Description:	CO_2 emission factor of the grid
Source of data used:	CEA
Value applied:	0.81
Justification of the choice of data or description of measurement methods and procedures actually applied :	This parameter is calculated based on the secondary information provided in CEA. The information is obtained from reliable secondary reviews. The factor has been calculated ex ante and fixed for entire crediting period.
Any comment:	Data archived: Crediting period + 2 yrs

Data / Parameter:	$EF_{OM,y}$
Data unit:	tCO_2/MWh
Description:	CO_2 operating margin emission factor of the grid
Source of data used:	CEA
Value applied:	1.00
Justification of the choice of data or description of measurement methods and procedures actually applied :	Simple OM method is used to calculate this parameter. The information is obtained from reliable secondary reviews. The simple OM is average of last three year OM. The factor has been calculated ex ante and fixed for entire crediting period.
Any comment:	Data archived: Crediting period + 2 yrs

Data / Parameter:	$EF_{BM,y}$
Data unit:	tCO_2/MWh
Description:	CO_2 built margin emission factor of the grid
Source of data used:	CEA
Value applied:	0.6300
Justification of the choice of data or description of measurement methods and procedures actually applied :	Built margin emission factor is calculated based on the power plant capacity additions in the electricity system that comprise 20 % of the system generation. The information is obtained from reliable secondary reviews. The factor has been calculated ex ante and fixed for entire crediting period.
Any comment:	Data archived: Crediting period + 2 yrs

B.6.3 Ex-ante calculation of emission reductions:

The project emission and leakage emission are not applicable for the project activity.

Baseline Emission Calculations

(a) Net units of electricity substituted due to the project activity in the grid:

EG_y	=	EG_{GEN}-EG_{AUX}
	=	92160 – 9216 (MWh)
	=	82944 MWh

(b) Thus the baseline emission is calculated as: $BE_y = EG_y * EF_y$

Where,

BE_y = Baseline Emissions due to displacement of electricity during the year y (in tons of CO_2)

EG_y = EG_y = Net quantity of electricity supplied to the manufacturing facility by the project during the year y in MWh

EF_y = Emission Factor of the grid (in tCO_2/ MWh) and y is any year within the crediting period of the project activity

Applying values from section B.6.2 and B.7.1:

BE_y	=	$EG_y * EF_y$
	=	82944 * 0.81
	=	67185 tCO_2/year

Emission Reductions

$ER_y = BE_y - PE_y - Ly$

Where ER_y is Emission Reduction during year y (tCO_2)

BE_y = Baseline Emission during year y (tCO_2)

PE_y = Project Emission during year y (tCO_2)

L_y = Leakage during year y (tCO_2)

Applying values from section B.6.2 and B.7.1:

ER_y	=	$BE_y - PE_y - L_y$
	=	67185 – 0 – 0
	=	67185 tCO_2/year

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

Year	Estimated Project Activity Emissions (tonnes of CO_2e)	Estimated Baseline Emissions (tonnes of CO_2e)	Estimated leakage(tonnes of CO_2e)	Estimated Emission Reduction (tonnes of CO_2e)
2008	0	67185	0	67185
2009	0	67185	0	67185
2010	0	67185	0	67185
2011	0	67185	0	67185
2012	0	67185	0	67185
2013	0	67185	0	67185
2014	0	67185	0	67185
2015	0	67185	0	67185
2016	0	67185	0	67185

2017	0	67185	0	67185
Total estimated reductions (tonnes of CO_2e)	**0**	**671850**	**0**	**671850**

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

B.7.1 Data and parameters monitored:

Data / Parameter:	EG_{GEN}
Data unit:	MWh/yr
Description:	Total Electricity generated
Source of data to be used:	On-site instrumentation
Value of data applied for the purpose of calculating expected emission reductions in section B.5	92160
Description of measurement methods and procedures to be applied:	Monitoring locations: energy meters at the plant and DCS will measure the data. Manager in-charge would be responsible for regular calibration of the meter. The accuracy of the meter will be +/- 0.5% (0.5 s class). Monitoring frequency: Monitoring daily and reported monthly.
QA/QC procedures to be applied:	Yes, Quality Management System will be used and the same procedures would be available at the project site
Any comment:	Data archived: Crediting period + 2 yrs

