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	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• 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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Biomass based power project by Shri Shyam Warehousing and Power Pvt. Ltd.
Version 08.1
04/12/2012

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

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The proposed CDM project activity is undertaken by Shri Shyam Warehousing and Power Pvt. Ltd. (SWPPL) and is a 10 MW biomass based power plant located in Banari, state of Chhattisgarh, India. The project activity will generate electricity by burning renewable fuel, rice husk and mixing it with coal fines at 85%:15% mix. The generated electricity will export to the NEWNE grid through sale to the Chhattisgarh State Electricity Board (CSEB). The purpose of the project activity is to generate electricity through the combustion of renewable biomass.

In India, the existing installed grid electricity generation capacity is predominately coal-based and therefore, electricity generation is a major source of carbon dioxide emissions[1]. In order to meet the increasing demand of electricity, the capacity addition of power nowadays includes mainly large coal based power plants. The generation of power from biomass residues will contribute to reducing greenhouse gas (GHG) emissions in the current energy mix. As the project utilises rice husk as the source of fuel for the generation of electricity it will qualify as a renewable source of electricity.

The existing set up at the project site includes two boilers of capacities 3tph and 4tph which generate steam for rice mill. The project activity will replace the existing these two boilers. These two existing boilers use rick husk as fuel to supply steam to rice mill process. After implementation of proposed project activity these two boilers will be stopped as steam requirement of rice mills will be met by proposed project activity

The project activity comprises the installation of a high pressure boiler of 50 tonnes per hour capacity (68 kg/cm^2, 490±5 °C) and an extraction bleed cum condensing type steam turbine generator set of 10 MW capacity. The project activity will also involve the installation of ancillary equipments to generate electricity for the grid from a renewable energy source (rice husk). The project activity will involve the collection of rice husk within a 75 km radius of the plant. The project activity is expected to generate 10 MW of electrical power at 11 kV and supply to the Chhattisgarh State Electricity Board (part of the NEW NE regional grid) at 33 kV through the local substation. The necessary transmission lines from the power plant to the substation would be laid by the project activity.

The project contributes towards regional sustainable development in the following ways:

- Economic development by increased electricity generation
- Rural and infrastructural development
- Creates general awareness of the benefits of clean energy in the society/community

[1] Source: Central Electricity Authority (CEA), www.cea.nic.in

- Generation of clean electricity by the utilization of surplus biomass

The project activity will also contribute to an increase in the local employment by employing skilled and unskilled personnel for construction, operation and maintenance of the project activity. The generation of renewable electricity will also reduce the dependence on existing and planned fossil fuel based generation.

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- Economic development by increased electricity generation
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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)	If Party wishes to be considered as a project participant
India (host)	**Private entity:** Shri Shyam Warehousing and Power Pvt. Ltd.	No
United Kingdom of Great Britain and Northern Ireland	**Private entity:** Agrinergy Pte Ltd	No

The contact details are mentioned in Annex I.

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.:

>>
Chhattisgarh

A.4.1.3. City/Town/Community etc:

>>
Village Banari, District Janjgir

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

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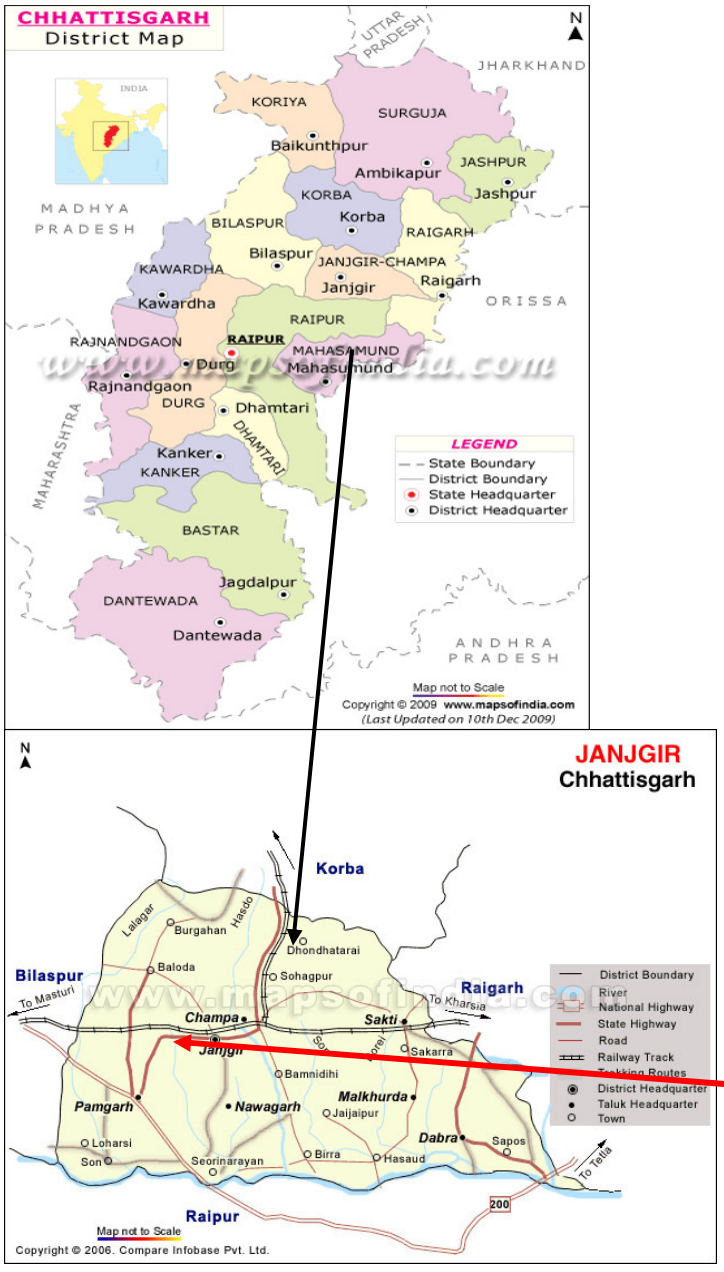
The project activity is located in Village Banari, District Janjgir in Chhattisgarh. The grid co-ordinates of the project site are:

Latitude	21^0 59' 51.83" N
Longitude	82^0 31'04.59"E

The following map shows the exact location of the project activity.



Project Activity

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

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Sectoral scope 1 - Energy industries (renewable/non-renewable sources)
Type I - Renewable Energy Projects
Category C – Thermal energy production with or without electricity

The project produces renewable energy from the combustion of a renewable biomass. The technology employed is a biomass fired plant which consists mainly of a boiler and turbine generator. The technology to be employed is domestically available in India and the main equipments i.e. boiler and turbine are supplied by well-known Indian manufacturers. All equipments are designed as per industry guidelines, meet the environmental and safety guidelines and comply with the criteria laid down by the state Pollution Control Board ensuring that the project activity will install environmentally safe technology. The project will generate electricity using a 50 TPH (tonnes per hour) AFBC boiler and a 10000 kW capacity extraction bleed cum condensing type steam turbo-generator. The technical parameters of boiler and turbo-generator are given below:

Travelling grate boiler		Turbo-generator	
MCR (Maximum Continuous Rating)	50 TPH	Steam parameters at turbine inlet	65 kg/cm^2(A), 485°C
Steam outlet parameters	68 kg/cm^2(A), 490±5°C	Generator rating	10 MW, 50Hz, 11 kV

The steam generated from the boiler will drive a steam turbine at the rated pressure and temperature coupled to an electric generator. The steam for the process steam requirements is trapped off from an intermediate stage and is directly fed to the process steam header. The power generated will be evacuated to CSEB, substation. As proposed project activity is cogeneration activity, some quantity of steam generated from project activity will also meet the steam requirement of existing rice mills located in the project premises.

The steam generated from the boiler is 47.06tph, out of which 0.1tph and 0.25tph will go in sealing process and ejector process respectively whereas 46.71tph will go to turbine. From turbine 12tph steam will be consumed in the process, 29.03tph will go for condenser and 6.66tph will be consumed in the deaerator.

The power generated from the project activity will be exported to the CSEB grid at Banari 220kV/33kV sub-station at 33kV through an independent single circuit 33kV overhead line from the proposed project activity. The sub-station is located at a distance of 200m from the project activity.

There is no transfer of technology to the host country since the technology is available in, and supplied from India.

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

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A 10-year fixed crediting period has been chosen.

Year	Estimation of annual emission reductions in tonnes of CO_2e
2012-13[2]	33,948
2013-14	33,948
2014-15	33,948
2015-16	33,948
2016-17	33,948
2017-18	33,948
2018-19	33,948
2019-20	33,948
2020-21	33,948
2021-22	33,948
Total estimated reductions (tonnes of CO_2e)	**339,480**
Total number of crediting years	10
Annual average of the estimated reductions over the crediting period (tCO_2e)	**33,948**

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

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There is no public funding involved in the project activity.

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

Appendix C, paragraph 2 of the Simplified Modalities and Procedures for Small-Scale CDM project activities states:

> "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:
>
> - With the same project participants;
> - In the same project category and technology/measure; and
> - Registered within the previous 2 years; and
> - Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point."

