CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01		Initial adoption
02		• 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		• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

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6.5 MW cogeneration project in Akbarpur, Punjab.
Version: 05
Date: 29/04/2011

A.2. Description of the small-scale project activity:

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The project activity is being implemented in the Sangrur district in Punjab at the textile unit of Gillanders Arbuthnot & Co. Ltd. (hereafter known as GACL). GACL is a part of the well known G.D Kothari Group of companies. The company has businesses in the area of plantation, construction, textile and chemical to name a few.

The proposed project activity involves installation of a cogeneration plant comprising of one rice husk fired AFBC boiler with steam generation capacity of 34 TPH at 66 kg/cm2 (g) pressure and 495±5˚ C temperature and a 6.5 MW multistage extraction cum condensing steam turbine generator. The project activity has been commissioned on 30th March, 2009 and is expected to produce 41.769 GWh of net electrical output per annum.

In the pre-project scenario power had been sourced from the NEWNE electricity grid, which is mainly connected with GHG intensive fossil fuel based power plants and process steam was generated from a 3 TPH rice husk fired boiler. The project utilizes biomass (rice husk) which is carbon neutral fuel, to generate electricity and steam for captive consumption in a co-generation unit. The project activity therefore, reduces the emissions of GHG from the fossil fuel based power plants connected to the regional electricity grid and contributes in reducing global warming.
As per the Glossary of CDM Terms, as per point no. 4 of definition of Renewable Biomass (page 26 of Glossary of CDM terms Version 05) and annex 18, EB 23 the rice husk are considered as renewable biomass. The design of the project equipments allows to use following fuels:

1. Rice husk (to the extent of 100%)
2. Sub bituminous coal in case of exigencies (to the extent of 100%)

Rice Husk is an agro waste generated from local rice mills and hence identified as Renewable Biomass. The project was conceived considering usage of 100% rice husk as fuel and emission reduction is estimated considering the same.

Contribution of the project activity to sustainable development:

The project contributes to the general well being of the region and is in line with the sustainable development policies of the host country:

Social well being:
The project activity will generate employment for skilled and unskilled labours to operate the power plant. The project activity will also enhance employment generation for the collection and transportation of biomass. This also offers the farmers an additional source of revenue.

Economic well being:
The project has opened up business opportunities for direct and indirect businesses for technology provider, consultants, labor contractors, biomass suppliers, farmers and local villagers, thus promoting economical well being in the region.

Environmental well being:
Use of biomass instead of high carbon intensive fossil fuel in the project activity contributes in reduction of GHG emissions. . The project also helps in reducing SO_X and NOx emissions which are associated with fossil fuel consumption for power generation.

Technological well being:
The project activity involves the installation of a cogeneration project in a textile mill. This will help in the promotion of such technology in the sector as well as enhance the skill sets of people involved in the operation and maintenance of the plant.

A.3. Project participants:

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Name of Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Kindly indicate if the Party wishes to be considered as a project participant (Yes/No)
India (host)	Private entity - Gillanders Arbuthnot & Co. Ltd.	No

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

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A.4.1.1. Host Party(ies):

>>
India

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

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State: Punjab

A.4.1.3. City/Town/Community etc:

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District: Sangrur
Village: Akbarpur

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

CDM – Executive Board

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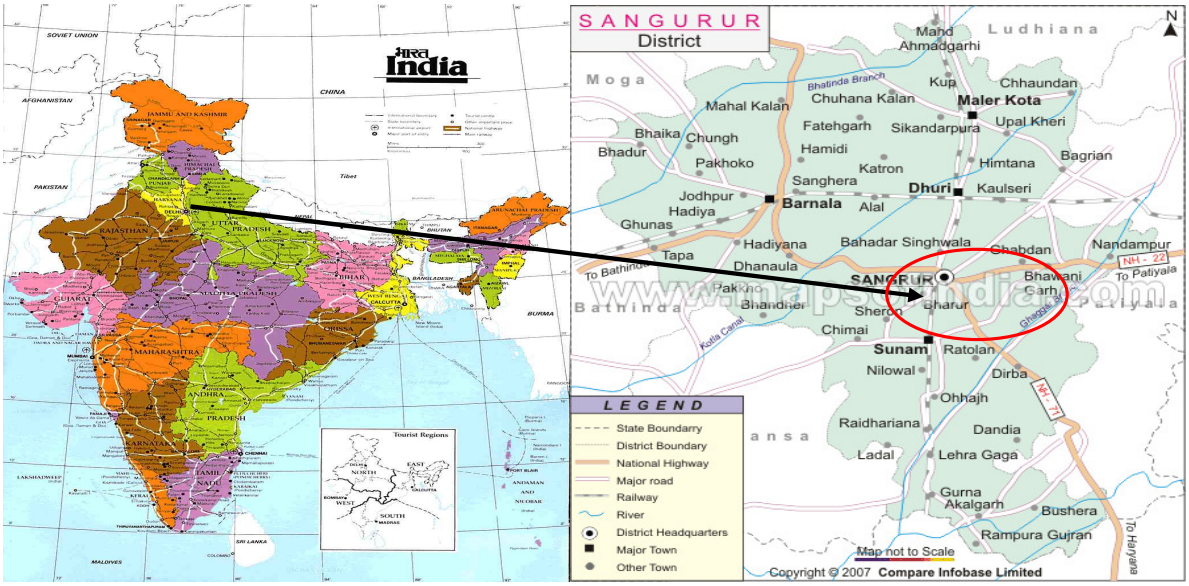
The geographical coordinates of the project activity are:

Latitude : 31.4991 ° N
Longitude: 75.3675 ° E



The project activity is located on national highway no. 71. Amritsar is the nearest airport from Akbarpur which is 110 km from the project site.

The physical address of the project is:

Gillanders Arbuthnot & Co. Ltd.
Village – Akbarpur PO Box – 1, Ahmedgarh
District – Sangrur,
Punjab – 148021

A.4.2. Type and category (ies) and technology/measure of the small-scale project activity:

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Type I – Renewable energy projects

Category C – Thermal energy production with or without electricity; Version 18

Technology/Measure of the small scale project activity

The proposed project activity involves installation of a cogeneration plant comprising of one biomass (rice husk) based AFBC boiler with steam generation capacity of 34 TPH at 66 Kg/cm2 (g) pressure and 495 (+/-5) ˚C temperature and a 6.5 MW extraction cum condensing steam turbine generator.

The boiler is supplied by M/s. Thermax Limited which is one of the leading boiler manufacturers in India.

The technical details of the biomass based boiler are provided below[1]:

Type of boiler	Atmospheric Fluidized Bed Combustion
Make	M/s Thermax Limited
Number of boilers	1
Boiler capacity	34 TPH
Type of fuel	Rice husk
Boiler steam outlet pressure	66 kg/cm²(g)
Boiler steam outlet temp.	495 (+/-5) ˚C
Feed water temp.	105°C
Efficiency (Rice Husk)	81%

The 6.5 MW turbine generator is supplied by M/s Triveni Engineering & Industries Ltd.[2]

Type of Turbine	Multistage extraction cum condensing.
Number of turbine	1
Output capacity	6500 kW
Gear box output speed	1500 rpm
Inlet steam pressure	65 kg/cm²(A)
Inlet steam temp	490°C

Apart from the above main equipments, other equipments as listed below are also part of the power plant.

[1] Source of data: Purchase order issued to M/s Thermax Limited for Boiler dated 03/11/2006

[2] Source of data: Purchase order issued to M/s Triveni Engineering & Industries Ltd for Turbine dated 15/12/2006

- Cooling tower and circulating water system
- Fuel and ash handling systems
- RO Water system and Air Compressor Plant
- ESP to remove suspended particles from the flue gas
- Electrical and Instrumentation system

In terms of the safe and sound technology, the technology provider is experienced in this field. The boiler will be inspected by the boiler inspector ensuring that its operation is safe. Furthermore, consents to establish and operate from the Pollution Control Board will be confirmed that the factory adheres to environmental guidelines. Thus the technology implemented is environmentally safe and sound. There is no technology transfer taking place in the project activity.

The project activity will stay within the capacity limit for the small scale project activity as the project proponent does not plan to enhance the output of the project activity.

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

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The chosen crediting period is fixed crediting period of 10 years.

Years	Estimation of annual emission reductions in tonnes of CO2 e
01/06/2011-31/05/2012	35,044
01/06/2012-31/05/2013	35,044
01/06/2013-31/05/2014	35,044
01/06/2014-31/05/2015	35,044
01/06/2015-31/05/2016	35,044
01/06/2016-31/05/2017	35,044
01/06/2017-31/05/2018	35,044
01/06/2018-31/05/2019	35,044
01/06/2019-31/05/2020	35,044
01/06/2020-31/05/2021	35,044
Total estimated reductions (tonnes CO_2 e)	**3,50,440**
Total number of crediting years	**10**
Annual average estimated reductions over the crediting period (t CO2 e)	**35,044**

A.4.4. Public funding of the small-scale project activity:

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There is no public funding of the project from Annex I countries.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

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With reference to "Appendix C to the simplified modalities and procedures for the small scale CDM project activities and para 2 of Annex 13 ,EB 54, "Guidelines on assessment of Debundling for SSC Project Activities", Version 03 *"A proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:*

(a) With the same project participants;

(b) In the same project category and technology/measure; and

(c) Registered within the previous 2 years; and

(d) Whose project boundary is within 1 km of the project boundary of the proposed small- scale activity at the closest point".

The project participant does not have any other registered small-scale CDM project activity or an application to register another small-scale CDM project activity. This project activity is the first project for which the project participant has applied for registration with the CDM Executive Board of UNFCCC. **Therefore, the project activity is not a debundled component of any large scale 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 small-scale project activity:

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AMS-I.C. - "Thermal energy production with or without electricity" --- Version 18

The following methodology/guidance/ tools are applied in the project activity:

- AMS-I.D. **-** Grid connected renewable electricity generation --- Version 16
- Attachment C to Appendix B version 3 "General guidance on leakage in biomass project activities
- Tool to calculate the emission factor for an electricity system, Version 02, EB 50, Annex 14.