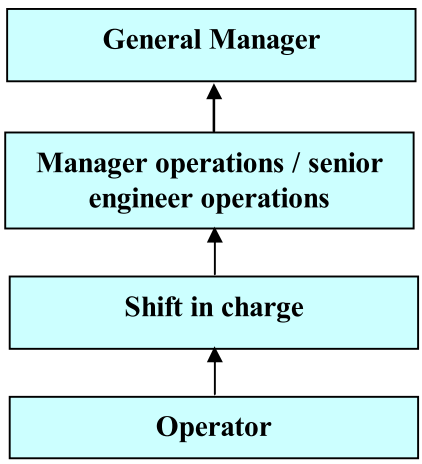
Data / Parameter:	EG_{AUX}
Data unit:	MWh/yr
Description:	Auxiliary consumption
Source of data to be used:	On-site instrumentation
Value of data applied for the purpose of calculating expected emission reductions in section B.5	9216
Description of measurement methods and procedures to be applied:	Monitoring locations: energy meters at the plant and DCS will measure the data. Manager in-charge would be responsible for regular calibration of the meter. The accuracy of the meter will be +/- 0.5% (0.5 s class). Monitoring frequency: Monitoring daily and reported monthly.
QA/QC procedures to be applied:	Yes, Quality Management System will be used and the same procedures would be available at the project site.
Any comment:	Data archived: Crediting period + 2 yrs

Data / Parameter:	EG_y
Data unit:	MWh/yr
Description:	Net quantity of electricity supplied to the manufacturing facility by the project during the year y in MWh
Source of data to be used:	On-site instrumentation
Value of data applied for the purpose of calculating expected emission reductions in section B.5	82944
Description of measurement methods and procedures to be applied:	The net electricity generation is calculated from the above two measured values i.e, total generation and auxiliary consumption.
QA/QC procedures to be applied:	Yes, Quality Management System will be used and the same procedures would be available at the project site
Any comment:	Data archived: Crediting period + 2 yrs

B.7.2 Description of the monitoring plan:

>>

For the adequate monitoring of the emission reduction ISL proposes the following structure of monitoring and reporting.



Roles and responsibility:

1. General Manager: General Manger will have the following responsibilities
    - Decision on the contents of the training program
    - Ensuring implementation of monitoring procedures
    - Internal audit and project conformance reviews
2. Manager (Operations): Manager will have the following responsibilities
    - Organizing and conduct training programs,

- Implementing all monitoring control procedures
- Associating with the Manager (QA) towards maintenance and calibration of monitoring equipments
- Has the overall responsibility for record handling and maintenance.
- Reviewing of records and dealing with monitored data
- Organizing internal audit for checking the data recorded
- Has the overall responsibility for closing project non-conformances and implementing corrective actions before the verification

3. Shift in change (Electrical officer): This officer will have the following responsibilities:
   - Supervising and training the operators and maintaining training records.
   - Has the overall responsibility of monitoring measurements and reporting
   - Will assist the Manager (Operations) in record handling, records checks and review and during internal audit
   - Check the data recorded by the operator in the individual sections as described in Section D.

4. Operator: The responsibility of operator to record appropriate data of the project activity represented in the monitoring tables. Based on the monitoring frequency, the operator will measure and record the data in the logbook as per the instructions of his officer/ supervisor.

Procedure for data uncertainty in case of failure of energy meters: The project proponent has installed the backup meter (check meter) for the data recording. In case of failure of main meter the energy generated from the backup meter (Check meter) is considered for emission reduction calculation.

The operational procedures for training, emergency preparedness, maintenance and calibration of monitoring equipments, monitoring measurements and reporting, record handling and maintenance, reviewing monitored data, internal audit, project performance reviews and corrective actions are available at the plant. Please refer the ‘manual for power plant CDM project’.

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)

>>

As required by ACM0004 methodology, baseline is calculated as per ACM0002 and the net baseline emission factor was found to be 0.81 kg CO_2 / kWh. The emission factor values are referred from the data published by Central Electricity Authority (CEA)[7]. Please refer to details in Annex 3 of the PDD.

Date of completing the final draft of this baseline and monitoring methodology:
14/09/2007

Name of person/entity determining the baseline:

[7] Source: http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

Ind Synergy Limited and its associated consultants

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:

>>
24/05/2005 (Financial Closure)

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

>>
15 years 0 months

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

C.2.1. Renewable crediting period

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

>>
NA

C.2.1.2. Length of the first crediting period:

>>
NA

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
The crediting period will start from the date of registration of the project activity. For calculation purposes 01/02/2008 is considered as start date of crediting.