[2] The crediting period shall start from date mentioned under Section C.2.2.1

As there is currently no registered CDM project or an application to register another project activity at the site either large scale or small scale by the same project participants, the project satisfies the criteria on de-bundling.

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:

>>
Type I – Renewable Energy Projects
I.C – Thermal energy production with or without electricity
Version 19, valid from 17th June 2011

Methodology also refers to following tool:
Tool to calculate emission factor for an electricity system, Version. 2.2.1
Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion, Version 2.0
Tool to calculate baseline, project and/or leakage emissions from electricity consumption, Version 01

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

>>
The project activity involves the generation of electricity from the combustion of rice husk, a renewable biomass and the electricity is supplied to the grid.

The methodology states the eligibility criteria for choice of project activity as follows:

Applicability conditions	Project activity justification
This methodology 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.	The project activity involves the installation of a renewable biomass based cogeneration system that displaces fossil fuel use.
Biomass-based cogeneration systems are included in this category. For the purpose of this methodology "cogeneration" shall mean the simultaneous generation of thermal energy and electrical energy in one process. Project activities that produce heat and power in separate element processes (for example, heat from a boiler and electricity from a biogas engine) do not fit under the definition of cogeneration project.	The project activity is a biomass based cogeneration plant producing both heat and electricity.
Emission reductions from a biomass cogeneration system can accrue from one of the following activities: *(a) Electricity supply to a grid;* *(b) Electricity and/or thermal energy (steam or*	The project is a biomass based co-generating system that supplies electricity (i) to the grid, (ii) thermal energy to the existing facilities. The project activity claims for emission reductions only from the supply of electricity to the grid. Thus

Applicability conditions	Project activity justification
heat) production for on-site consumption or for consumption by other facilities; *(c) Combination of (a) and (b).*	satisfies this criterion.
The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW thermal (see paragraph 6 for the applicable limits for cogeneration project activities).	The project activity is a cogeneration system and it solely claims for emission reductions from electrical energy production. The total installed capacity is 10MW which is below the small scale specified limit of 15MW.
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 (see paragraph 6 for the applicable limits for cogeneration project activities).	The project activity is a co-fired system uses both fossil and renewable fuel in the production of electricity with the total thermal installed capacity of 39.5MW_{th} which is less than the 45MW_{th}. Hence, satisfies this criterion[3].
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. For the purpose of calculating this capacity limit the conversion factor of 1:3 shall be used for converting electrical energy to thermal energy (i.e. for renewable energy project activities, the maximal limit of 15 MW(e) is equivalent to 45 MW thermal output of the equipment or the plant);* *(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 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*	The project activity fulfils the condition specified in the paragraph 6(c) because it solely claims for emission reductions from the electrical energy production. The total installed capacity is 10MW which is below the small scale specified limit of 15MW.

[3] MWth calculation provided in financial spread sheet.

Applicability conditions	Project activity justification
shall not exceed 15 MW.	
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.	The project activity involves the installation of 10MW biomass cogeneration system at the adjacent rice mill. It is physically distinct from the existing units as a new set of equipments have been installed as part of the project activity which are not connected to the existing equipments.
Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category.	The project activity is a new power plant and does not involve retrofit or modification of an existing facility.
New Facilities (Greenfield projects) and project activities involving capacity additions compared to the baseline scenario are only eligible if they comply with the related and relevant requirements in the "General Guidelines to SSC CDM methodologies".	The proposed project activity is a Greenfield renewable energy project and meets all the related and relevant requirements of the "General Guidelines to SSC CDM methodologies".
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.	The project activity is not using biomass fuel in briquette form.
Where the project participant is not the producer of the processed solid biomass fuel, the project participant and the producer are bound by a contract that shall enable the project participant to monitor the source of the renewable biomass to account for any emissions associated with solid biomass fuel production. Such a contract shall also ensure that there is no double-counting of emission reductions.	The project activity does not involve use of solid biomass fuel such as briquette and hence this criterion is not applicable.
If electricity and/or steam/heat produced by the project activity is delivered to a third party i.e. 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 that ensures there is no double-counting of emission reductions.	The steam produced is used for captive consumption by the adjacent rice mill and not delivered to another facility or facilities within the project boundary.
If the project activity recovers and utilizes biogas for power/heat production and applies this methodology on a stand alone basis i.e. without using a Type III component of a SSC methodology,	The project activity does not recover and utilize the biogas for power heat production and hence this criterion is not applicable to the project activity.

Applicability conditions	Project activity justification
any incremental emissions occurring due to the implementation of the project activity (e.g. physical leakage of the anaerobic digester, emissions due to inefficiency of the flaring), shall be taken into account either as project or leakage emissions.	
Charcoal based biomass energy generation project activities are eligible to apply the methodology only if the charcoal is produced from renewable biomass sources 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 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.*	The project activity is not charcoal based biomass energy generation and hence this condition is not applicable.

As the project activity capacity is 10 MW and the equipments are sized accordingly, the project activity will not exceed 15 MW without major investment in new plant machinery over the crediting period.

From the above it is concluded that the project activity meets all the applicability conditions of the small scale methodology AMS I.C.

B.3. Description of the project boundary:

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According to the paragraph 15 of the methodology AMS I.C – The spatial extent of the project boundary encompasses:

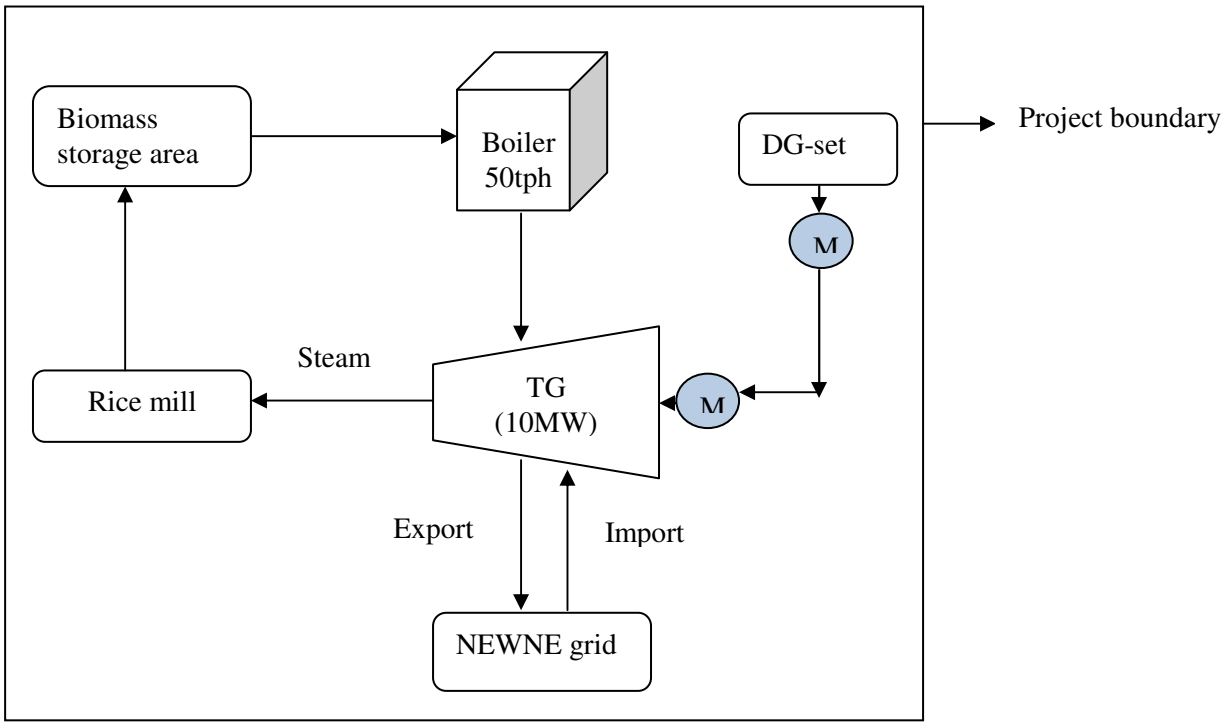
a) All plants generating power and/or heat located at the project site, whether fired with biomass, fossil fuels or a combination of both;
b) All power plants connected physically to the electricity system (grid) that the project plant is connected to;
c) Industrial, commercial or residential facility, or facilities, consuming energy generated by the system and the processes or equipment affected by the project activity;
d) The processing plant of biomass residues, for project activities using solid biomass fuel (e,g. Briquette), unless all associated emissions are accounted for as leakage emissions;

e) The transportation itineraries, if the biomass is transported over distances greater than 200 kilometres, unless all associated emissions are accounted for as leakage emissions;
f) The site of the anaerobic digester in the case of project activity that recovers and utilizes biogas for power/heat production and applies this methodology on a stand alone basis i.e. without using a Type III component of a SSC methodology.

Hence, the project boundary of the proposed activity includes the following:

- Adjacent rice mill
- Biomass storage area
- Steam and power generating equipments i.e. boiler and turbine
- NEWNE regional grid

The project boundary has been clearly defined below:



For the purpose of the project activity the relevant grid is defined by the power generating units serving the same grid as the project activity .In line with the tool to calculate the grid emission factor, which states that "*If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used*", we have considered the regional grid that is delineated by the Central Electricity Authority of India.