B.2 Justification of the choice of the project category:

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Applicability Criteria	Conformity to methodological requirements in the project
1. This category comprises renewable energy technologies that supply users with thermal energy that displaces fossil fuel use. These units include technologies such as solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass and other technologies that provide thermal energy that displaces fossil fuel	Not applicable – Though the project activity comprises use of renewable biomass to generate steam for the process but in the absence of which, the steam requirements would have been met by biomass based boiler system. Therefore, the project activity doesn't displace fossil fuel for thermal energy generation.
2. Biomass-based co-generating systems consisting of steam generator(s) and steam turbine(s)are included in this category. For the purpose of this methodology "Cogeneration" shall mean the simultaneous generation of thermal energy and electrical Project activities that produce heat and power in separate element processes (for example, heat from a boiler and electricity from biogas engine) do not fit under the definition of cogeneration project.	Applicable and fulfilled– The project activity involves the installation of a biomass based cogeneration system supplying heat and electricity to the textile unit.
3.Emission reductions from a biomass cogeneration system can accrue from one of the following activities: *(a) Electricity to a grid;* *(b) Electricity and/or thermal energy (steam or heat) for on-site consumption or for consumption by other facilities;*	Applicable and fulfilled – In the baseline scenario, the heat requirement was met by a 3 TPH rice husk fired boiler and electricity requirement by NEWNE grid. Emission reductions for this project activity are being claimed only against the power generation

(c) Combination of (a) and (b)	from the project activity using biomass which is being used on site for captive consumption.
4. The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW	Applicable and fulfilled –The total rated thermal energy generation capacity of the project equipment i.e. the steam generating boiler is less than $45MW_{th}$ as shown below[3]: Capacity of the boiler: 34TPH Outlet steam pressure: 66 $kg/cm^2(g)$ Outlet steam temperature: 495 (+/-5) ˚C Enthalpy of the generated steam: 812.94kcal/kg Inlet feed water pressure: 90 $kg/cm^2(g)$ Inlet feed water temperature: 105^0C Enthalpy of feed water: 106.64kcal/kg Total Net thermal energy generation capacity of the project boiler = total Net enthalpy of the generated steam at the boiler outlet = 34TPH x 1000kg/hr x (812.94-106.64) kcal/kg = 24014200kcal/hr = (24014200/860000)MW = **$\underline{27.92MW (< 45MW_{th})}$**
5. For co-fired systems, the total installed thermal energy generation capacity of the project equipment, when using both fossil and renewable fuel shall not exceed 45 MW thermal.	Applicable and fulfilled: The project boiler is designed to fire either 100% biomass or 100% coal. Although the PP does not intend to fire coal, but coal may be fired in case of exigencies and if coal is fired during any monitoring period, then the case of co-firing becomes applicable. The thermal capacity of the unit is demonstrated based on output steam conditions irrespective of the input fuel. Thus the installed capacity of the unit would hold good for co-firing of biomass and coal as well.
6. The following capacity limits apply for biomass cogeneration units: *(a) If the project activity includes emission reductions from both the thermal and electrical energy components, the total installed energy generation capacity (thermal and electrical) of the project equipment shall not exceed 45 MW thermal.* *(b) If the emission reductions of the cogeneration project activity are solely on account of thermal energy production (i.e., no emission reductions accrue from electricity component), the total installed thermal energy production capacity of the*	Applicable and fulfilled : As the project activity is a cogeneration system whose emission reductions are solely on account of electrical energy production and the total installed electrical energy generation capacity of the project equipment of the cogeneration unit is 6.5MW which is less than 15MW – so, applicability criteria (a) & (b) are not applicable but (c) is applicable and fulfilled.

[3] Source: Boiler P.O. dated 03rd November, 2006

project equipment of the cogeneration unit shall not exceed 45 MW thermal; *(c) If the emission reductions of the cogeneration project activity are solely on account of electrical energy production (i.e., no emission reductions accrue from thermal energy component), the total installed electrical energy generation capacity of the project equipment of the cogeneration unit shall not exceed 15 MW.*	
7. In case electricity and/or steam/heat produced by the project activity is delivered to another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered into specifying that only the facility generating the energy can claim emission reductions from the energy displaced.	Applicable and fulfilled - The electricity generated by the power plant will be supplied to the textile unit for captive consumption. A understanding between the power plant and textile unit have been made to specify that only the facility generating the energy will claim emission reductions from the energy displaced.
8. Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category	Not applicable- The project activity does not seek to retrofit or modify an existing facility.
9. The capacity limits specified in the above paragraphs apply to both new facilities and retrofit projects. In the case of project activities that involve the addition of renewable energy units at an existing renewable energy facility, the total capacity of the units added by the project should comply with capacity limits in paragraphs 4 to 6 and should be physically distinct from the existing units.	Applicable and fulfilled – The project activity is a new facility which involves installation of a 34 TPH biomass fired boiler and a 6.5 MW steam turbine. The thermal output capacity of the new boiler is 27.92 MWth. The existing 3 TPH biomass fired boiler in the pre project scenario is replaced by the new 6.5 MW cogeneration plant. The existing 3 TPH boiler will not be operated as the steam requirement will be met by the new cogeneration unit. Thus the project activity is not the addition of renewable energy unit at an existing renewable energy facility and is physically distinct from the existing unit. The capacity limit of the project activity is in line with the requirements of paragraphs 4 to 6.
10. Charcoal based biomass energy generation project activities are eligible to apply the methodology only if the charcoal is produced from renewable biomass sources5 provided: *(a) Charcoal is produced in kilns equipped with methane recovery and destruction facility; or* *(b) If charcoal is produced in kilns not equipped with a methane recovery and destruction facility, methane emissions from the production of charcoal shall be considered. These emissions shall be calculated as per the procedures defined in the approved methodology AMS-III.K. Alternatively, conservative emission factor values from peer reviewed literature or from a registered*	Not applicable - The project activity is not a charcoal based energy generation system.

CDM project activity can be used, provided that it can be demonstrated that the parameters from these are comparable e.g. source of biomass, characteristics of biomass such as moisture, carbon content, type of kiln, operating conditions such as ambient temperature.	
11. If solid biomass fuel (e.g. briquette) is used, it shall be demonstrated that it has been produced using solely renewable biomass and all project or leakage emissions associated with its production shall be taken into account in emissions reduction calculation.	Not Applicable- as the project activity is not designed to fire solid biomass fuel.
Footnote 1: That is, residential, industrial or commercial facilities.	Applicable – The project activity is an Industrial facility.
Footnote 2: Thermal energy generation capacity shall be manufacturer's rated thermal energy output, or if that rating is not available the capacity shall be determined by taking the difference between enthalpy of total output (for example steam or hot air in kcal/kg or kcal/m3) leaving the project equipment and the total enthalpy of input (for example feed water or air in kcal/kg or kcal/m3) entering the project equipment. For boilers, condensate return (if any) must be incorporated into enthalpy of the feed.	Applicable – The total rated thermal energy generation capacity of the project equipment i.e. the steam generating boiler has been calculated taking the difference between enthalpy of total output steam leaving the project boiler and the total enthalpy of feed water entering the project boiler.
Footnote 3: Co-fired system uses both fossil and renewable fuels.	Applicable to the project activity as in case of extreme exigency there may be co-firing of fossil fuel.
Footnote 4: Physically distinct units are those that are capable of producing thermal/electrical energy without the operation of existing units, and that do not directly affect the mechanical, thermal, or electrical characteristics of the existing facility. For example, the addition of a steam turbine to an existing combustion turbine to create a combined cycle unit would not be considered .physically distinct.	Applicable- The project activity has dedicated boiler and turbine to generate steam and electricity therefore they are physically distinct and not directly affect the mechanical, thermal, or electrical characteristics of the existing facility.
Footnote 5: Refer to Annex 18, EB 23 for the definition of renewable biomass.	The project activity is using rice husk which is as per the Glossary of CDM Terms, point no. 4 of definition of Renewable Biomass (page 26 of Glossary of CDM terms Version 05) is a renewable biomass and not a charcoal based project.

Thus, the proposed CDM project activity meets relevant requirements of the methodology as mentioned above and therefore the choice of project category is justified. Moreover the project activity qualifies as a small-scale project activity as described above and it will remain under the limits of type I (i.e. capacity of the proposed project activity will not exceed 15 MW) during every year of crediting period. If the project activity goes beyond the limit of its type in any year of the crediting period, the emission reduction that is claimed by the project activity during this particular year will be capped by the maximum emission reduction estimated in this PDD by the project participant for that year during the crediting period.

B.3. Description of the project boundary:

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According to paragraph 12 of the methodology, the project boundary has been defined as:

"The physical, geographical site of the project equipment producing the renewable energy delineates the project boundary. The boundary also extends to the industrial, commercial or residential facility, or facilities, consuming energy generated by the system and the processes or equipment that is affected by the project activity".

The energy generation unit consists of boiler and turbine, electrical and instrumentation systems, water treatment plant and fuel feeding system and auxiliary equipment for the plant operation. The project boundary encompasses the textile mill where the generated steam and power is consumed.

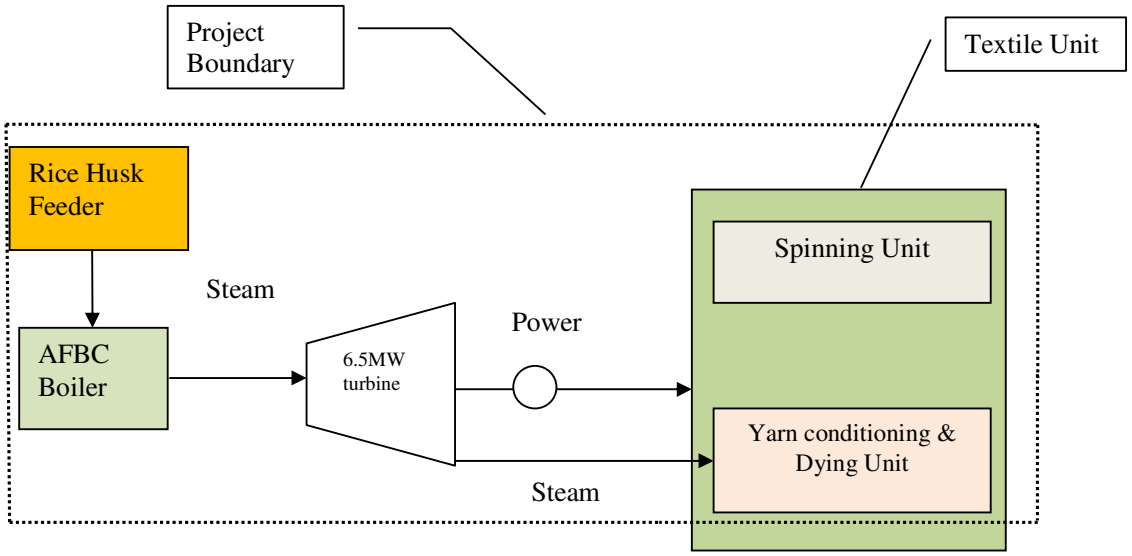

Fig 1. Project Boundary

B.4. Description of baseline and its development:

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Currently the textile unit imports power from PSEB which is part of the NEWNE regional electricity grid and generates steam for the process from a rice husk fired 3 TPH boiler. The power is required for the entire textile unit whereas the steam is required only for the yarn conditioning unit and the dying unit.

There is an expansion of textile unit for which the power supply would have been met from the regional electricity grid only and the steam requirement would have been met by the 3 TPH existing rice husk fired boiler.