C.2.2.2. Length:

>>
10 years 0 months

SECTION D. Environmental impacts

>>

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

>>

The assessment of environmental impact for the project activity has been carried out by ISL. Ind. Synergy has received NOC from Chhattisgarh Environment Conservation Board (CECB) for obtaining Environmental Clearances from MOEF to obtained Consent To Establish (CTE) under the provisions of Water (Prevention and Control of Pollution) Act, 1974 & Air (Prevention and Control of Pollution) Act, 1981, EIA notification-1994 and subsequent amended under Environment Protection Act, 1986.

The treated effluent shall confirm to the limits of the general standards prescribed under the provisions of EP act 1986 for discharge of effluent into inland surface water. Air emissions shall confirm to Emission Regulations issued by the Central Pollution Control Board (CPCB) and as adopted by the State Pollution Control Board (SPCB). The infrastructure facility for monitoring of stack emissions on each stack and flow measuring devices at each unit of effluent treatment plant shall be provided.

The proposed project is to establish a 16 MW WHRB power plant waste heat as fuel. The environmental impacts can be either categorized as primary or secondary impacts. Primary impacts are those that can be attributed directly to the project itself while secondary impacts are those, which are induced indirectly because of the development activity which may be triggered by the primary impact. The secondary impacts typically include the associated investment and changed patterns of social and economic activity by the project activity

The impact of the project on the environment can occur at two stages:

1. Construction phase
2. Operational phase

The Summary of impact assessment had been described in the tables below:

Table D.1: Environmental Impacts due to Project Activity during Construction Phase

SL. NO.	ENVIRONMENTAL IMPACTS & BENEFITS	MITGATION MEASURES / REMARKS
A	CATEGORY– AIR ENVIRONMENT	
1.	Dust level will be the main pollutant affecting the ambient air quality of the surrounding area during the construction phase. Short term localized and impact is expected due to fugitive dust emission generated during construction stage.	Providing suitable surface treatment to ease the traffic flow and regular sprinkling of water will reduce the dust generation.
B	CATEGORY– WATER ENVIRONMENT	
1.	There will be consumption of water during construction activity. Domestic wastewater will also be generated because of sanitation and other uses.	The domestic sewage has to be appropriately treated.
	Wastewater generation due to construction activities.	The wastewater has to be sent to the treatment system. It has to be disposed off in appropriate manner.
C	CATEGORY-NOISE ENVIRONMENT	
1.	Construction activities are likely to produce maximum noise levels up to 85 dBA. Construction activities involve excavation, digging, hammering etc which leads to increase in noise levels. There will be rise in movement of vehicles in the plant area during the construction phase that could lead to rise in noise levels in the vicinity. There will be short term, localized and reversible impact on ambient noise levels during the construction stage.	The construction activity has to be scheduled such that most of the work gets completed during the daytime. The contractor has to make sure that construction does not take place during night time.

SL. NO.	ENVIRONMENTAL IMPACTS & BENEFITS	MITGATION MEASURES / REMARKS
D	CATEGORY-LAND ENVIRONMENT	

1.	The project will be implemented on already acquired land. Therefore the predicted impact on land use pattern of the site will be insignificant. There will be lot of solid waste generation during construction phase. Improper disposal of waste on land environment will lead to changes in land environment. It could lead to changes in soil quality.	Proper measures are to be taken in disposal of solid waste on land.
E	CATEGORY-ECOLOGICAL ENVIRONMENT	
1.	No impact are envisaged during construction activity	-
F	CATEGORY-SOCIO-ECONOMIC ENVIRONMENT	
1.	Employment opportunity will be generated during the construction phase.	-

Table D.2: Environmental Impacts due to Project Activity during Operation Phase

SL. NO.	ENVIRONMENTAL IMPACTS & BENEFITS	MITGATION MEASURES
A	CATEGORY– AIR ENVIRONMENT	
1.	ISL conducted ambient air quality monitoring in and around the plant region. All the parameters were well within the statutory limits. The project has no negative impact on the ambient air quality of the area.	The air quality parameters have to be monitored regularly and it has to be made sure that the ground level concentrations are below the standard limits. Appropriate air quality pollution control instruments have to be installed to limit the emissions.
2.	The region grid is dependant on fossil fuels like coal for power generation. The implementation of project will replace electricity in the grid that will in turn lead to reduction in emissions.	-
3.	If the project proponent would have gone for coal based power generation unit, there would have been adverse impacts on the air environment due to handling, transportation of coal as well as the process emissions	The project activity utilizes waste heat for power generation.