In the case of India there are regional grids which facilitate the transfer of electricity between states and which are supplied by central sector power stations operating in the region. The Indian power system is divided into two grids for the purposes of calculating the grid emission factor, namely the new integrated Northern, Eastern, Western, and North-Eastern regional grids (NEWNE) and the Southern grid. Rajasthan is part of the Northern Region (along with Delhi, Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Uttar Pradesh and Uttarakhand) as per the grid definitions outlined by the CEA and we have therefore utilized the analysis of the NEW NE grid undertaken by the CEA in order to determine our baseline emission factor for electricity generation. This provides a complete analysis of the power plants that the project will affect.

Since there is no transfer of equipment to/from the project activity there is no requirement to measure leakage associated with equipment transfer.

With reference to the general guidance on leakage in biomass project activities, we have considered the possibility of leakage in the case of the project activity as it utilizes biomass residues (rice husk) from external sources. Leakage may occur because of the diversion of biomass from other activities outside the boundary thus increasing the fossil fuel combustion outside the boundary. Considering that the

biomass requirement for the project is small and that there is abundant biomass, no such leakage is anticipated. As per Attachment C to Appendix B, the project participants will evaluate *ex-ante* if there is a surplus of the biomass in the region of the project activity in order to ensure that there is no leakage due to competing uses for biomass. The biomass surplus assessment survey has been carried out at the start of the crediting period.

In order to estimate emissions from the project activity, the measurement of transport emissions from external biomass have been incorporated as per the guidance on leakage in small scale biomass project activities. The biomass that is stored is used up almost immediately and under no circumstances will the storage of the biomass extend to one year. Project emissions from the decomposition of biomass, stored for significant periods of time, can therefore be ruled out.

B.4. Description of baseline and its development:

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In accordance with AMS I.C, the following can be plausible scenarios for the proposed project activity:

Baseline scenario	**Explanation for the applicability of scenario to project activity**
Electricity is imported from a grid and thermal energy (steam/heat) is produced using fossil fuel;	Not applicable, fossil fuel was not used for generating steam/heat in the past.
Electricity is produced in an on-site captive power plant using fossil (with a possibility of export to the grid) and thermal energy (steam/heat) is produced using fossil fuel;	Not applicable, electricity and thermal energy were not produced using fossil fuel in the past.
A combination of (a) and (b);	Not applicable
Electricity and thermal energy(steam/heat) are produced in a cogeneration unit using fossil fuel (with a possibility of export of electricity to a grid/other facilities and/or thermal energy to other facilities);	Not applicable, electricity and thermal energy were not produced using fossil fuel in the past.
Electricity is imported from a grid and/or produced in an on-site captive power plant using fossil fuels (with a possibility of export to the grid); steam/heat is produced from biomass;	**Applicable**, Electricity was imported from the grid and thermal energy was produced from rice husk.
Electricity is produced in an on-site captive power plant using biomass (with a possibility of export to a grid) and/or imported from a grid; steam/heat is produced using fossil fuel;	Not applicable, electricity was not exported to the grid historically and steam/heat was not produced using fossil fuel.
Electricity and thermal energy (steam/heat) are produced in a biomass fired cogeneration unit (without a possibility of export of electricity either to a grid or to other facilities and without a possibility of export of	Not applicable, thermal and electrical energy were not produced in a biomass fired cogeneration unit.

Baseline scenario	Explanation for the applicability of scenario to project activity
thermal energy to other facilities). This scenario applies to a project activity that installs a new grid connected biomass cogeneration system that produces surplus electricity and this surplus electricity is exported to a grid. The baseline scenario is that the electricity would otherwise have been generated by the operation of grid-connected power plants and by the addition of new generation sources to the grid;	
Electricity and/or thermal energy produced in a co-fired system	Not Applicable as there was no co-fired system on the plant site.
Electricity is imported from a grid and/or produced in a biomass fired cogeneration unit (without a possibility of export of electricity either to the grid or to other facilities); steam/heat is produced in a biomass fired cogeneration unit and/or a biomass fired boiler (without a possibility of export of thermal energy to other facilities). This scenario applies to a project activity that installs a new biomass cogeneration system that displaces electricity which otherwise would have been imported from a grid.	The proposed project activity is new biomass cogeneration system and electricity generated will be exported to grid. Although there is import of electricity from grid in baseline scenario, the electricity imported from the grid is more than captive electricity generated using biomass. Hence, this criterion is not applicable

Hence amongst the above mentioned baseline scenarios of the applied methodology AMS I.C, the applicable baseline scenario for the project activity is the paragraph 19(e) i.e. "*Electricity is imported from the grid and/or produced in an on-site captive power plant using fossil fuels (with a possibility of export to the grid); steam/heat is produced from biomass"*

Baseline emissions are determined according to paragraph 21 of the methodology that state:

"Baseline emissions for supply of electricity to and/or displacement of electricity from a grid shall be calculated as per the procedures detailed in AMS-I.D or AMS I.F as applicable."

As per paragraph 10 of the methodology AMS I.D, the project activity is the installation of a new grid connected renewable power plant. Therefore the baseline scenario is the electricity delivered to the grid by the project activity. Therefore the grid has been taken as the baseline mentioned in paragraph 10 of the methodology for the project activity and the baseline emissions are *the product of electrical energy baseline $EG_{BL,y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor.*

$$BE_y = EG_{BL,y} * EF_{CO_2,grid,y}$$

Where:

BE_y	Baseline Emissions in year y (tCO_2)
$EG_{BL,y}$	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)
$EF_{CO2,grid,y}$	CO_2 emission factor of the grid in year y (tCO_2/MWh)

The emission factor has been calculated as mentioned in paragraph 12 (a) of the methodology in a transparent and conservative manner as the 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'.

As per the "Tool to calculate the emission factor for an electricity system",

The combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$$

Where:

$EF_{grid,BM,y} = EF_{CO2,grid,y}$	Build margin CO_2 emission factor for the year y (tCO_2/MWh)
$EF_{grid,OM,y}$	Operating margin CO_2 emission factor for the year y (tCO_2/MWh)
w_{OM}	Weighting of operating margin emission factors (%)
w_{BM}	Weighting of build margin emission factors (%)

Simple Operating Margin (tCO_2/MWh)			
	2006-07	2007-08	2008-09
NEW NE	1.0084	0.9999	1.0065

Build Margin (tCO_2/MWh)	
NEW NE	0.6751

The tool specifies that for biomass power generation project activities: w_{OM} = 0.5 and w_{BM} =0.5.

Combined Margin (tCO_2/MWh)			
	OM	BM	**CM**
NEW NE	1.0049x0.50	0.6751x0.50	**0.8400**

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:

In line with attachment A to appendix B of the simplified M&P for small scale CDM project activities, demonstration of additionality focuses on the barriers facing the project. As a part of additionality, an investment analysis has been performed to demonstrate that the project activity faces an investment barrier. In showing that the project is additional we demonstrate that it is not a part of the baseline scenario, which in the case of the project activity is the generation of electricity in fossil fuel based grid

power plants. The project activity has to overcome significant investment barriers for its successful implementation.

National Policies:

As per the Electricity Act 2003, any entity may install power plant on its own. Also, the central government and various state governments have come with renewable energy policies to promote renewable energy technologies.

Privatised companies that were previously state run electricity boards, primarily manage electricity generation in India. The Electricity Act, 2003 is now the main driver of reform in the electricity sector. The Electricity Act, 2003 consolidated the laws relating to the generation, transmission, distribution and trading of electricity and generally sought to put in place measures to promote the development and supply of electricity across India.

Section 3 of the electricity act also empowered the respective State Electricity Commissions to specify the terms and conditions for the determination of tariffs in their respective states. Hence, various states issued respective tariff orders for projects in respective states. All the tariff orders were in force during the conceptualization of the project

There are neither any national & sectoral policies nor any circumstances that influence the decision or impose obligation to the project proponent on implementation of the project activity.

Below benefits available to biomass based co-generation projects has been considered in investment analysis, which leads to conservative IRR:

1. Tax holiday for 10 consecutive years among the first 15 years as per Income-tax Act, 1961
2. Accelerated depreciation benefit of 80% which can be availed by renewable energy projects as per Income Tax Act 1961
3. Power generated through non-conventional energy sources is purchased by CSEB at specified rate in the tariff order issued by the regulatory commission.

Benchmark

The project has been financed with a mix of debt and equity. The benchmark for comparison with the project IRR is selected as the typical Weighted Average Cost of Capital (WACC) for a firm in the power generation industry in India. This is calculated as the weighted average of cost of equity and cost of debt. The WACC has been calculated using the CAPM approach.

A typical power industry WACC represents an estimate of the required return on capital and cost of financing for comparable projects. The following parameters have been taken into account while calculating the WACC:

$$WACC = w_d c_d + w_e c_e$$

Where,

w_d	weight of debt
c_d	cost of debt
w_e	weight of equity

c_e cost of equity

Cost of Debt

The cost of debt is defined as the rate at which lenders agree to lend money to a project. Accordingly, the bank prime lending rate (PLR) i.e. 11.50% prevailing at as provided by the Reserve Bank of India website[4] at the time of the investment decision of the project activity has been taken as the cost of debt.

$$c_d = PLR \times (1 - tax\ rate)$$

The tax rate used is the applicable MAT rate of 11.33% for the assessment year 2009-10.