As per paragraph 15 of approved methodology AMS-I.C. version 18,

"Project activities producing both heat and electricity including cogeneration shall use one of the following baseline scenario"

(a) *Electricity is imported from the grid and steam/heat is produced using fossil fuel*

(b) *Electricity is produced in an onsite captive power plant (with a possibility of export to the grid) and steam/heat is produced using fossil fuel*

(c) *A combination of (a) and (b)*

(d) *Electricity and steam/heat are produced in a cogeneration unit, using fossil fuel.*

(e) *Electricity is imported from the grid and/or produced in an on-site captive power plant (with a possibility of export to the grid); steam/heat is produced from renewable biomass.*

(f) *Electricity is produced in an on-site captive power plant using biomass (with a possibility of export to the grid) and/or imported from the grid; steam/heat is produced using fossil fuel;*

(g) *Electricity and thermal energy (steam/heat) are produced in a biomass fired cogeneration unit (without a possibility of export of electricity either to the grid or to other facilities and without a possibility of export of thermal energy to other facilities)*[7]*;*

(h) *Electricity and/or thermal energy produced in a co-fired system.*

In the pre-project scenario it has an operational history of grid power import and biomass based steam generation which is in line with baseline option (e). Thus for the project activity the most likely baseline scenario is the electricity import from the grid and steam generation from biomass i.e. paragraph 15. (e) of the methodology AMS-I.C. Version 18.
As the project activity displaces grid electricity import and the baseline is the grid itself, so the baseline emission factor for the project activity can be calculated following paragraph 21 of the methodology AMS-I.C. Version 18 states that *"For project activities that do not displace captive electricity generated by existing plant but displace grid electricity import and/or supply electricity to grid, the emission factor of the grid shall be calculated as per the procedures detailed in AMS-I.D."*

Now as per paragraph 11 of approved methodology AMS-I.D. version 16 the Baseline Emission can be calculated as follows:

$$BE_y = EG_{BL,y} * EF_{CO2,grid,y}$$

Where:

BE_y = Baseline Emissions in year y; tCO_2

$EG_{BL,y}$ = Quantity of net electricity supplied to the process plant as a result of the implementation of the CDM project activity in year y (MWh)

$EF_{CO2,grid,y}$ = CO2 emission factor of the NEWNE grid in year *y* -(tCO_2/MWh)

The Emission Factor for the regional grid can be calculated in a transparent and conservative manner as per paragraph 12 of AMS.I.D, ver 16:

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the "Tool to calculate the Emission Factor for an electricity system'. or
(b) The weighted average emissions (in t CO2/MWh) of the current generation mix. The data of the year in which project generation occurs must be used.

Calculations shall be based on data from an official source (where available) and made publicly available.

The project proponent has opted the approach (a). The project participant has chosen combined margin (CM) approach for determination of the baseline emission factor of the project activity.

The emission factor has been estimated using the seven steps according to "Tool to calculate the emission factor for an electricity system" (Version -02, EB- 50) provided in section B.6.1

As heat/steam was already being generated by biomass in the baseline scenario, as per paragraph 28 of AMS-I.C., version18, emission reductions for thermal generation is not eligible. Thus the baseline emissions is calculated only for the corresponding net electricity generation by the project activity which would have been supplied by other power plants connected to the grid in the absence of the project activity.

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 small-scale CDM project activity:

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According to the **Attachment A to Appendix B** of the simplified modalities and procedures for small-scale CDM project activities and paragraph 1 of Annex34, EB35:

"Project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers:

(a) ***Investment barrier****: a financially more viable alternative to the project activity would have led to higher emissions*

(b) ***Technological barrier:*** *a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions*

(c) ***Barrier due to prevailing practice****: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions*

(d) ***Other barriers:*** *without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher*

The baseline scenario, which is continuation of grid supply without any new investment would be a financially more viable alternative to the project activity, which would have led to higher emissions. Thus, from the above directive, it can be said that the project activity faces investment barriers and same is being demonstrated in the following section.

Investment barrier:

The guidance 16 of Annex 58, EB51, says *"If the proposed baseline scenario leaves the project participant no other choice than to make an investment to supply the same (or substitute) products or services, a benchmark analysis is not appropriate and an investment comparison analysis shall be used. If the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate"*. Since the proposed baseline scenario is the supply of electricity from the grid, benchmark analysis has been chosen to demonstrate the additionality of the project. Having regard to the fact that the project is funded by a mix of debt and equity, project IRR is considered as an appropriate indicator. Annex 58 EB 51 permits use of project IRR as financial indicator and the project IRR is one of the financial indicators used by the banks to assess the investment worthiness of the project.

The project proponent has selected PLR, the commercial lending rate as the bench mark which is in conformity with the guidance 12 Annex 58 EB 51, as project IRR has been chosen as the financial indicator. At the time of decision making, the PLR was 10.25 – 10.75%[4]. PP has chosen 10.75% as the benchmark. Since the bench mark is publicly available and hence verifiable by DOE, the bench mark confirms to guidance 13 Annex 58 EB 51.

Following are the assumptions considered at the time of decision making:

Parameter	Value	Unit	Source
Project Cost			
Plant & Machinery	179.8	Million INR	Quotation from EPC contractor dated 2nd Dec, 2005
Building	50	Million INR	Estimation from Civil Engineer dated 9th Dec, 2005
IDC	8.77	Million INR	Calculated considering 7.5months construction period
Land	20	Million	Estimation from Civil Engineer dated 9th Dec, 2005

[4] Source: http://rbidocs.rbi.org.in/rdocs/Bulletin/PDFs/68241.pdf

		INR	
Total project cost	258.57	Million INR	Calculated
Financing Pattern			
Debt	181.00	Million INR	Andhra Pradesh Electricity Regulatory Commission Order dated 20th March, 2004 (http://www.aperc.gov.in/OtherOrders/Order_RP_84_2003.doc)
Equity	77.57	Million INR	
Terms of loan			
Interest rate	12.75	%	Loan Sanction letter dated 06th March, 2007
Repayment	28	instalments in seven years	
Moratorium	12	Months	
TUFS	5	%	GOVERNMENT RESOLUTION ON TUFS ON TECHNO-OPERATIONAL PARAMETERS (http://www.txcindia.com/html/tufsbookletsection1.pdf)
Effective interest rate	7.75	%	
Installed capacity	6.5	MW	Quotation from EPC contractor dated 2nd Dec, 2005
No. of working days	350	days	Continuous plant with 15 days annual shut down
Hrs of operation in a day	24	hrs/day	
Auxiliary consumption	10	%	Quotation from EPC contractor dated 2nd Dec, 2005 and Andhra Pradesh Electricity Regulatory Commission Order dated 20th March, 2004 (http://www.aperc.gov.in/OtherOrders/Order_RP_84_2003.doc)
Capacity Utilization Factor (CUF)	85	%	CUF submitted to the bank
Gross power generation	46,410	MWh	Calculated
Annual Net power generation	41,769	MWh	Calculated
Tariff	4	INR/kWh	Electricity bill for November 2005
Escalation in tariff	0.094	INR/kWh	Grid power tariff history
Specific consumption of biomass in project plant for power generation	1.13	kg biomass /kWh gross power generated	"Biomass Consumption in Project" worksheet
Annual consumption of biomass in project boiler	52,511	tonnes/annum	Calculated
Biomass cost	2,000	INR/Ton	Invoice raised by the biomass suppliers

Biomass cost escalation	5	%	Andhra Pradesh Electricity Regulatory Commission Order dated 20th March, 2004 (http://www.aperc.gov.in/OtherOrders/Order_RP_84_2003.doc)
Working Capital for biomass storage	2	Months	
Working Capital for O & M	1	Month	
Working capital (Promoters contribution)	25	% of total WC	WC loan sanction letter 09th Feb, 2005
Interest on Working capital loan	12.75	%	
O & M cost	12	INR million	Quotation for O & M dated 25th Nov, 2005
O & M cost escalation	5	%	
Rate of depreciations			
Depreciation on building	3.34	%	http://pdsarafco.com/Quick%20Info%20Link/Cos.%20Act/Schedule%20XIV%20-%20Rates%20Of%20Depreciation.htm
Depreciation on plant & machinery	5.28	%	
Depreciation on building as per IT Act	10	%	IT Rule old Appendix I
Depreciation on plant & machinery as per IT Act	80	%	
Tax rate (33.66%)	33.66	%	http://www.taxindiaonline.com/RC2/inside2.php3?filename=bnews_detail.php3&newsid=5638
Emission factor	0.84	tCO2/MWh	CEA data base version 05
CER price	10	Euro/CER	
Exchange rate	54.17	INR/Euro	Rate on 15th December, 2005 (http://www.x-rates.com/cgi-bin/hlookup.cgi)

Guidance 11 of Annex 58 EB 51 states that in cases, where a post tax benchmark is applied the actual interest payable should be accounted in the calculation of Income Tax. Accordingly the interest rate stipulated in the sanction letter of the IDBI bank has been taken into consideration.

In this context it is stated that the financial indicator has been calculated for a period of 20 years, which is in confirmative with guidance 3 Annex 58 EB 51. The CUF is based on that submitted to the bank for loan sanction and therefore confirms to Annex 11 EB 48.
The salvage value has been taken as the residual value, namely the total investment cost less book depreciation provided during the 20 Year period. In this context it is submitted that since 70% of the

project cost has been subjected to accelerated depreciation, the salvage value represents the potential profit expected in the terminal year. Therefore the salvage value confirms to guidance 4 Annex 58 EB 51.

Based on the above, the project IRR works out to 7.99% which is below the benchmark and hence the project is not a business as usual scenario.

Sensitivity analysis
The conclusion that the project is additional has been tested by subjecting critical parameters to reasonable variations as required by Annex 58 EB 51. As per guideline provided at paragraph 17 of EB51 annex 58 the criterion for choosing the sensitivity analysis parameter is:

Guidance: *Only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation (all parameters varied need not necessarily be subjected to both negative and positive variations of the same magnitude), and the results of this variation should be presented in the PDD and be reproducible in the associated spreadsheets.*

A sensitivity analysis on the project's financial returns has been performed with the variation in the following parameters selected following the above guidance:

1. CUF
2. Biomass price
3. O & M cost
4. Project cost

These parameters have been subjected to 10% variation on either side. The variation considered for sensitivity analysis is appropriate as there has been an over run in the project cost, biomass price has gone up even beyond 10% and the O & M cost contracted by the company as well as the escalation there on has been much more than what has been envisaged in the financial indicator calculation. The variation conforms to guidance 18 Annex 58 EB 51.
The results of the sensitivity analysis are given below:

Variable parameters	Variation		
	-10%	0%	10%
Project Cost	10.08%	7.99%	6.31%
CUF	4.95%	7.99%	11.00%
O & M Cost	9.18%	7.99%	6.72%
Fuel Cost	17.29%	7.99%	Negative

From the figures given above, it is evident that not only the project is additional, but would continue to remain additional even when the critical parameters are subjected to reasonable variations.