4.	Pre-project scenario led to thermal pollution ie, emitting waste heat gases directly into the atmosphere. Post project scenario will lead to utilizing of waste heat which reduces the heat losses into the environment.	-
B	CATEGORY– WATER ENVIRONMENT	
1.	The water requirement is only for indirect purposes like cooling and demineralization and hence the pollution load in the wastewater is relatively less. Water percolation to ground should be avoided. The treated water will be used for coal heap quenching, irrigation on Green Belt and for sponge iron cooler spray. The storm water drains of the project will be separate from the waste water drains	The wastewater generated should be treated in the treatment system. It should be made sure that only treated water is disposed to surface and ground water. During the rainy season, the storm water should be used for rain water harvesting and also recycling the collected water in the project to the best extent possible.
2	Due to use of waste hot flue gas for power generation through heat exchange or heat recovery process. Thus the flue gas is cooled up to 160 ^{0}C form 900^{0}C therefore significant reducing in additional water consumption.	
C	CATEGORY-NOISE ENVIRONMENT	
1.	During operation phase noise levels are expected from turbines, boiler operations etc. The impact on ambient noise due to the project will be marginal at the plant boundary and remain within the stipulate criteria of noise standard prescribed. The sound pressure generated by noise sources decreasing with increasing distance mainly due to wave divergent (attenuation). The highest noise level will be from turbo generator, which will be order of 95 dBA at 1 meter away from the source.	It is proposed that personnel who have to work in the noise prone areas will be provided with earmuffs. The noise levels could be controlled by providing proper acoustic enclosures. The turbine and air compressors should be installed in closed room.
D	CATEGORY-LAND ENVIRONMENT	

1.	The only source of solid waste could be dust collected from ESP which may contain fly ash and fines. If this solid waste is disposed off on open land, it will have impact on the land environment.	As far as possible, ash should be supplied to nearby brick manufactures, or in road preparation etc. In addition company is being install fly ash based brick making unit in the premises & used in-house construction work. Plant premises have tremendous volume of low-lying area whereas filled by solid waste with soil cover & develop green belt.
E	CATEGORY-ECOLOGICAL ENVIRONMENT	
1.	No impact are envisaged during construction activity	Whereas development of thick green belt, enhance the biodiversity and beauty in the area.
F	CATEGORY-SOCIO-ECONOMIC ENVIRONMENT	
1.	Employment opportunity will be generated during the construction & operation phase.	-
2.	Operation of waste heat recovery boiler power plant will lead to cleaner environment conditions.	-
3.	There will be no displacement of humans, as it is part of expansion project on existing facility	-
G	CATEGORY-NATURAL RESOURCE CONSERVATION	
1.	The power generated using waste heat would otherwise be generated using coal. The project activity substitutes electricity in the grid, thereby reducing emissions from the power plants of the grid. Thus, the project results conservation of fossil fuels and conserving top soil & biodiversity	-
H	GREEN BELT	
1.	It is proposed to strengthen the 25-35 m wide greenbelt all along the boundary. The main objective of the green belt is to provide a barrier between the source of pollution and receptors of the surrounding areas. The green belt helps to capture the fugitive emissions and to attenuate the noise generated apart from improving the aesthetics.	-

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:

>>

Waste Heat Recovery Boiler (WHRB) is a clean technology and would not lead to pollution. As per the impacts discussed in the above section, there are no significant impacts envisaged on implementation of the project. Environment Impact Assessment has been conducted and NOC have been obtained from regulatory authority for obtaining Environmental Clearances from MOEF for the project. Environment Management Plan (EMP) for the expected impacts is in place.

SECTION E. Stakeholders' comments

>>

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

>>

Identification of Stakeholders

Ind Synergy Limited (ISL) has proposed to implement a 16 MW Waste Heat Recovery Boiler (WHRB) at Kotmar village, Raigarh district. The project proposed would produce power utilizing the waste heat and thereby limiting greenhouse gases emission into the atmosphere. The project would lead to reduce the consumption of fossil fuels. So the project leads to zero net GHG on-site emissions.

The stakeholders identified for the project are as under.