Cost of Equity

The cost of Equity is calculated using CAPM i.e. Capital Asset Pricing Model using the data from BSE 500. The model states that

$$c_e = R_f + \beta \times (R_m - R_f)$$

Where,

(R_m – R_f) is termed as **Market Risk Premium.**

The value calculated is 11.66%.

R_f = Risk Free Return

The value of risk free rate of return is 7.60%[5] which has been taken from Indian Government bond rates for more than 10 years, at the time of the investment decision of the project activity.

R_m = Market returns

Rm is calculated using compounded annual return (CAGR) of the BSE-500 Index as it represents a diversified index in the Indian Equity Markets. The value of R_m calculated for a period of 10.58 years (since inception of BSE-500 index to the time of investment decision date) is 19.26%.

BETA β

Beta measures the risk that cannot be eliminated in a systematic, well balanced and diversified portfolio. Equity beta is calculated as the covariance between its return and the return of a well-diversified market portfolio, divided by a variance of the return of a well-diversified market portfolio.

$$Beta(\beta) = \frac{\mathrm{cov}\, ar(r, r_m)}{\mathrm{var}(r_m)}$$

Where,

r is the return from the equity investment in a single stock

r_m is the return from the equity investment in the well diversified market portfolio

[4] http://rbidocs.rbi.org.in/rdocs/Wss/PDFs/4Tab_091009.pdf

[5] http://rbidocs.rbi.org.in/rdocs/Wss/PDFs/22T_021009.pdf

The value of β also depends on the Capital Mix (D/E ratio) of the firm. A common practise to compare equity β among various firms with different capital structures is to adjust the equity β to asset β (β if the asset was wholly funded by equity).

$$Asset\ Beta = \frac{levered\ \beta}{\left(1+(1-Tax)\left(\frac{D}{E}\right)\right)}$$

Beta values of power generating companies in India have been considered for the purposes of its determination. The beta value is calculated as 1.03. The indicator for the benchmark is chosen as the Weighted Average Cost of Capital (WACC). The expected cost of equity for the power generating industry in India has been calculated using the CAPM approach. The weighted average cost of capital for the project activity is 13.02%.

Investment analysis

An investment analysis has been undertaken to calculate the returns from the project activity. In line with the requirements, the analysis has been undertaken over a period of 20 years. The revenues include the sale of electricity from the unit using the power purchase agreement price as per the policy of government of Chhattisgarh. Apart from the fuel costs, the operating costs include the costs to be incurred through the operation and maintenance and employee salary. These costs and revenues have been detailed in the spreadsheet provided to the DOE. The investment decision to go ahead with the project activity was taken during the board meeting on 10/10/2009 based on the detailed project report dated October 2008. Both the documents have been provided to the DOE.

The basic assumptions in performing the financial analysis are outlined in the table below.

S. No.	Parameter	Unit	Value	Reference
1	Project installed capacity	MW	10	Detailed Project Report
2	Availability	Days	330	Detailed Project Report
3	Hours	Hrs	24	Detailed Project Report
4	Plant Load Factor (PLF)	%	90%	Detailed Project Report
5	Auxiliary consumption	%	10%	Detailed Project Report
6	Investment cost	INR 1000	5,19,617	Detailed Project Report
7	Term loan interest rate (Bank loan)	%	12%	Detailed Project Report
8	Term loan repayment	Years	9	Detailed Project Report
9	Moratorium period	Years	1	Detailed Project Report
10	O & M cost	%	2.5% of project cost	Detailed Project Report
11	Escalation	%	5%	Detailed Project Report
12	Salaries	INR 1000	6,000	Detailed Project Report
13	Biomass purchase cost	INR	1,200	Detailed Project Report
14	Coal fines purchase cost	INR	1,300	Detailed Project Report
15	Escalation in fuel	%	5%	Detailed Project Report
16	Company tax rate	%	33.99%	Host country rates (Financial

S. No.	Parameter	Unit	Value	Reference
				year 2009-10)
17	MAT rate	%	11.33%[6] %	Host country rates (Financial year 2009-10)
18	Tariff rate	Rs/kWh	3.18	CSERC tariff order

Based on the above assumptions the project IRR is calculated as 11.08% without the CDM revenues. Considering the CDM revenues for the CERs generated by the project activity at a rate of €10 per CER, the project IRR increases to 16.39%.

All the workings and assumptions are in line with the recognized standards and will be made available to the DOE during validation.

Sensitivity analysis

The sensitivity analysis has been done in accordance with EB 62, Annex 5 '*Guidance on the Assessment of Investment Analysis'* paragraph 20 and 21. The following factors are expected to have a significant impact on the financial internal rate of return of the project and hence sensitivity analysis has been conducted for these:

1. Plant Load Factor
2. Electricity Tariff
3. Investment Costs
4. Fuel Costs

An increase or decrease in Plant Load Factor (PLF) of the project activity will have an impact on the power available for export to the grid thereby affecting the revenues of the project. The PLF has been varied by ±10% to determine its effect on the project IRR.

Plant Load Factor	10%	Base	-10%
IRR without CDM	15.43%	11.08%	6.14%

If PLF increased by 10%, IRR crossing the benchmark but it is also an unrealistic scenario as PP has already considered higher PLF i.e 90% which is also conservative as per standard industry norms. To run boiler at 100% PLF is highly unlikely scenario.

The electricity tariff rate has been varied by ±10% to determine its effect on the project IRR.

Electricity tariff	10%	Base	-10%
IRR without CDM	15.61%	11.08%	0.00%

Based on the above result, if tariff increased by 10% then IRR crossing the benchmark, but the rate of tariff considered based on CSERC Tariff order dated 15th January 2008 which was available at the time of investment decision and also mentioned in DPR which was the basis for investment decision. The year-over-year growth rate for the first 10 years (CAGR) is 0.93%. The same escalation has been given

[6] http://www.incometaxindiapr.gov.in/incometaxindiacr/contents/taxrates/taxrates_2009_10_cos.htm

to the tariff from year 11 to year 20 for conservative calculation of the IRR. The PPA has signed on 31/12/2007 before the board decision in which the tariff rate is valid for 10 years time period

Furthermore, PP has considered the impact of the tariff order for biomass project activity as issued by Central Electricity Regulatory Commission (CERC) dated 9th November 2010. The CERC order mentioned the tariff rate as 4.41Rs/kWh for biomass project. The same annual escalation of 0.93% has been considered for the calculation of IRR. The effect of the new tariff order values on the IRR of the project has been shown in the IRR spreadsheet and it is seen that the IRR reduces 10.96%.

The investment cost is unlikely to decrease but the parameter has been given a variation of ±10% as per the investment guidance.

Investment cost	10%	Base	-10%
IRR without CDM	9.16%	11.08%	13.35%

The project has already commissioned and the cost incurred on the project is INR 524.298 million. Therefore the question of the cost coming down is unrealistic.

The fuel cost has been varied by ±10% to determine its effect on the project IRR.

Fuel cost	10%	Base	-10%
IRR without CDM	8.06%	11.08%	13.79%

A negative variation in biomass price is not a possible scenario as there is a continuous trend of increase in biomass price.

The O & M cost has been varied by +10% to determine its effect on the project IRR.

O & M cost	10%	Base	-10%
IRR without CDM	10.72%	11.08%	11.43%

Thus all the necessary parameters have been subjected to sensitivity analysis and it has been shown that the project remains additional, thus it can be concluded that CDM revenues are essential for the successful implementation of the project.

In the absence of project activity, Shri Shyam Warehousing and Power Pvt. Ltd. will continue its existing two (2) units of rice husk fired boilers and purchase electricity from the grid. These practices do not present any particular obstacle as these have been used effectively in the past with good result, and the continued operation of existing facilities and actual practices presents no real barriers.

CDM consideration

In line with Annex 13, EB62 since the start date of the project activity is after 2nd August 2008, the project proponents have notified the Designated National Authority (DNA) of India and the UNFCCC within 6 months of the start date about their intention to seek CDM status. The email and letters have been provided to the DOE during the site visit.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y	Emission reductions in year y (tCO_2e)
BE_y	Baseline emissions in year y (tCO_2e)
PE_y	Project emissions in year y (tCO_2)
LE_y	Leakage emissions in year y (tCO_2)

The methodology AMS I.C is applicable to the proposed project activity, as it is applicable to measure the GHG emissions from electricity imported from the grid.

The proposed project activity involves displacement of electricity from, and supply of electricity to the grid with a cogeneration plant that uses rice husk to produce steam and electricity.

Since steam/heat is also produced from renewable biomass in the baseline, and since the baseline heat generation includes biomass, no emission reduction has been accounted for heat generation. Therefore, emission reductions from the displacement of heat/steam are not being claimed.

As mentioned in paragraph 11 of the methodology AMS I.D, version 17 the baseline for the project activity is the grid and *the baseline emissions are the product of electrical energy baseline* $EG_{BL,y}$ *expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor*.