An analysis was also conducted to ascertain at what percentage variation in the critical parameters the project IRR would equal/breach the bench mark and the results of the analysis are as follows:

a) When the project cost goes down by 18.5%
b) When the CUF goes up by 9.2%

c) When the O & M cost goes down by 24.4%
d) When the fuel cost goes down by 2.5%

It is submitted that all the above conditions are hypothetical and unrealistic for the following reasons-

a) The project has already experienced cost overrun and the cost incurred on the project is INR 360.1 million which is evidenced by a chartered accountant. Therefore the question of the cost coming down is unrealistic.
b) The CUF considered is based on the letter submitted to bank for loan sanction. The generation has been computed based on 350 days on operation while the biomass plants operate maximum 330 days in a year. Therefore an increase in the CUF by 9.2% would result in the plant operating at a capacity of more than 92.82% which has never been witnessed so far.
c) The company has already signed an O & M agreement with M/s Triveni Engineering as per which the company has to pay O & M charges of INR. 0.94 Million per month plus INR 0.1 Million per month resulting in an overall O & M cost of INR 1.04 Million per month. As the O&M cost considered for project IRR calculation is based on O &M offer letter i.e. INR 1 Million per month which is lower than the actual contracted value, therefore reduction in O&M cost is not possible.
d) Fuel cost considered in the financial indicator calculation is not only based on the quotation/invoice but also substantiated by the Annual Report of the company. The company is at present paying more than INR 3,000 per tonne which is also evidenced by the Annual Report. In the above back ground any reduction in biomass cost is unrealistic.

In the above back ground it is submitted that the project is not a Business as usual scenario. It is additional and would continue to remain additional irrespective of any changes in the critical parameters. It is in the above back ground that the registration of the project as CDM project activity assumes significance in as much as the project IRR breaches the bench mark with CDM benefits (15.05% as against the bench mark of 10.75%).

CDM Consideration:

The start date of the project activity is 21st June, 2006. Since the start date of the project activity is prior to 02nd August, 2008 and the PDD was webhosted after the start date of the project activity, the project activity falls under "existing project" activity and the project developer is required to demonstrate the conformity of the project activity to paragraphs 6(a) & (b) and 8 of Annex 22 EB 49. As required, the chronology of events which evidences project developer taking parallel action for the implementation of the project activity and the registration of the project as CDM activity is given below:

CDM Trail	Date
Board resolution for project approval with CDM consideration	16th December, 2005
Joint offer for CDM consultation from IDBI and Mitcon consultancy	12th October, 2006
Placement of Letter of Intent to Thermax limited for Purchase of boiler	21st June, 2006
Negotiation with IDBI	07th December, 2006
Revised joint offer from MITCON and IDBI	05th January, 2007
LOI to IDBI	12th April, 2007

Acceptance of LOI by IDBI	04th September, 2007
Invitation of stake holders meeting at factory premises	28th November, 2008
Stakeholders meeting	12th December, 2008
Start of commercial operation (COD)	30th March, 2009
Termination of contract of IDBI/MITCON as CDM advisors from GACL	01st June, 2009
LoU with First Climate (India) Pvt. Ltd. for CDM advisory services	19th June, 2009
Appointment of DOE	27th November, 2009
Date of receiving HCA	12th January,2010

As could be seen from the details given above, the project developer had taken parallel action for the parallel action for the implementation of the project activity and the registration of the project as CDM activity. Therefore, the project conforms to paragraphs 6(a) & (b) and 8 of Annex 22 EB 49.

Consideration of national/sectoral policies:

In terms of EB 22, Annex 3, baseline scenario should be established taking into account relevant national and/or sectoral policies and circumstances, such as sectoral reform initiatives, local fuel availability, power sector expansion plans, and the economic situation in the project sector.

Para 7(a) of same states that, only those national and/or sectoral policies or regulations under paragraph 6(a) i.e. type E+ policy that increase GHG emissions, that have been implemented before adoption of the Kyoto Protocol by the COP (decision 1/CP.3, 11 December 1997), shall be taken into account when developing a baseline scenario. For more GHG emitting power sector, no policy with comparative advantage existed before 11 December 1997. Hence, it is not applicable for baseline determination.

Para 7(b) of the same state, that those National and/or sectoral policies or regulations under paragraph 6 (b), i.e., type E- policy that decrease GHG emissions, that have been implemented since the adoption by the COP of the CDM M&P (decision 17/CP.7, 11 November 2001) need not be taken into account in developing a baseline scenario. Hence, the baseline scenario is the electricity generation by grid connected fossil fuel dominated power plants.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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Baseline Emission:

According to paragraph 17 of the Approved Methodology AMS IC version 18,
Baseline emissions for supply of electricity to and/or displacement electricity from a grid shall be calculated as per the procedures detailed in AMS-I.D. Now as per paragraph 11 of approved methodology AMS-I.D. version 16 the Baseline Emission can be calculated as follows:

$$BE_y = EG_{BL,y} * EF_{CO2}$$

$$= (EG_{gross,y} - EG_{aux,y}) * EF_{CO_2,grid,y}$$

Where,

BE_y = Baseline Emissions in year y; tCO_2

$EG_{BL,y}$ = Energy baseline in year y; MWh

$EG_{gross,y}$ = Gross electricity generated by the project activity in the year y; MWh

$EG_{aux,y}$ =Auxiliary electricity consumption during the year y; MWh

$EF_{CO_2,grid,y}$ = $EF_{grid,CM,y}$ = The CO2 Emission Factor of the NEWNE grid in year y; tCO2/MWh

The baseline emission factor has been calculated based on combined margin approach considering the data from "CO2 Baseline Database" Version 5.0 published by CEA which is available at the time of preparation and webhosting of the PDD. The CO2 Baseline Database published by CEA is in accordance with "Tool to Calculate the Emission Factor for an Electricity System" Version 01.1. However, the said tool is revised during EB 50 as Version 02 with addition of option to include off-grid power plants in the calculation of operating margin and build margin emission factor. As the revision in the tool version 02 is optional and does not apply to Indian grid system, the CO2 Baseline Database, Version 5.0 does also comply with version 02 of the tool for calculation of emission factor.

Calculation of $EF_{CO_2,grid,y}$ = $EF_{grid,CM,y}$ by using "Tool to calculate the emission factor for an electricity system" (Version -02, EB- 50) is provided below:

Step 1: Identify the relevant system:

The Central Electricity Authority, Ministry of Power, Government of India (Host Country) has given the delineations of the project electricity system and the connected electricity system in India. As per CEA, the Indian power system is divided into two regional grids, viz. NEWNE Grid & Southern Grid. Each grid covers several states as given in the following table. As the project activity is located in the State of Punjab, NEWNE Grid will be the relevant electricity system.

Geographical scope of the electricity generation system:

NEWNE Grid				**Southern Grid**
Northern	**Eastern**	**Western**	**North-Eastern**	**Southern**
Chandigarh	Bihar	Chhattisgarh	Arunachal Pradesh	Andhra Pradesh
Delhi	Jharkhand	Gujarat	Assam	Karnataka
Haryana	Orissa	Daman & Diu	Manipur	Kerala
Himachal Pradesh	West Bengal	Dadar & Nagar Haveli	Meghalaya	Tamilnadu
Jammu & Kashmir	Sikkim	Madhya Pradesh	Mizoram	Lakshadweep
Punjab	Andaman-Nicobar	Maharashtra	Nagaland	

Rajasthan		Goa	Tripura	
Uttar Pradesh				
Uttarakhand				

Step 2: Choose whether to include off-grid power plants in the project electricity system (optional):

Option I (Only grid power plants are included in the calculation) is applicable as the grid system in India is very stable enough and off grid generation is not significant.

Step 3: Select a method to determine the operating margin (OM):

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods:

(a) Simple OM, or
(b) Simple adjusted OM, or
(c) Dispatch data analysis OM, or
(d) Average OM.

Out of the above options, the simple OM method (option a) is used in India. The Dispatch data analysis OM is not used as off-grid generation is not significant in India as per step 2 above. Other methods cannot currently be applied in India due to lack of necessary data.

For the simple OM, the simple adjusted OM and the average OM, the emissions factor can be calculated using either of the two following data vintages:

• Ex ante option: If the ex ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation. For off-grid power plants, use a single calendar year within the 5 most recent calendar years prior to the time of submission of the CDM-PDD for validation.
• Ex post option: If the ex post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring. If the data required to calculate the emission factor for year y is usually only available later than six months after the end of year y, alternatively the emission factor of the previous year y-1 may be used. If the data is usually only available 18 months after the end of year y, the emission factor of the year proceeding the previous year y-2 may be used. The same data vintage (y, y-1 or y-2) should be used throughout all crediting periods.

As per emission factor tool, the simple OM method (option a) can only be used if low- cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production.

In India as per available data (most recent five years) with CEA, the low-cost/must-run resources constitute 19.64% (NEWNE Grid) for which is less than 50% of total grid generation.

	Share of low cost / must run (% of net generation)[5]				
Year	2004-05	2005-06	2006-07	2007-08	2008-09
NEWNE grid	25.4%	18.0%	18.5%	19.0%	17.3%
Average of most recent four years (NEWNE grid)		**19.64%**			

Step 4: Calculate the operating margin emission factor according to the selected method:

The operating margin describes the average CO2 intensity of the existing stations in the grid which are most likely to reduce their output if a CDM project supplies electricity to the grid (or reduces consumption of grid electricity). The simple operating margin is the weighted average emissions rate of all generation sources in the region except so-called low-cost or must-run sources. In India, hydro and nuclear stations qualify as low-cost / must run sources and are excluded. The operating margin, therefore, can be calculated by dividing the region's total CO2 emissions by the net generation of all thermal stations. In other words, it represents the weighted average emissions rate of all thermal stations in the regional grid.

Simple Operating Margin:

The simple OM emission factor is calculated as the generation-weighted average CO2 emissions per unit net electricity generation (tCO2/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units. The values of OM have been taken from CEA Database which has been calculated based on "Tool to calculate the emission factor for an electricity system". The value of simple operating margin emission factors is 1.004 tCO2/MWh (NEWNE Grid).

Year	**Simple Operating Margin (OM)**	**Net Generation in Operating Margin (GWh)**	**Source of data**
2006-07	1.008 tCO2/MWh	379470.598 GWh	CEA data base version 5.0 http://www.cea.nic.in/planning/c%20and%20e/government%20of%20india%20website.htm
2007-08	0.999 tCO2/MWh	401641.586 GWh	
2008-09	1.006 tCO2/MWh	421802.633 GWh	
	Weighted Average Operating Margin (OM)		
2008-09	1.004 tCO2/MWh		

[5] http://www.cea.nic.in/planning/c%20and%20e/database_publishing_ver5.zip

Simple Operating Margin calculation has been done *ex-ante* and hence OM values will remain fixed and need not be monitored during the crediting period.