- ✓ Elected body of representatives administering the local area (village Panchayat)
- ✓ Chhatisgarh State Electricity Board (CSEB)
- ✓ Chhatisgarh Environment Conservation Board (CECB)
- ✓ Ministry of Environment & Forest (MoEF), Government of India
- ✓ Equipment Suppliers
- ✓ Project Consultants

Stakeholder list includes the government and non-government parties, which are involved in the project at various stages. ISL has not only communicated with the relevant stakeholders under statutory obligations but also has engaged the other stakeholders in a proactive manner in expressing and accounting their opinions on the project.

Stakeholders Involvement

The village Panchayat /local elected body of representatives administering the local area are a true representative of the local population in a democracy like India. Hence, their consent / permission to set up the project are necessary.

Local population comprises of the local people in and around the project area. The project has not displaced any local population. In addition, the local population is also an indirect consumer of the power that is supplied from the power plant. This is essentially because the power sold to the grid has improved the stability in the local electricity network. Since, the distance between the electrical substation for power evacuation and the plant is not very high, installation of transmission lines did not create any inconvenience to the local population. Thus, the project has not caused any adverse social impacts on local population rather has helped in improving their quality of life.

Chhattisgarh Environment Conservation Board (CECB) has prescribed standards of environmental compliance and monitors the adherence to the standards. The project has received NOC from CECB for obtaining Environmental Clearances from MOEF for issue of Consent to Establish from CECB to start commissioning of the plant. Chattisgarh State Electricity Board (CSEB) is also a stakeholder in the project.

Projects consultants are to be involved in the project to take care of the various pre contact and post contract issues / activities like preparation of detailed project report (DPR), preparation of basic and detailed engineering documents, preparation of tender documents, selection of vendors / suppliers, supervision of project operation, implementation, successful commissioning and trial run.

The various stakeholders identified above were duly communicated about the consultation meeting. In addition public notices were also displayed and distributed at key public places for the local stakeholder consultation meeting. The local stakeholder consultation meeting was organised on 03rd November, 2005 at 2.00 pm to understand and discuss stakeholders concerns regarding the "ISL Waste Heat Recovery Project, India" at Kotmar, Chhattisgarh.

The chairperson of the meeting was the Regional Officer (Chhattisgarh Environment Conservation Board, Raigarh). The meeting was also attended by other prominent personalities such as President (Batmul Ashram (NGO)), Ex Sarpanch (Village Panchayat-Siarpali) etc. The local stakeholders overall appreciated the project proponent for undertaking the project. The project would lead to clean and better local environment.

E.2. Summary of the comments received:

>>

The comments received for the 16 MW WHRB Project at Raigarh can be summarised under four main categories:

a) Public Concern
b) NGO Concern
c) Employee Concern
d) Other Concern

The detailed information regarding the comments is attached as enclosure 2.

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

>>

The identified stakeholders were provided satisfactory clarifications on the concerns raised during the stakeholder's consultation. There were no negative response were received by the project proponent.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Ind Synergy Ltd
Street/P.O.Box:	North Ambazari Road
Building:	201, Krishnam Appt
City:	Nagpur
State/Region:	Maharashtra
Postfix/ZIP:	440 033
Country:	India
Telephone:	0712-2229700-08
FAX:	0712-2229709
E-Mail:	nagpur@indsynergy/mumbai@indsynergy.com
URL:	www.indsynergy.com
Represented by:	
Title:	Business Development Manager
Salutation:	Mr
Last Name:	Sharma
Middle Name:	
First Name:	Umesh
Department:	-
Mobile:	91 9324252578
Direct FAX:	022 – 26613221
Direct tel:	022 – 26613245
Personal E-Mail:	mumbai@indsynergy.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding for the project has been obtained.

Annex 3
BASELINE INFORMATION

Detailed information of electricity emission factor is attached as enclosure 1.

CENTRAL ELECTRICITY AUTHORITY: CO2 BASELINE DATABASE				
VERSION			**2.0**	
DATE			**21 June 2007**	
BASELINE METHODOLOGY			**ACM0002 / Ver 06**	
Simple Operating Margin (tCO2/MWh) (incl. Imports)				
	2003-04	2004-05	2005-06	**Average OM**
West	0.99	1.01	0.99	**1.00**
Build Margin (tCO2/MWh) (not adjusted for imports)				
	2003-04	2004-05	2005-06	
West			0.63	**0.63**
			CM	**0.81**

Annex 4

MONITORING PLAN

AS PER SECTION B.7