Baseline Emissions

$$BE_y = EG_{BL,y} * EF_{CO_2,grid,y}$$

Where:

BE_y	Baseline Emissions in year y (tCO_2)
$EG_{BL,y}$	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)
$EF_{CO2,grid,y}$	CO_2 emission factor of the grid in year y (tCO_2/MWh)

$$EG_{BL,y} = EG_{Export,y} - EG_{Import,y}$$

Where:

$EG_{Export, y}$	Quantity of net electricity exported to the grid in year y (MWh)
$EG_{Import, y}$	Quantity of electricity imported from the grid in year y (MWh)

$EF_{CO2,grid,y}$ is calculated using the data from the "CO_2 Baseline Database for the Indian Power Sector – User Guide", Version 5, which is the official source of the Ministry of Power, Government of India.

As per the "Tool to calculate the emission factor for an electricity system, version 02", the combined margin emission factor is calculated as per the following steps:

Step 1: Identify the relevant electricity systems
Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)
Step 3: Select a method to determine the Operating Margin (OM)
Step 4: Calculate the operating margin emission factor according to the selected method
Step 5: Identify the group of power units to be included in the build margin (BM)
Step 6: Calculate the build margin emission factor
Step 7: Calculate the combine margin (CM) emissions factor

The following section details the steps mentioned above in order to calculate the combined margin emission factor:

Step 1: Identify the relevant electricity systems

The tool requires that for the purpose of determining the electricity emission factor, a project electricity system is defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity and that can be transmitted without significant transmission constraints.

It has also been mentioned that in the case of India the Government of India has published a delineation of the project electricity system and connected electricity systems, the delineations provided are therefore used as shown in the following table:

NEW NE grid				**Southern grid**
Northern	Eastern	Western	North-Eastern	Southern
Chandigarh Delhi Haryana Himachal Pradesh Jammu & Kashmir Punjab Rajasthan Uttar Pradesh Uttarakhand	Bihar Jharkhand Orissa West Bengal Sikkim Andaman & Nicobar	**Chhattisgarh** Gujarat Daman & Diu Dadar & Nagar Haveli Madhya Pradesh Maharashtra Goa	Arunachal Pradesh Assam Manipur Meghalaya Mizoram Nagaland Tripura	Andhra Pradesh Karnataka Kerala Tamil Nadu Pondicherry Lakshadweep

The project activity supplies electricity to the NEWNE grid and hence NEWNE grid has been chosen as the relevant electric power system.

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

Project proponents have chosen Option I: Only grid power plants are included in the calculation.

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

As per the tool the calculation of the operating margin emission factor is based on one of the following methods:

a) Simple OM
b) Simple adjusted OM
c) Dispatch data analysis OM
d) Average OM

The tool allows the use of any of the above mentioned methods to calculate the operating margin emission factor; however, in order to use the simple OM method, it must be ensured that low-cost/must-run resources constitute less than 50% of the total grid generation in:

1. Average of the five most recent years
2. Based on long term averages for hydroelectricity production

We have adopted the approach of average of the five most recent years for calculating the share of low cost must-run sources. Please see Annex 3 for data. Since the low-cost/must-run resources constitute less than 50% of the total grid generation the simple OM method has been chosen. As per the Central Electricity Authority CO_2 baseline database, in India, hydro and nuclear stations qualify as low-cost/ must run sources and are excluded.

According to the tool, the emission factor can be calculated using either of the two following data vintages:

- **Ex ante option:** 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, without requirement to monitor and recalculate the emissions factor during the crediting period, or
- **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.

"Ex ante option: A 3-year generation - weighted average" has been selected for the purpose of emission reductions calculation for this project.

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

The operating margin emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low cost/must run power plant/units. The operating margin emission factor is defined as the weighted-average emissions per electricity unit (tCO_2/MWh) of all generating sources serving the system, excluding zero or low-cost/must-run power sources based on the average of the latest three years of data available (2006-07, 2007-08, 2008-09). The OM has been calculated as per the equation 1 of the tool:

$$EF_{grid,OMsimple,y} = \frac{\sum_{m} EG_{m,y} xEF_{EL,m,y}}{\sum_{m} EG_{m,y}}$$

Where:

$EF_{grid,OMsimple,y}$	Simple operating margin CO_2 emission factor in year *y* (tCO_2/MWh)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
$EF_{EL,m,y}$	CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
m	All power units serving the grid in year y except low-cost / must-run power units
y	The relevant year as per the data vintage chosen in Step 3

Determination of $EF_{EL,m,y}$

The emission factor of each power unit *m* has been determined by Option A1, equation 2 of the tool as follows:

$$EF_{EL,m,y} = \frac{\sum_{i} FC_{i,m,y} xNCV_{i,y} xEF_{CO2,i,y}}{EG_{m,y}}$$

Where:

Where:

$EF_{EL,m,y}$	CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
$FC_{i,m,y}$	Amount of fossil fuel type *i* consumed by power unit *m* in year *y* (Mass or volume unit)
$NCV_{i,y}$	Net calorific value (energy content) of fossil fuel type *i* in year *y* (GJ/mass or volume unit)
$EF_{CO2,i,y}$	CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_2/GJ)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
m	All power units serving the grid in year *y* except low-cost/must-run power units
i	All fossil fuel types combusted in power unit *m* in year *y*
y	The relevant year as per the data vintage chosen in Step 3

As per the database provided by the Central Electricity Authority the weighted generation OM is calculated to be 1.0049 tCO_2/MWh.

Simple Operating Margin (tCO_2/MWh) (incl. Imports)			
	2006-07	2007-08	2008-09
NEWNE	1.0084	0.9999	1.0065

Net Generation in Operating Margin (GWh)				
		2006-07	2007-08	2008-09
NEWNE		379,471	401,642	421,803

Please refer to Annex 3 for detailed information.

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

The tool to calculate the emission factor requires the project proponent to choose between the following two options for the vintage of data,

Option 1: *For the first crediting period, the build margin emission factor should 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. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.*

Option 2: *For the first crediting period, the build margin emission factor shall be updated annually, ex-post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex-ante, as described in option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.*

Option 1 has been chosen from the above mentioned options and the build margin has been calculated *ex-ante* based on the most recent information available on the plants already built for a sample group *m* at the time of PDD submission. There will not be any monitoring of the emission factor during the fixed crediting period.

Step 6: Calculate the build margin emission factor

The build margin emission factor has been obtained from the CO_2 Baseline database published by the Central Electricity Authority for the year 2008-09 which is 0.6751tCO_2/MWh.

It has been calculated by equation 13 of the tool

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} x EF_{EL,m,y}}{\sum_m EG_{m,y}}$$

Where:

$EF_{grid,BM,y}$	Build margin CO_2 emission factor in year *y* (tCO_2/MWh)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
$EF_{EL,m,y}$	CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
M	Power units included in the build margin
Y	Most recent historical year for which power generation data is available

Build Margin (tCO2/MWh) (not adjusted for imports)			
	2006-07	2007-08	2008-09
NEWNE	0.6313	0.5977	0.6751

Please refer to Annex 3 for detailed information.

Step 7: Calculate the combined margin emissions factor

The combined margin emission factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$$

Where:

$EF_{grid,CM,y}$	Combined margin CO_2 emission factor for the year y (tCO_2/MWh)
$EF_{grid,BM,y}$	Build margin CO_2 emission factor for the year y (tCO_2/MWh)
$EF_{grid,OM,y}$	Operating margin CO_2 emission factor for the year y (tCO_2/MWh)
w_{OM}	Weighting of operating margin emission factors (%)
w_{BM}	Weighting of build margin emission factors (%)

The tool further specifies that for biomass power generation project activities: w_{OM} = 0.50 and w_{BM} =0.50 (owing to their intermittent and non-dispatchable nature). Therefore, we can calculate the combined margin emission factor as shown in the following table:

	tCO_2/MWh
Operating Margin (generation weighted average of 3 years)	1.0049
Build Margin	0.6751
Combined Margin	(1.0049 x 0.5) + (0.6751 x 0.5) = 0.8400

For the purpose of calculations, $EF_{grid,CM,y} = EF_{CO2,grid,y}$

The emission factor is calculated in accordance with paragraph 12 (a) of AMS I.D which states that "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". The CEA value of the grid $EF_{CO2,grid,y}$ that we have considered is the weighted sum using 50:50 weights for OM and BM.

Using the fixed carbon dioxide emissions factor determined in section B.4, this equation may be simplified to the following:

$$BE_y = EG_y \times 0.8400$$

Project Emissions

A diesel generator shall be used for black start and emergency situations and consumption of diesel shall be monitored. Ex ante PP has considered zero project emission but diesel consumption will be monitored throughout the crediting period.

For ex ante purpose diesel related project emissions are not considered for simplification.

The project activity will use coal fines to the extent of 15%. Hence as per methodology AMS I.C, it is necessary to account for project emissions arising from the on-site consumption of coal fines due to the project activity.