Step 5: Identify the group of power units to be included in the build margin (BM):

The sample group of power units m used to calculate the build margin consists of either:

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

Project participants should use the set of power units that comprises the larger annual generation. Since in India, the installed capacity and corresponding annual generation from power plants is quite high, the sample group containing set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently comprise the sample group with the larger annual generation. Thus the sample group m consisting of option (b) is used for the estimation of build margin.

In terms of vintage of data, project participants have a choice to pick one of the two options provided. Option 1 has been chosen wherein, for the first crediting period, the build margin emission factor is to be calculated *ex-ante* based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation.

Step 6: Calculate the build margin emission factor:

The build margin emissions factor is the generation-weighted average emission factor (tCO2/MWh) of all power units m during the most recent year y for which power generation data is available, calculated as follows:

$$EF_{grid,BM,y} = (\sum_{m} EG_{m,y} * EF_{EL,m,y}) / \sum_{m} EG_{m,y}$$

Where:

$EF_{grid,BM,y}$ = Build margin CO2 emission factor in year y (tCO2 / MWh)

$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)

$EF_{EL,m,y}$ = CO2 emission factor of power unit m in year y (tCO2 / MWh)

m = Power units included in the build margin

y = Most recent historical year for which power generation data is available.

Calculations for the Build Margin emission factor $EF_{grid,BM,y}$ is based on the most recent information

available on the plants already built for sample group m at the time of PDD submission. The sample group m consists of the power plant capacity additions in the electricity system that comprise 20 % of the system generation and that have been built most recently.

As per CEA CO_2 database, the latest available for the year 2008-09 is

Build Margin	Values	Source
2008 - 09	0.675 tCO_2e/MWh	CEA CO2 Data base, Version 5

Step 7: Calculate the combined margin emission factor:

The combined margin is a weighted average of the simple operating margin and the build margin. The combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$$

$EF_{grid,CM,y}$ = Combined margin emission factor in year y (tCO2/MWh)

$EF_{grid,OM,y}$ = Operating margin CO2 emission factor in year y (tCO2/MWh)

W_{OM} = Weighting of operating margin emissions factor (%)

$EF_{grid,BM,y}$ = Build margin CO2 emission factor in year y (tCO2/MWh)

W_{BM} = Weighting of build margin emissions factor (%)

The default values used for biomass based power plants are W_{OM} =0.5 and W_{BM} =0.5

Hence the combined margin is calculated as follows and it will be *fixed ex-ante* for the entire crediting period:

$$\begin{aligned} EF_{grid,CM,y} &= EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM} \\ &= (0.5 * 1.004) + (0.5 * 0.675) \\ &= 0.839 \text{ tCO2/MWh} \\ &= EF_{CO2,grid,y} \end{aligned}$$

Combined Margin for the project activity	Values	Source
	0.839 tCO2e/MWh	Calculated

Project Emission:

The project activity emission sources as per the small scale methodology AMS- IC (paragraph 43) and their relevance with respect to the proposed CDM project activity are given below in a tabular format.

Source of project activity emission	**Relevance with respect to the proposed CDM project**
CO2 emissions from on-site consumption of fossil fuels due to the project activity shall be calculated using the latest version of "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion"	Applicable: Fossil fuel (coal) may be consumed in case of emergencies or during raining seasons.
CO2 emissions from electricity consumption by the project activity using the latest version of "Tool to calculate baseline, project and/or leakage emissions from electricity consumption"	Not applicable as paragraph 2 on page 2 of this tool specified that it is **not** applicable in cases where captive renewable power generation technologies are installed to provide electricity in the project activity, in the baseline scenario or to sources of leakage.". As this project activity is using technology of captive renewable power generation.
Any other significant emissions associated with project activity within the project boundary	Not applicable as there are no other significant emissions associated with project activity within the project boundary.
For geothermal project activities, project participants shall account for the following emission sources, where applicable: fugitive emissions of carbon dioxide and methane due to release of non-condensable gases from produced steam; and, carbon dioxide emissions resulting from combustion of fossil fuels related to the operation of the geothermal power plant	Not applicable as this is biomass based co-generation project, not a geothermal project activity.

From above only emissions from onsite combustion of fossil fuels are required to be accounted. This is done in line with the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" as follows:

$$PE_y = PE_{FC,y} = \sum_i FC_{i,y} \times COEF_{i,y}$$

Where:

$PE_{FC,y}$	CO_2 emissions from fossil fuel combustion during the year *y* (tCO_2 / yr);
$FC_{i,y}$	Quantity of fossil fuel type *i* combusted during the year y (tons/yr);
$COEF_{i,y}$	CO_2 emission coefficient of fossil fuel type *i* in year y (tCO_2 / ton);
i	Fossil fuel types combusted during the year y.

The CO_2 emission coefficient $COEF_{i,y}$ can be calculated using one of the following two Options, depending on the availability of data on the fossil fuel type i, as follows:

Option A:
The CO_2 emission coefficient $COEF_{i,y}$ is calculated based on the chemical composition of the fossil fuel type i, using the following approach:

If $FC_{i,j,y}$ is measured in a mass unit: $COEF_{i,y} = w_{,i,y} \times 44/12$ (2)

If $FC_{i,j,y}$ is measured in a volume unit: $COEF_{i,y} = w_{,i,y} \times \rho_{i,y} \times 44/12$ (3)

Where: $COEF_{i,y}$	=	CO_2 emission coefficient of fuel type i (tCO_2/mass or volume unit);
$w_{C,i,y}$	=	Weighted average mass fraction of carbon in fuel type i in year y (tC/mass unit of the fuel);
$\rho_{i,y}$	=	Weighted average density of fuel type i in year y (mass unit/volume unit of the fuel)
i	=	Fuel types combusted in process j during the year y

Option B:
The CO_2 emission coefficient $COEF_{i,y}$ is calculated based on net calorific value and CO_2 emission factor of the fuel type i, as follows:

$$COEF_{i,y} = NCV_{i,y} \times EF_{CO_2,i,y} \quad \textbf{(4)}$$

Where: $COEF_{i,y}$	=	CO_2 emission coefficient of fuel type i in year y (tCO_2/mass or volume unit)
$NCV_{i,y}$	=	Net calorific value of the fuel type i in year y (TJ/mass or volume unit)
$EF_{CO_2,i,y}$	=	Emission factor of fuel type i consumed in the project activity in year y (tCO_2/TJ)
i	=	Fuel types combusted in process j during the year y

As per the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" the preferred approach to calculate CO_2 emission coefficient $COEF_{i,y}$ should be Option A where necessary data is available. But due to lack of necessary data availability Option B has been adopted.

So,

$$PE_y = FC_{i,y} * NCV_{i,y} * EF_{CO_2,i,y} \quad \textbf{(5)}$$

Where:

Standard parameter	Customised Parameter for project activity	Description
$FC_{i,y}$ =	$FC_{coal,y}$ =	Quantity of fossil fuel type *i* combusted during the year y (tons/yr)
$NCV_{i,y}$ =	$NCV_{coal,y}$ =	Net calorific value of sub-bituminous coal in year y (TJ/tonne)
$EF_{CO2,i,y}$ =	$EF_{CO2,coal,y}$=	CO_2 emission factor of sub-bituminous coal in year y (tCO_2/TJ)
i =	Coal =	Type of fossil fuel for the project activity which is sub-bituminous coal combusted in project activity during the year y

Leakage: LE_y

As per paragraph 45 of AMS-I.C., version 18,*"If the energy generating equipment currently being utilised is transferred from boundary to the project activity, leakage is to be considered."*. For this project activity there is no transfer of equipment and therefore leakage due to equipment transfer has been taken to be zero.

As per paragraph 18 of **Attachment C to Appendix B version 3 *"General guidance on leakage in biomass project activities"* -** *The project participant shall evaluate ex ante if there is a surplus of the biomass in the region of the project activity, which is not utilised. If it is demonstrated (e.g., using published literature, official reports, surveys etc.) at the beginning of each crediting period that the quantity of available biomass in the region (e.g., 50 km radius), is at least 25% larger than the quantity of biomass that is utilised including the project activity, then this source of leakage can be neglected otherwise this leakage shall be estimated and deducted from the emission reductions.*

In line with this guidance on leakage associated with the use of biomass material for project activities, it is demonstrated through survey/biomass availability study[6] conducted by DSCL energy services company ltd in Oct, 2008, within a distance of max. 50 km radius around the project site, that the biomass available in the region is around 47.68 % surplus than the quantity of biomass that is utilised including the project activity.
The districts which have been covered are given below along with the surplus availability of rice husk.

Sl. No.	Parameters	Unit	Value
1	Total generation of rice	MT	371,241

[6] Ref: "Biomass Assessment Report for M/s. Gillanders Arbuthnot & Co. Ltd Sangrur District, Punjab." prepared by DSCL Energy Services Company Ltd. in Oct, 2008

	husk(X)		
2	Consumption of rice husk in Industry(y)	MT	151,716
3	Rice mill Self Consumption @10% of Rice Husk Production(z)	MT	37,124.1
4	Consumption of rice husk in the project activity(A)	MT	62,535
5	Total Consumption of Rice Husk(B)	MT	251,375
6	**Surplus rice husk in Catchment Area(X- B)**	**MT**	**119,866**
7	**Surplus %**	**%**	**47.68**

Since the surplus quantity of rice husk is 47.68%, which is more than 25% as required by the guidance in Attachment C to Appendix B, the leakage associated with competing use of biomass is neglected.

The other source of Leakage is emissions associated with the transportation of biomass material to the project plant.

As per paragraph 46 of AMS-I.C., version 18, *"In case collection/processing/transportation of biomass residues is outside the project boundary, CO2 emissions from collection/processing/transportation of biomass residues to the project site should be considered"*. GACL purchase rice husk from outside of the project boundary. So, the leakage applicable for this project activity will be due to transportation of biomass residues to project site. Now as per footnote 11 of AMS-I.C. *"If biomass residues are transported over a distance of more than 200 kilometers due to the implementation of the project activity then this leakage source attributed to transportation shall be considered, otherwise it can be neglected."*

For the project activity, leakage emission due to transportation of biomass is considered zero, based on the biomass surplus availability report, which proves biomass is available in plenty within a distance of 200 km radius around the project site.

The emission reductions can therefore be given as:

Emission Reduction: ER_y

The emission reduction due to project activity in the year y is the difference between the baseline emissions (BE_y), project emission (PE_y) thus

$$ER_y = BE_y - PE_y - LE_y$$
$$= \left(EG_{BL,y} * EF_{CO_2,grid,y}\right) - \left(FC_{i,y} * NCV_{i,y} * EF_{CO_2,i,y}\right) - LE_y$$

Where

ER_y	=	Emission reduction during the year y, tCO_2e
BE_y	=	Base line emission during the year y, tCO_2e
PE_y	=	Project emission during the year y, tCO_2e
LE_y	=	Leakage emission during the year y, tCO_2e
$EG_{BL,y}$	=	Quantity of net electricity supplied to the process plant as a result of the implementation of the CDM project activity in year y (MWh)
$EF_{CO2,grid,y}$	=	CO2 emission factor of the NEWNE grid in year *y* -(tCO_2e/MWh)
$FC_{i,y}$	=	Quantity of fossil fuel type *i* combusted during the year y (tons/yr)
$NCV_{i,y}$	=	Net calorific value of the fuel type i consumed in the project activity in year y (TJ/ton)
$EF_{CO_2,i,y}$	=	Emission factor of fuel type i consumed in the project activity in year y (tCO_2/TJ)
i	=	Are the fuel types combusted during the year y

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

Data / Parameter:	**$FC_{i,m,y}$**
Data unit:	Mass or volume unit
Description:	Amount of fossil fuel type *i* consumed by power plant / unit m in year *y*
Source of data used:	"CO_2 Baseline Database for Indian Power Sector" Version 5 published by the Central Electricity Authority, Ministry of Power, Government of India. It is available at http://www.cea.nic.in/planning/c%20and%20e/government%20of%20india%20website.htm
Value applied:	Varies for each plant (refer "CO_2 Baseline Database for Indian Power Sector" Version 5 and its corresponding spreadsheets). The spreadsheets are available at the link "Baseline Carbon Dioxide Emission Database" Version 5 in the following web page http://www.cea.nic.in/planning/c%20and%20e/government%20of%20india%20website.htm
Justification of the choice of data or description of measurement methods and procedures actually applied :	"CO_2 Baseline Database for Indian Power Sector" User guide, Version 5 for further justifications.
Any comment:	-

Data / Parameter:	***$NCV_{i,y}$***
Data unit:	GJ / Mass or volume unit
Description:	Net calorific value (energy content) of fossil fuel type *i* in year *y*
Source of data used:	"CO_2 Baseline Database for Indian Power Sector" Version 5 published by the Central Electricity Authority, Ministry of Power, Government of India. It is available at http://www.cea.nic.in/plannil,.,ng/c%20and%20e/government%20of%20india%20website.htm
Value applied:	Varies for each fuel type (refer to Appendix B of "CO_2 Baseline Database for Indian Power Sector" Version 5, user guide).
Justification of the choice of data or description of measurement methods and procedures actually applied :	"CO_2 Baseline Database for Indian Power Sector" User guide, Version 5 for further justifications.
Any comment:	-

Data / Parameter:	$EF_{CO2,i,y}$
Data unit:	tCO2/TJ
Description:	Tonnes of carbon dioxide per energy unit of fuel in grid based plants used in the determination of the emission factor
Source of data used:	Appendix B of "CO_2 Baseline Database for Indian Power Sector" Version 5 user guide, published by the Central Electricity Authority, Ministry of Power, Government of India. It is available at http://www.cea.nic.in/planning/c%20and%20e/government%20of%20india%20website.htm
Value applied:	Varies for each fuel type (refer to Appendix B of "CO_2 Baseline Database for Indian Power Sector" Version 5, user guide).
Justification of the choice of data or description of measurement methods and procedures actually applied :	"CO_2 Baseline Database for Indian Power Sector" User guide, Version 5 for further justifications.
Any comment:	-

Data / Parameter:	$EG_{m,y}$
Data unit:	MWh
Description:	Net electricity generated and delivered to the grid by power plant / unit *m* in year *y*
Source of data used:	"CO_2 Baseline Database for Indian Power Sector" Version 5 published by the Central Electricity Authority, Ministry of Power, Government of India. It is available at http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver5.pdf
Value applied:	Varies for each plant (refer "CO_2 Baseline Database for Indian Power Sector" Version 5 and its corresponding spreadsheets). The spreadsheets are available at the link "Baseline Carbon Dioxide Emission Database" Version 5 in the following web page http://www.cea.nic.in/planning/c%20and%20e/government%20of%20india%20website.htm
Justification of the choice of data or description of measurement methods and procedures actually applied :	"CO_2 Baseline Database for Indian Power Sector" User guide, Version 5 for further justifications.
Any comment:	-

Data / Parameter:	$OXID_i$

Data unit:	%
Description:	Oxidation factor applied to the combustion of fuels in grid based plants for the determination of the emission factor
Source of data used:	"CO_2 Baseline Database for Indian Power Sector" Version 5, user guide, published by the Central Electricity Authority, Ministry of Power, Government of India. It is available at http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver5.pdf
Value applied:	Varies for each fuel type (refer to Appendix B of "CO_2 Baseline Database for Indian Power Sector" Version 5, user guide and India's Initial National communication).
Justification of the choice of data or description of measurement methods and procedures actually applied :	CO_2 Baseline Database for Indian Power Sector" User guide, Version 5 for further justifications.
Any comment:	-

Data / Parameter:	Biomass surplus availability
Data unit:	%
Description:	Surplus biomass (rice husk) availability in the region
Source of data used:	Based on report from DSCL energy services company ltd in Oct, 2008
Value applied:	47.68
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data is used from third party assessment report.
Any comment:	DSCL Energy Services Company Ltd is **CRISIL-BEE accredited agency** http://www.bee-india.nic.in/schemes/documents/ecbc/accredited_ESCOs.pdf

Data / Parameter:	**SEC_{ff}**
Data unit:	TJ /MWh
Description:	Specific energy consumption of the cogeneration unit when fired with sub-bituminous coal
Source of data used:	Calculated from boiler efficiency with sub-bituminous coal and total steam enthalpy at boiler outlet.
Value applied:	Coal - 0.00424 (fixed *ex-ante*)
Justification of the choice of data or description of measurement methods	The above value is calculated based on the 85% boiler efficiency (**Tool to determine the baseline efficiency of thermal or electric energy generation systems, version 01)** and the enthalpy of is taken from the steam tables for output steam at 66 ata pressure and 490 deg C temp. And feed water at 90 ata

and procedures actually applied :	pressure and 105 deg C temp.
Any comment:	Specific energy consumption of coal is fixed *ex-ante.*

Data / Parameter:	**$SEC_{biomass}$**
Data unit:	TJ /MWh
Description:	Specific energy consumption of boiler when fired with biomass (rice husk)
Source of data used:	Calculated from manufacturer supplied boiler efficiency with rice husk and total steam enthalpy at boiler outlet.
Value applied:	Rice husk - 0.00444 (fixed *ex-ante*)
Justification of the choice of data or description of measurement methods and procedures actually applied :	The above value is calculated based on the boiler efficiency (**supplier specification)** and the enthalpy of is taken from the steam tables for output steam at 66 ata pressure and 490 deg C temp. And feed water at 90 ata pressure and 105 deg C temp.
Any comment:	Specific energy consumption of rice husk is fixed *ex-ante*.

B.6.3 Ex-ante calculation of emission reductions:

>>

Baseline Emission:

The Baseline Emission is calculated with 350 days of 24 hours operation[7] with 85% Capacity Utilization Factor (CUF)[8]. There is 10% auxiliary consumption[9] of generated power in the plant. Therefore, the net electricity generation will be as follows:

$EG_{BL,y}$

= Capacity of the project plant * days of operation per annum*hours of operation per day*

(1-% Auxiliary consumption) *CUF%

=6.5 MWh *350 days/year*24hrs/day*(1-10%)*85%

= 41,769MWh/year

Hence, Baseline Emission is

BE_y

= 41,769MWh/year*0.839tCO_2/MWh

= 35,044 tCO_2e/year

[7] Continuous plant with 15 days annual shut down

[8] Source of data: Based on CUF submitted to Bank

[9] Source of data: EPC offer letter

Project Emission:

As discussed in section B.6.1, the project emission can be calculated based on net calorific value and CO_2 emission factor of the fuel type i, as follows:

$$PE_y = FC_{i,y} * NCV_{i,y} * EF_{CO_2,i,y} \quad \textbf{(5)}$$

Presently GACL has no intention to fire fossil fuel (coal) and neither have the fuel preparation (coal crusher) equipment in place.
So, for emission reduction *ex-ante* estimation,
$PE_y = 0$

Leakage Emission:

As discussed in the section B.6.1, within a distance of maximum 50 km radius around the project site, surplus availability of biomass (rice husk) is is more than 25% as required by the guidance in Attachment C to Appendix B, the leakage associated with competing use of biomass is neglected. Moreover, as the biomass is procured from within 50 km radius of the project site, there is no Leakage Emission as well due to transportation of biomass.
Therefore,

$LE_y = 0$

Therefore Emission Reduction is,

$ER_y = BE_y – PE_y - LE_y$

$= (35{,}044 – 0 – 0)\ tCO_2/year$

$= 35{,}044\ tCO_2/year$

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

Year	Estimation of project activity emissions tCO2e	Estimation of baseline emissions tCO2e	Estimation of leakage tCO2e	Estimation of overall emission reductions tCO2e
01/06/2011-31/05/2012	0	35,044	0	35,044
01/06/2012-31/05/2013	0	35,044	0	35,044
01/06/2013-31/05/2014	0	35,044	0	35,044
01/06/2014-31/05/2015	0	35,044	0	35,044
01/06/2015-31/05/2016	0	35,044	0	35,044
01/06/2016-31/05/2017	0	35,044	0	35,044
01/06/2017-31/05/2018	0	35,044	0	35,044
01/06/2018-	0	35,044	0	35,044

31/05/2019				
01/06/2019-31/05/2020	0	35,044	0	35,044
01/06/2020-31/05/2021	0	35,044	0	35,044
Total (tonnes of CO_2 e)	**0**	**3,50,440**	**0**	**3,50,440**

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

B.7.1 Data and parameters monitored:

Parameter:	**$EG_{gross,y}$**
Unit:	MWh
Description:	Gross electricity generated by the project activity in the year y
Source of data:	Plant log book/DCS record
Value of data	46,410 (Calculated *ex-ante* considering 350 days of operation and 85% CUF)
Brief description of measurement methods and procedures to be applied:	• Measurement Method: Online continuous monitoring using the energy meters installed in the power plant. • Measurement Procedure and frequency: The data will be recorded on an hourly basis by electrical technician. There will be three shifts in a day and the data for the three shifts will then be summarised daily and will be consolidated on monthly basis. • Measuring Equipment: Energy Meter with 0.5 S accuracy installed within the project boundary • Calibration Process: Energy Meter duly calibrated by an independent accredited third party. • Calibration frequency: Once in three years • Responsible Entity: Management of GACL • Archiving Policy: Paper & Electronic.
QA/QC procedures to be applied (if any):	The meter will be calibrated at least once in three year as per paragraph 17(c), annex 35, EB 55 by an independent accredited third party. The meter is under sealed conditions by an authorized agency.
Any comment:	The data will be kept for a minimum of two years after the end of crediting period or the last issuance of CERs whichever occurs later. The data will be maintained in both soft copy and hard copy format.