Both, the emissions arising from diesel consumption in DG sets and from consumption of coal fines in the boilers shall be calculated as per latest version of *"Tool to calculate project or leakage CO_2 emissions from fossil fuel consumption"*. As per the tool, the project emissions are calculated as follows:

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

Where:

$PE_{FC,j,y}$	the CO2 emissions from fossil fuel combustion in process *j* during the year *y* (tCO2 / yr);
$FC_{i,j,y}$	the quantity of fuel type *i* combusted in process *j* during the year *y* (mass or volume unit / yr);
$COEF_{i,y}$	the CO2 emission coefficient of fuel type *i* in year *y* (tCO2 / mass or volume unit);
i	the fuel types combusted in process *j* during the year *y*.

The coefficient of emission factor of the fuel is calculated in accordance with the option 'B' of the *"Tool to calculate project or leakage CO_2 emissions from fossil fuel consumption" which* states that *"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:"*

$$COEF_{i,y} = NCV_{i,y} \times EF_{CO2,i,y}$$

Where:

$COEF_{i,y}$	the CO_2 emission coefficient of fuel type *i* in year y (tCO_2/ mass or volume unit);
$NCV_{i,y}$	the weighted average net calorific value of the fuel type *i* in year y (GJ/ mass or volume unit);
$EF_{CO2,i,y}$	weighted average CO_2 emission factor of fuel type *i* in year y (tCO_2/GJ);
i	the fuel types combusted in process *j* during the year y.

For ex-ante purposes diesel related project emission are not considered for simplification. However, emissions related to consumption of coal fines are accounted for in the emission reduction calculations.

Leakage

With reference to the general guidance on leakage in biomass project activities, we have to consider the possibility of leakage in the case of the project activity as it utilizes biomass residues from external sources. Leakage may occur because of the diversion of biomass from other activities outside the boundary thus increasing the fossil fuel combustion outside the boundary. Considering that the biomass requirement for the project is small and that there is sufficient biomass available in the region surrounding the site of the project activity, no such leakage is anticipated. However a survey has been undertaken ex-ante to ensure that there is surplus biomass in the region and hence the usage of biomass in the project activity does not lead to leakage elsewhere.

As per Attachment C to Appendix B, Annex 28, EB 47, version 03, paragraph 18 – *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., 50km 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 the project case, the PP has conducted a biomass assessment in the study region of 75 km radius from the project site.

Leakage due to transport of the biomass to the project site:

In accordance of the footnote of the methodology AMS I.C, since the transport of biomass is from within 200 kilometres, the emissions related to transport of biomass can be neglected. Hence leakage emissions in this case can be neglected.

A biomass assessment survey has been undertaken ex-ante by the project proponents to account for leakage if any.

Emission Reductions

The emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

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

Data / Parameter:	**$EF_{CO2,grid,y}$**
Data unit:	tCO_2/MWh
Description:	Grid emission factor
Source of data used:	Central Electricity Authority http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver5.pdf
Value applied:	0.8400
Justification of the choice of data or description of measurement methods and procedures actually applied :	This value has been provided by the Central Electricity Authority (CEA), a government body for the NEWNE grid in India.
Any comment:	Specified *ex-ante*

Data / Parameter:	**$EF_{grid,OM,y}$**
Data unit:	tCO_2/MWh
Description:	Operating Margin for grid
Source of data used:	Central Electricity Authority http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver5.pdf
Value applied:	1.0049
Justification of the choice of data or description of measurement methods and procedures actually applied :	This value has been provided by the Central Electricity Authority (CEA), a government body, for the NEWNE grid in India.
Any comment:	-

Data / Parameter:	**$EF_{grid,BM,y}$**
Data unit:	tCO_2/MWh
Description:	Build Margin for the grid
Source of data used:	Central Electricity Authority http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver5.pdf
Value applied:	0.6751
Justification of the choice of data or description of measurement methods and procedures actually applied :	This value has been provided by the Central Electricity Authority (CEA), a government body, for the NEWNE grid in India.
Any comment:	-

B.6.3 Ex-ante calculation of emission reductions:

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From section B.6.1, the emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

Baseline emissions

The baseline emissions are calculated as:

$$BE_y = EG_{BL,y} * EF_{CO_2,grid,y}$$

Where:

BE_y	Baseline Emissions in year y (tCO_2)
$EG_{BL,y}$	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)
$EF_{CO2,grid,y}$	CO_2 emission factor of the grid in year y (tCO_2/MWh)

The quantity of electricity generated is equal to the difference between gross electricity generated and the electricity used for auxiliary consumption and is based on factors such as installed capacity, operating days and the plant load factor (PLF). It is initially assumed that the 10 MW plant will operate for 330 days at 90% PLF for generation during the first year.

$$EG_{BL,y} = EG_{Export,y} - EG_{\mathrm{Im}port,y}$$

$EG_{Export,y}$ = 64,152 MWh/yr

$EG_{Import,\ y}$ = 0 (for simplification purpose)
However, $EG_{Import,\ y}$ shall be monitored and account during the project operation.

$EF_{CO2,grid,y}$ fixed ex ante as per Section B.6.2 at 0.8400 based on the CEA value for the NEWNE grid

Using the value of EF_y = 0.8400 tCO_2/MWh gives BE_y = 53,887 tCO_2.

As per paragraph 40 of AMS-I.S version 19, "The requirements concerning demonstration of the remaining lifetime of the replaced equipment shall be met as described in the General Guidelines to SSC CDM methodologies. If the remaining lifetime of the affected systems increases due to the project activity, the crediting period shall be limited to the estimated remaining lifetime, i.e. the time when the affected systems would have been replaced in the absence of the project activity."

The 'General guidelines to SSC CDM methodologies' refer to the "Tool to determine the remaining lifetime of equipment Version 01" as per which the remaining lifetime of the pre-project boilers of 3 TPH and 4 TPH were confirmed by an independent technical expert as below:

Serial No.	First Date of commissioning	Rated Capacity	Remaining life as on 12/10/2012	Conservative remaining lifetime as on 12/01/2012
MP/4370	22/08/1997	3 TPH	15 to 18 years	15 years
CG/459	26/11/2008	4 TPH	20-25 years	20 years

Therefore, the existing boilers would have still be in operation even after the crediting period of 10 years as proposed in the project activity is completed. Moreover, the PP will only claim emission reductions based on the net electricity supplied and not on the steam generation/consumption. The details on the third party assessment have been shared with the DOE.

Project emissions

Project emissions arise from the CO_2 emissions due to the on-site consumption of fossil fuels due to the project activity. As the project activity uses 15% coal fines, we consider project emissions due to the consumption of coal. These emissions are calculated as per the "*Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"*.

The project emissions are as follows:

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

Where:

$PE_{FC,j,y}$	the CO2 emissions from fossil fuel combustion in process *j* during the year *y* (tCO2 / yr);
$FC_{i,j,y}$	the quantity of fuel type *i* combusted in process *j* during the year *y* (mass or volume unit / yr);
$COEF_{i,y}$	the CO2 emission coefficient of fuel type *i* in year *y* (tCO2 / mass or volume unit);
i	the fuel types combusted in process *j* during the year *y*.

The coefficient of emission factor of the fuel is calculated in accordance with the option 'B' of the *"Tool to calculate project or leakage CO_2 emissions from fossil fuel consumption" which* states that *"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:"*

$$COEF_{i,y} = NCV_{i,y} \times EF_{CO2,i,y}$$

Where:

$COEF_{i,y}$	the CO_2 emission coefficient of fuel type *i* in year y (tCO_2/ mass or volume unit);
$NCV_{i,y}$	the weighted average net calorific value of the fuel type *i* in year y (GJ/ mass or volume unit);
$EF_{CO2,i,y}$	weighted average CO_2 emission factor of fuel type *i* in year y (tCO_2/GJ);
i	the fuel types combusted in process *j* during the year y.

The net calorific value of the coal fines used is calculated as 3400 kcal/kg as per 2006 IPCC Guidelines for National Greenhouse Gas Inventories:

Net CV = Gross CV - 0.212H - 0.0245M - 0.0008O

Gross CV = 3400 (Detailed Project Report)
H (percentage of hydrogen) = 2.79% (Detailed Project Report)
M (percentage of moisture) = 9.86% (Detailed Project Report)
O (percentage of oxygen) = 7.68% (Detailed Project Report)

NCV of 3400 kcal/kg which is 0.01424 GJ/kg and the emission factor is 0.099700 tCO2/GJ. Therefore, the COEF in kg/ tCO_2 comes out to 0.00142 kg/tCO_2.

The total quantity of coal fines expected to be combusted in the project activity is 14,048 tonnes per annum.

Therefore,

$PE_{FC,j,y}$ = 14,048*1000*0.00146

$PE_{FC,j,y}$ = 19,939 tCO_2e

Leakage

With reference to the general guidance on leakage in biomass project activities, we have to consider the possibility of leakage in the case of the project activity as it utilizes biomass residues from external sources. Leakage may occur because of the diversion of biomass from other activities outside the boundary thus increasing the fossil fuel combustion outside the boundary. Considering that the biomass requirement for the project is small and that there is sufficient biomass available in the region surrounding the site of the project activity, no such leakage is anticipated. However a survey has been undertaken ex-ante to ensure that there is surplus biomass in the region and hence the usage of biomass in the project activity does not lead to leakage elsewhere. The biomass surplus assessment survey has been carried out at the start of the crediting period[7].

Total generation of the biomass is 577,080 MT, total consumption of the biomass in the project area is 6,240 MT and in the proposed project activity is 79,604 MT. Hence, the total surplus availability of the biomass in the project activity area is:

577,080 – (6,240 + 79,604) = 491,236 MT

[7] A biomass survey has been conducted by the project owner through a third party to assess the surplus availability of biomass in line with the guidance in Attachment C to Appendix B

Total generation of biomass (MT)	Total consumption of biomass in the project activity (MT)	Surplus biomass available (MT)_
5,77,080	85,844	491,236

Hence, the percentage of available surplus biomass is 572% which is larger than the 25% of the quantity of the biomass as per the "General guidance on leakage in biomass project activities". Therefore the leakage is not considered.

As per Attachment C to Appendix B, this source of leakage can be neglected under the present situation.

Leakage due to transport of the biomass to the project site:

In accordance of the footnote of the methodology AMS I.C, since the transport of biomass is from within 200 kilometres, the emissions related to transport of biomass can be neglected. Hence leakage emissions in this case can be neglected.

Therefore $LE_y = 0$

Emission Reductions

Emission reductions are provided by the following equation:

$$ER_y = BE_y - PE_y - LE_y$$

From the analysis above the emission reductions are calculated as 33,948 tCO_2.

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

>>

Year	Estimation of project activity emissions (tCO_2e)	Estimation of baseline emissions (tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of overall emission reductions (tCO_2e)
2012-13	19,939	53,887	0	33,948
2013-14	19,939	53,887	0	33,948
2014-15	19,939	53,887	0	33,948
2015-16	19,939	53,887	0	33,948
2016-17	19,939	53,887	0	33,948
2017-18	19,939	53,887	0	33,948
2018-19	19,939	53,887	0	33,948
2019-20	19,939	53,887	0	33,948
2020-21	19,939	53,887	0	33,948
2021-22	19,939	53,887	0	33,948
Total (tonnes of CO_2e)	**19,9390**	**538,870**	0	**339,480**

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

B.7.1 Data and parameters monitored:

Data / Parameter:	$EG_{BL,y}$
Data unit:	MWh/year
Description:	Quantity of net electricity supplied to the grid in year y (MWh)
Source of data to be used:	Plant records
Value of data	64,152
Description of measurement methods and procedures to be applied:	$EG_{BL,y}$ shall be calculated based on the $EG_{Export,y}$ and $EG_{Import,y}$ as below: $EG_{BL,y} = EG_{Export,y} - EG_{Import,y}$ The metering for $EG_{Export,y}$ and $EG_{Import,y}$ shall be carried out using the two way energy meter located at common metering point/interconnection point. The meter shall be capable Continuous monitoring. The monthly recording will be done manually and the records will be maintained electronically. Joint meter reading will be taken in the presence of an official from state electricity board and project owner.
QA/QC procedures to be applied:	Accuracy class of the meter – 0.2 The meters shall be calibrated once every three years. Net electricity export can be cross checked with invoice.
Any comment:	All data will be kept for a minimum of 2 years following issuance of certified emission reductions or the end of the crediting period, whichever is later.

Data / Parameter:	$B_{biomass,y}$
Data unit:	Tonnes
Description:	Net quantity of biomass consumed in year *y*
Source of data to be used:	Plant records
Value of data	79,604 (wet basis) 72,503 (dry basis)
Description of measurement methods and procedures to be applied:	Each truck that enters the site will be recorded at the weighbridge installed at the factory. The biomass shall be calculated on dry basis based on the moisture content of biomass.
QA/QC procedures to be applied:	The weighbridge records will be tallied against transporters receipts or against the computer generated payment invoices. Calibration frequency - annually Cross checked with annual energy balance.
Any comment:	The data will be kept for the later of, two years after the end of the crediting period or the last issuance of CERs for the project activity. 100% of the data will be monitored.

Data / Parameter:	$B_{moisture}$
Data unit:	% water content
Description:	Moisture content of the biomass

Source of data to be used:	Plant records
Value of data	8.92 (as per DPR)
Description of measurement methods and procedures to be applied:	On-site measurement The moisture content of rice husk will be monitored for every batch and average value of all three batches for a day recorded in log book signed off by Controller, Laboratory. Daily data aggregated into monthly data. The moisture content (% of water) will be obtained from the laboratory records. The weighted average of monthly data will be calculated for each monitoring period.
QA/QC procedures to be applied:	Alternatively, moisture content can be measured by any accredited laboratory to cross check the consistency of moisture content estimated in plant's laboratory.
Any comment:	In case of dry biomass residue, this parameter is not necessary.

Data / Parameter:	**NCV_k**
Data unit:	GJ/mass
Description:	Net calorific value of biomass
Source of data to be used:	Plant records
Value of data	0.013398
Description of measurement methods and procedures to be applied:	Measurement in laboratories according to relevant national/international standards. Measure quarterly, taking at least three samples for each measurement. The average value can be used for the rest of the crediting period. Measure the NCV based on dry biomass.
QA/QC procedures to be applied:	Check the consistency of the measurements by comparing the measurement results with, relevant data sources (e.g. values in the literature, values used in the national GHG inventory) and default values by the IPCC.
Any comment:	Determine once in the first year of the crediting period.

Data / Parameter:	**$FC_{coal,i,y}$**
Data unit:	Tonnes/yr
Description:	Quantity of coal fines used in the project activity in the year y
Source of data to be used:	On site measurement
Value of data	14,048
Description of measurement methods and procedures to be applied:	The amount of coal used in the project activity will be measured via a calibrated weighbridge system as and when consumed on continuous basis. The total quantity of coal procured for the project activity is completely combusted in the boiler. Hence, the total quantity of coal procured and quantity of coal combusted is considered as same for the project activity.

QA/QC procedures to be applied:	Weigh bridge undergoes maintenance / calibration subject to appropriate industrial standards, at least annually. The data recorded can be cross checked against purchase receipt. Cross check the measurements with an annual energy balance that is based on purchased quantities and stock changes, and the calibration frequency will not be less than once in three years.
Any comment:	The data on quantity of coal combusted would be collected, recorded and archived separately for entire crediting period +2 years.

Data / Parameter:	**$EF_{CO2,coal,y}$**
Data unit:	tCO_2/GJ
Description:	CO_2 emission factor for coal
Source of data to be used:	**Data source** / **Conditions for using the data source** a) Values provided by the fuel supplier in invoices — This is the preferred source b) Measurements by the project participants — If a) is not available c) Regional or national default values — If a) is not available These sources can only be used for liquid fuels and should be based on well-documented, reliable sources (such as national energy balances) d) IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories — If a) is not available
Value of data	99700×10^{-6}
Description of measurement methods and procedures to be applied:	A default value is applied as values from the fuel supplier in not available. Any future revisions of the IPCC Guidelines will be taken into account.
QA/QC procedures to be applied:	Project Participant has no control on the parameter. Hence, no QA/QC procedures are applicable.
Any comment:	-

<table>
<tr><td>Data / Parameter:</td><td>$NCV_{coali,y}$</td></tr>
<tr><td>Data unit:</td><td>GJ/kg</td></tr>
<tr><td>Description:</td><td>Net calorific value of coal</td></tr>
<tr><td>Source of data to be used:</td><td>
<table>
<tr><th>Data source</th><th>Conditions for using the data source</th></tr>
<tr><td>a) Values provided by the fuel supplier in invoices</td><td>This is the preferred source if the carbon fraction of the fuel is not provided (Option A)</td></tr>
<tr><td>b) Measurements by the project participants</td><td>If a) is not available</td></tr>
<tr><td>c) Regional or national default values</td><td>If a) is not available

These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).</td></tr>
<tr><td>d) 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</td><td>If a) is not available</td></tr>
</table>
</td></tr>
<tr><td>Value of data</td><td>0.014235765[8]</td></tr>
<tr><td>Description of measurement methods and procedures to be applied:</td><td>The sample of type of coal would be collected from the plant according to the procedures of sample collection for analysis and would be sent for analysis to reputed laboratories where measurement carried out according to relevant standards.</td></tr>
<tr><td>QA/QC procedures to be applied:</td><td>Check the consistency of the measurements by comparing the measurement results with measurements from previous years, relevant data sources. If the measurement results differ significantly from the previous measurements or other relevant sources, conduct additional measurements.</td></tr>
<tr><td>Any comment:</td><td>The data will be archived for 2 years after the end of crediting period.</td></tr>
</table>

Data / Parameter:	**Diesel consumption ($FC_{i,j,y}$)**
Data unit:	mass or volume/year
Description:	Quantity of diesel consumed on site every year.
Source of data to be used:	Plant records
Value of data	0
Description of measurement methods and procedures to be applied:	A monitoring cell fitted with a level indicator gauge above the fuel tank of the D.G Set shall be used to monitor the diesel consumption every month. Log book shall also maintain for the same purpose. The fuel tank of the D.G. Set is filled every five to eight months (As the

[8] This is equivalent to 3400kcal/kg

	consumption is very low) and with the help of level indicator gauge reduction in diesel level (on consumption) will be monitored every month.
QA/QC procedures to be applied:	The level indicator gauge will be calibrated by Government accredited/ ISO certified agency every two years. The diesel consumption quantities can be cross-checked with the record of the quantity of diesel issued by the stores manager and maintained in a log book in the store room.
Any comment:	All monitored data will be kept for a minimum of 2 years following issuance of certified emission reductions or the end of the crediting period, whichever is later.