Parameter:	**$EG_{aux,y}$**
Unit:	MWh
Description:	Auxiliary electricity consumption during the year y
Source of data:	Plant records (Log book)
Value of data	4,641 (Calculated *ex-ante* considering as 10% of gross generation)
Brief description of measurement methods	• Measurement Method: Online continuous monitoring using the energy meters installed in the power plant.

and procedures to be applied:	• Measurement Procedure and frequency: The data will be recorded on an hourly basis by electrical technician. There will be three shifts in a day and the data for the three shifts will then be summarised daily and will be consolidated on monthly basis. • Measuring Equipment: Energy Meter with 0.5 S accuracy installed within the project boundary • Calibration Process: Energy Meter duly calibrated by an independent accredited third party. • Calibration frequency: Once in three years • Responsible Entity: Management of GACL • Archiving Policy: Paper & Electronic.
QA/QC procedures to be applied (if any):	The meter will be calibrated at least once in three year as per paragraph 17 (c), annex 35, EB 55 by an independent accredited third party. The meter is under sealed conditions by an authorized agency.
Any comment:	The data will be kept for a minimum of two years after the end of crediting period or the last issuance of CERs whichever occurs later. The data will be maintained in both soft copy and hard copy format.

Parameter:	**$EG_{BL,y}$**
Unit:	MWh
Description:	The amount of net electricity supplied by the project activity during the year *y*
Source of data:	Plant records
Value of data	41,769 (Calculated as $\mathbf{EG_{gross,y}}$ - $\mathbf{EG_{aux,y}}$)
Brief description of measurement methods and procedures to be applied:	• Measurement Method: Calculated as $\mathbf{EG_{gross,y}}$ - $\mathbf{EG_{aux,y}}$ • Measurement Procedure and frequency: Calculated monthly basis and consolidated annually. • Measuring Equipment: NA • Calibration Process: NA • Calibration frequency: NA • Responsible Entity: Management of GACL • Archiving Policy: Paper & Electronic.
QA/QC procedures to be applied (if any):	Not applicable. Please refer details for $\mathbf{EG_{gross,y}}$ and $\mathbf{EG_{aux,y}}$
Any comment:	The data will be kept for a minimum of two years after the end of crediting period or the last issuance of CERs whichever occurs later. The data will be maintained in both soft copy and hard copy format.

Parameter:	**$FC_{biomass,y}$**
Unit:	Tonne
Description:	Quantity of biomass consumed (on dry basis) in the project activity during the year y
Source of data:	Procurement data as maintained in the plant, data will be monitored on a monthly frequency.

Value of data	62,535 (Calculated considering rice husk as fuel and 350 days of power plant operation at 85% CUF)
Brief description of measurement methods and procedures to be applied:	• Measurement Method: Stock in/stock out method. • Measurement Procedure and frequency: The amount of biomass consumed during the year y will be consolidated from the difference of the opening stock, total biomass procured from weigh bridge records (as when purchased basis) and the balance stock recorded on monthly basis. • Measuring Equipment: In house Weigh Bridge for measuring the procurement quantity with accuracy of ±5kg. • Calibration Process: As per weights and measurement act. • Calibration frequency: Once in a year. • Responsible Entity: Management of GACL • Archiving Policy: Paper & Electronic.
QA/QC procedures to be applied (if any):	Data will be verified by the biomass purchase records and invoices.
Any comment:	The data will be kept for a minimum of two years after the end of crediting period or the last issuance of CERs whichever occurs later. The data will be maintained in both soft copy and hard copy format.

Parameter:	**$FC_{coal,y}$**
Unit:	Tonne
Description:	Quantity of sub-bituminous coal consumed in the project activity during the year y
Source of data:	Procurement data
Value of data	0
Brief description of measurement methods and procedures to be applied:	• Measurement Method: Stock in/stock out method. • Measurement Procedure and frequency: The amount of sub-bituminous coal consumed during the year y will be consolidated from the difference of the opening stock, total coal procured from weigh bridge records (as when purchased basis) and the balance stock recorded on monthly basis. • Measuring Equipment: In house Weigh Bridge for measuring the procurement quantity with accuracy of ±5kg. • Calibration Process: As per weights and measurement act. • Calibration frequency: Once in a year. • Responsible Entity: Management of GACL • Archiving Policy: Paper & Electronic.
QA/QC procedures to be applied (if any):	Data will be verified by the sub-bituminous coal purchase records and invoices.
Any comment:	The data will be kept for a minimum of two years after the end of crediting period or the last issuance of CERs whichever occurs later. The data will be maintained in both soft copy and hard copy format.

Parameter:	**$NCV_{coal,y}$**
Unit:	TJ/tonne

Description:	Net calorific value of sub-bituminous coal consumed in the project activity during the year y
Source of data:	Supplier data or in absence of which National/local or IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories will be considered..
Value of data	Will be measured *ex-post*.
Brief description of measurement methods and procedures to be applied:	Not applicable
QA/QC procedures to be applied (if any):	Values will be verified whether they are within the uncertainty range of the IPCC default values as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories will have ISO17025 accreditation or will comply with similar quality standards in case supplier or local data is being used.
Any comment:	The data will be kept for a minimum of two years after the end of crediting period or the last issuance of CERs whichever occurs later. The data will be maintained in both soft copy and hard copy format.

Parameter:	**$EF_{CO2,coal,y}$**
Unit:	tCO_2/TJ
Description:	Emission factor of sub-bituminous coal consumed in the project activity during the year y
Source of data:	In absence local and supplier data IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories has been considered.
Value of data	100
Brief description of measurement methods and procedures to be applied:	Any future revision of the IPCC Guidelines will be taken into account.
QA/QC procedures to be applied (if any):	As IPCC Guidelines is publicly available third party data, no QA/QC check is required.
Any comment:	The data will be kept for a minimum of two years after the end of crediting period or the last issuance of CERs whichever occurs later. The data will be maintained in both soft copy and hard copy format.

Parameter:	**$NCV_{biomass,y}$**
Unit:	TJ/tonne
Description:	Net calorific value of rice husk (on dry basis) consumed in the project activity during the year y
Source of data:	Annual laboratory test report from NABL accredited laboratory.

Value of data	Will be measured *ex-post*.
Brief description of measurement methods and procedures to be applied:	Annual measurement in laboratories according to relevant national/international standards. NCV will be measured based on dry biomass.
QA/QC procedures to be applied (if any):	Consistency of the measurements will be checked by comparing the measurement results with measurements from previous years. If the measurement results differ significantly from previous measurements or other relevant data sources, additional measurements will be conducted.
Any comment:	The data will be kept for a minimum of two years after the end of crediting period or the last issuance of CERs whichever occurs later. The data will be maintained in both soft copy and hard copy format.

Parameter:	**$M_{biomass,y}$**
Unit:	% water
Description:	Moisture content of the biomass residues in year y.
Source of data:	On site lab test report.
Value of data	Will be measured *ex-post*.
Brief description of measurement methods and procedures to be applied:	• Measurement Method: In house lab test. • Measurement Procedure and frequency: The moisture content of biomass shall be monitored at least on a monthly basis. The weighted average would be calculated for each monitoring period and to be used in the calculations. • Measuring Equipment: In house lab equipment. • Calibration Process: Calibration of the electronic weigh scale (of accuracy ±0.001gm) used for moisture analysis will be done as per national standards. • Calibration frequency: Annually. • Responsible Entity: Management of GACL • Archiving Policy: Paper & Electronic.
QA/QC procedures to be applied (if any):	As a QA/QC procedure, annual sampling will be done by third party accredited lab and highest value will be considered to calculate the dry quantity of biomass.
Any comment:	The data will be kept for a minimum of two years after the end of crediting period or the last issuance of CERs whichever occurs later. The data will be maintained in both soft copy and hard copy format.

B.7.2 Description of the monitoring plan:

The monitoring plan revolves around the monitoring electrical energy generation.The gross electricity generation and auxiliary electricity consumption will be monitored using energy meters installed in the power plant.

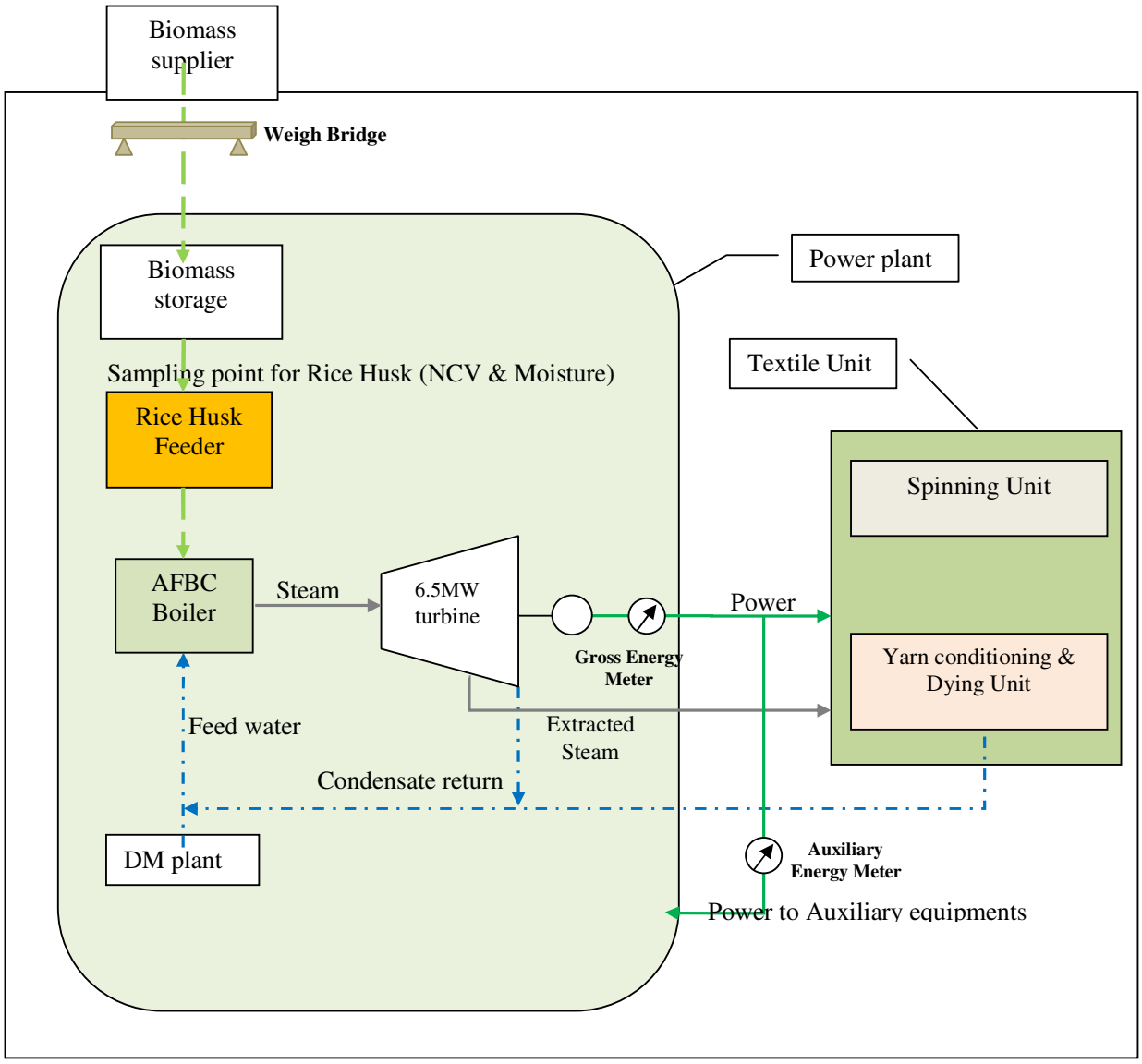
The monitoring will be done on a continuous basis and records (log books) would be maintained on an hourly basis. These records will then be collated at the end of every day by the power plant manager. The biomass and coal (if any) consumed in the project activity will be monitored in stock in stock out basis. Moisture would be measured in-house on monthly

basis and NCV would be tested annually by NABL accredited external lab.

All the energy meters will be calibrated at least once in three year and Weigh Bridge will be calibrated at least once in a year to ensure their proper functioning. In case of any measuring equipment failure same will be replaced as soon as possible to avoid any loss of run data of the project plant.

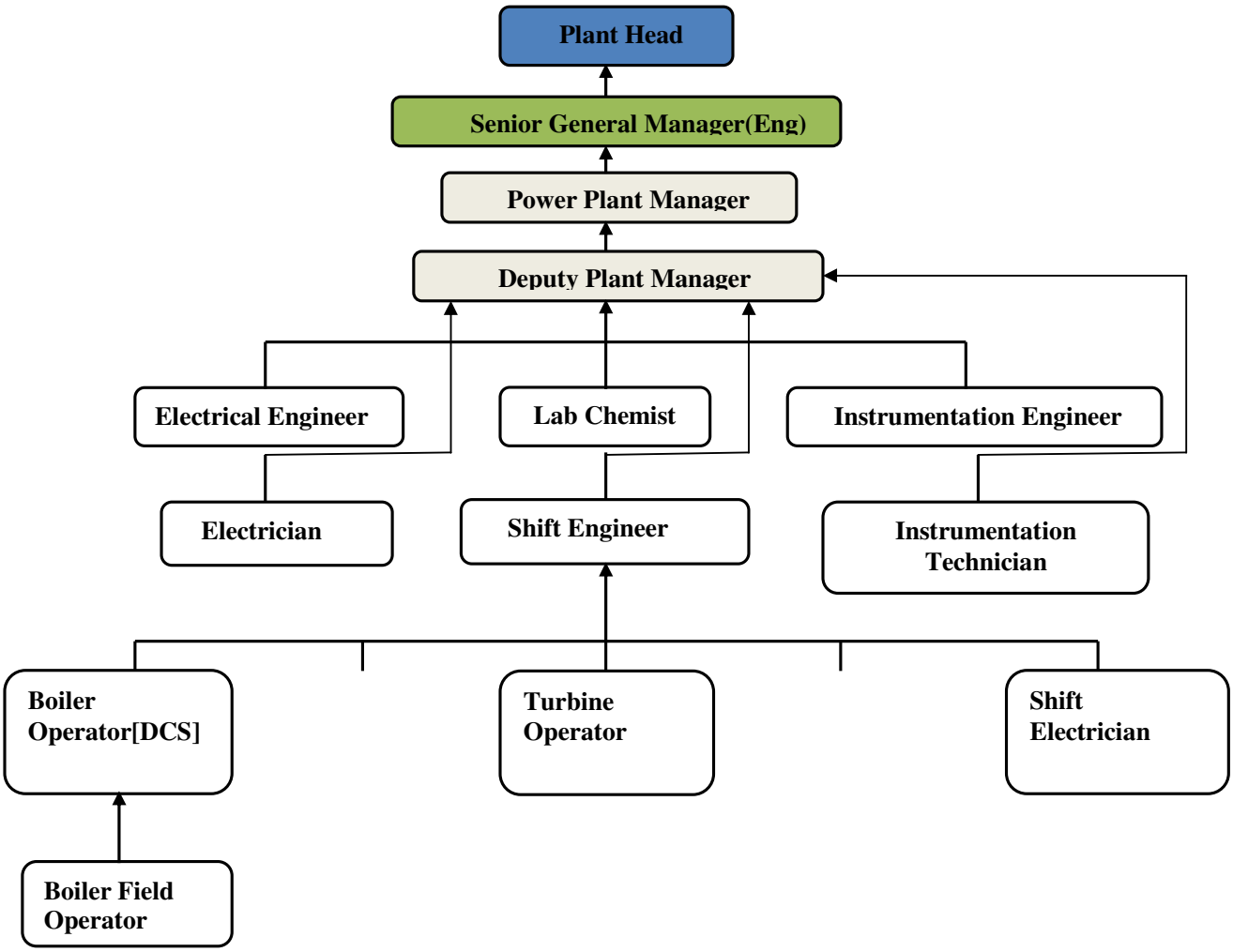
The monitored data will be kept in the plant for a minimum of two years after the end of crediting period or the last issuance of CERs whichever occurs later. The data will be maintained in both soft copy and hard copy format. There will be internal audits to check the consistency of data and to take necessary corrective actions in case any data discrepancy. Training will be provided to the respective responsible persons for proper monitoring and data archiving.

Single Line Diagram showing the monitoring points



	Biomass
	Water/condensate
	Steam
	Power
	Energy Meter

The overall responsibility of the monitoring and reporting of the data will be with the Plant Head. The organisation chart pertaining to the data monitoring for the project activity is given below.



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

>>

Date of completion of the application of the baseline and monitoring methodology: 01/12/2010

Name of person/entity determining the baseline: First Climate (India) Pvt. Ltd.
3C, Camac Street,
Camac Tower, 9th floor,
Kolkata – 700 016, India.

First Climate (India) Private Limited is not a project participant.

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:

>>
The date of the purchase orders of the boiler for the proposed CDM project would be considered as the start date of the project as demonstrated below:

21/06/2006 Signing date for supply of boiler with Thermax

Hence, the start date for the project activity is: 21/06/2006

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

>>
25 years[10]

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

>>
A fixed ten years of crediting period has been chosen.

C.2.1. Renewable crediting period

>>

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

>>
Not applicable.

C.2.1.2. Length of the first crediting period:

>>
Not applicable.

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
01/06/2011 or the effective date of registration whichever is later.

C.2.2.2. Length:

>>
10 years 0 months.

[10] Ref: Page 4 of "Tool to determine the remaining lifetime of equipment" EB 50, Annex 15

SECTION D. Environmental impacts

>>

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

>>

The Central Pollution Control Board requested the project participant to perform an Environmental Impact Assessment, therefore the EIA study has been conducted for the project activity. The reference number is SEIAA/2008/24976. The clearance is obtained on 27th June, 2008 from State Level Environment Impact Assessment Authority, Punjab, India.

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:

>>

The EIA was conducted by M/s EST Consultants (P) Ltd. and environmental impacts are not considered significant. Following are the key areas on which impact of the project activity has been considered:

A. Impact on Air Environment:

The main pollutants discharged into the atmosphere from the thermal power plant shall be SPM, SO_2 and NO_X. Being a cleaner fuel, gaseous emission loads will be extremely low with rice husk. The SO_2 generation from the boiler will be traces and SPM (Suspended Particulate Matter) will remain within the stipulated standards as GACL will use electrostatic precipitators and sufficient stack height. The temperature encountered in the steam generator while burning biomass fuels, are low enough not to produce nitrogen oxides.

B. Impact on Water Environment:

In a thermal power plant, thermal pollution is apprehended from the water discharged from the cooling towers of steam boiler. In the project activity the cooling tower blow down for auxiliary circuit operates in a closed cycle with cooling tower for heat rejection which eliminate the chances of thermal pollution of any surface water body in the surrounding area.

C. Impact on Land Environment:

Arrangements are made for disposing of generated ash in low lying areas as land fill. Water sprinkler will be used for dust suppression.

D. Impact due to noise:

The major stationary sources of noise generation in the plant are steam release valves, compressors and blowers. Proper arrangement has been made so that the ambient noise level remains within the permissible value.

On the basis of the EIA studies and evaluation of impacts on the above areas, it is inferred that the project activity is environmentally safe to implement.

SECTION E. Stakeholders' comments

>>

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

>>

The stakeholders identified for the project activity are as under:

1. Own employees
2. Local Populations
3. Statutory Bodies
4. Equipment suppliers

The comments were invited by conducting a stakeholder consultation meeting in the plant premises. Invitation letters were sent to local gram panchayat (Akbarpur), Local Municipal committee and the Punjab Pollution Control Board on 28/11/2008. The meeting was conducted on 12/12/2008.

E.2. Summary of the comments received:

>>

Following comments were raised during stakeholder consultation meeting:

Comment No.	Raised by	Comment
1.	Local Businessman Mr. Mohan Lal.	As the project activity will be utilizing ground water for boiler operation, local people raised concerns about change in ground water level.
2.	Local Shop worker Mr Hakam Din.	What would happen to the ash generated from the boiler?

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

>>

1 - As the project activity will be utilizing ground water for boiler operation, local people raised concerns about change in ground water level.

Response: It was clarified that bulk of the water will be taken only during the boiler startup and once the boiler is operating, only make up water will be taken from the ground. This therefore minimizes the impact of project on the water level. Further to take care of the problem the company is also implementing rain water harvesting. Furthermore, the company will be utilizing ground water within permission from Central ground water authority. All the participants were fully satisfied with the response and commended the company on their initiative to harvest rain water.

2-What would happen to the ash generated from the boiler?

Response: It was clarified that the ash generated from the boiler will be land filled in a specific site owned by the company near the project site. Therefore there would not be any impact due to ash generation to the local surrounding.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Gillanders Arbuthnot & Co. Ltd.
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FAX:	
E-Mail:	textile@gillandersarbuthnot.com
URL:	www.gillandersarbuthnot.com
Represented by:	
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Salutation:	Mr
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Middle Name:	
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Represented by:	
Title:	President Textile
Salutation:	Mr
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funds are utilised in the project activity.

Annex 3

BASELINE INFORMATION

Please refer to section B.6.1.

Annex 4

MONITORING INFORMATION

Please refer to section B.7.1 and B.7.2

Annex 5

Revision History of PDD.

Version number	Date of revision	Reason for revision/ edits
1	31st August, 2009	Initial draft version for review
2	24th September, 2009	Revised after discussion with PP
3	15th December, 2009	Revised due to revision in methodology
4	02nd March, 2011	Revised according to the DVR
5	29th April, 2011	Revised according to the TR comment

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