Data / Parameter:	**CO_2 emission factor ($EF_{CO2,i,y} = EF_{diesel}$)**
Data unit:	tCO_2e/ TJ
Description:	CO_2 emission factor for Diesel Oil
Source of data used:	The following data sources may be used if the relevant conditions apply:

Data source	Conditions for using the data source
a) Values provided by the fuel supplier in invoices	This is the preferred source if the carbon fraction of the fuel is not provided (Option A)
b) Measurements by the project participants	If a) is not available
c) Regional or national default values	If a) is not available These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).
d) 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	If a) is not available

Value applied:	74.8
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC 2006 default value of CO_2 Emission Factor (for diesel oil) is used for calculating project activity emissions. The default value of CO_2 Emission Factor has been calculated by taking into account carbon content (default value), carbon oxidation factor (default value) and mass conversion factor of 3.666.
Any comment:	

Data / Parameter:	**Net Calorific Value ($NCV_{i,y} = NCV_{Diesel}$)**
Data unit:	GJ/t
Description:	Net calorific value of Diesel Oil
Source of data used:	The following data sources may be used if the relevant conditions apply:

	<table><tr><th>Data source</th><th>Conditions for using the data source</th></tr><tr><td>a) Values provided by the fuel supplier in invoices</td><td>This is the preferred source if the carbon fraction of the fuel is not provided (Option A)</td></tr><tr><td>b) Measurements by the project participants</td><td>If a) is not available</td></tr><tr><td>c) Regional or national default values</td><td>If a) is not available These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).</td></tr><tr><td>d) 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</td><td>If a) is not available</td></tr></table>
Value applied:	43.3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default Net calorific value (for diesel oil) provided in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories has been used for calculating project activity emissions.
Any comment:	-

B.7.2 Description of the monitoring plan:

>>

Two (2) nos of two way energy meters i.e. main meter and check meter with accuracy of 0.2 will be installed at the grid substation of the Chhattisgarh State Electricity Board (CSEB). A representative of the project owner and the CSEB will take the main meter reading once in a month as agreed in the signed Power Purchase Agreement (PPA). The data will be collated on monthly basis and it will be the basis for emission reduction calculation.

The Site Head will be responsible for the monthly JMR (electricity exported and electricity imported). He will transmit these data monthly to the Plant Manager.

The electricity meter will be calibrated annually by state utility. The Instrumentation Engineer will be in charge of maintaining the records of the calibrations on site.

Fuel consumption

The consumption of fuel for the generation of electricity will be monitored at the weighbridge installed at the factory. The weighbridge records will be tallied against transporters receipts or against the computer generated payment invoices.

The Plant Manager will collate monthly the consumption of all types of fuels and the number of trucks of the daily data.

The Instrumentation Engineer will be in charge of the calibrations and of maintaining the records of the calibrations of the weighbridge at the site.

General
The organization will train the staff to ensure that the monitoring process is appropriate and effective. The CDM data will be collated monthly in an excel file maintained by the Plant Manager. A detailed monitoring and verification report will be produced by the plant on a yearly basis.

The monitored data will be reported through project owner to Agrinergy on a monthly basis for the calculation and estimation of emission reductions.

All data will be kept for a minimum of 2 years following issuance of certified emission reductions or the end of crediting period, whichever is later and the storage of this data will be the responsibility of the project owner.

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

>>
28/03/2011
Ms. Rashmi Ranjan
Agrinergy Consultancy Pvt Ltd
rashmi.ranjan@agrinergy.com
The entity 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:

>>
29/01/2010
Date of placement of purchase order of boiler

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

>>
20y 00m

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

C.2.1. Renewable crediting period

Not Applicable

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

>>
Not 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:

>>
07/12/2012

C.2.2.2. Length:

>>
10 y 00 m

SECTION D. Environmental impacts

>>

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

>>

In relation to the baseline scenario no negative environmental impacts will arise as a result of the project activity.

The positive environmental impacts arising from the project activity are:

- Reduction in CO_2 emissions, which would be generated under the baseline scenario, by the replacement of fossil fuels
- Reduction in the emissions of other harmful gases (NO_x and SO_x) that would have been emitted from the combustion of fossil fuels for power generation in power plants connected to the grid.
- Reduced ash production because rice husk has lower ash content (6-7%) than that of Indian coal (30-40%)

An Environmental Impact Assessment (EIA) is not required but the project has received a 'consent to establish' from the Chhattisgarh Pollution Control Board.

The project activity has no significant impact on the environment. According to the latest notification dated 1/12/2009, "power plant up to 15MW, based on biomass and using auxiliary fuel such as coal/ lignite/ petroleum products up to 15% are exempt."(http://moef.nic.in/downloads/rules-and-regulations/3067.pdf). Hence, there is no need of applicability of the Environmental Impact Assessment (EIA) of the proposed project activity.

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 project activity is a renewable energy project. There are no negative environmental impacts envisaged from the project activity.

SECTION E. Stakeholders' comments

>>

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

>>

Shri Shyam Warehousing and Power Pvt. Ltd. identified the following stakeholders' to be associated with the project activities, directly or indirectly:

- Local people/villagers
- Farmers
- Rice husk suppliers

The stakeholders review has been conducted at the local level in the following ways:

1. A notice was published in the local newspaper on 03/09/2010 in the local language i.e. Hindi. The notice informed the local population about the company's intention to set up the biomass based power plant to burn biomass and also of their intention to apply for CDM status which would help the company in making the project financially feasible.
2. The *gram panchayat* provided the no objection certificate for the implementation of the project activity with CDM revenues
3. All the necessary approvals have been obtained from the local regulatory bodies.

A national stakeholder review is undertaken through the approval of the project by the DNA (Ministry of Environment and Forests).

E.2. Summary of the comments received:

>>

The stakeholders' meeting were conducted on 20/09/2010 at the project site and was attended by the residents of the nearby villages, farmers, the suppliers of the rice husk and the representatives of the Shri Shyam Warehousing and Power Pvt. Ltd. Concerns and responses as recorded during the meeting at the project site.

All the stakeholders actively participated in the stakeholder's consultation meeting and expressed their views on project activity. Farmers of nearby villages and villagers appreciated the company and concluded that:

- The project activity will generate various employment opportunities for the local populace.
- Installation of the project will trigger development of various commercial activities in the region leading to improve the living standards of the local population.
- The project activity is an environmentally friendly activity based on biomass residue and such type of activity must be appreciated.

The stakeholder appreciated the project owner for the environment friendly power generation using rice husk and facilitates development of the area and augmenting the deficit in electricity generation of the region. Hence, no negative comments have been received related to the project activity.

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

>>

Since no negative comments were received, no action was taken.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Shri Shyam Warehousing and Power Pvt Ltd
Street/P.O.Box:	Station Road, Post office Naila, Champa
Building:	-
City:	Janjgir
State/Region:	Chhattisgarh
Postfix/ZIP:	-
Country:	India
Telephone:	-
FAX:	-
E-Mail:	-
URL:	-
Represented by:	-
Title:	General Manager
Salutation:	Mr
Last Name:	Ramesh
Middle Name:	-
First Name:	Agrawal
Department:	-
Mobile:	+91-9425230096
Direct FAX:	+91-07817222412
Direct tel:	-
Personal E-Mail:	shyamwarehousingp@yahoo.in

Organization:	Agrinergy Pte Ltd
Street/P.O.Box:	10 Hoe Chiang Road
Building:	#04-08 Keppel Towers
City:	-
State/Region:	-
Postfix/ZIP:	089315
Country:	Singapore
Telephone:	+65-6592 0400
FAX:	+65-6592 0401
E-Mail:	-
URL:	www.agrinergy.com
Represented by:	-
Title:	Director
Salutation:	Mr
Last Name:	Atkinson
Middle Name:	-
First Name:	Ben
Department:	-
Mobile:	-
Direct FAX:	+65-6592 0401
Direct tel:	+65-6592 0400
Personal E-Mail:	moc@agrinergy.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The project has not received any public funding.

Annex 3

BASELINE INFORMATION

We have adopted the approach specified in the "Tool to calculate the emission factor for an electricity system" to calculate the CO_2 emission coefficient of the regional electricity grid.

Baseline information:

Emission Factors:

Simple Operating Margin (tCO2/MWh) (incl. Imports)			
	2006-07	2007-08	2008-09
NEWNE	1.01	1.00	1.01
South	1.00	0.99	0.97
India	1.01	1.00	1.01

Build Margin (tCO2/MWh) (not adjusted for imports)			
	2006-07	2007-08	2008-09
NEWNE	0.63	0.60	0.68
South	0.70	0.71	0.82
India	0.65	0.63	0.71

Generation Data:

Gross Generation Total (GWh)			
	2006-07	2007-08	2008-09
NEWNE	4,99,380	5,31,539	5,48,029
South	1,61,897	1,67,379	1,67,587
India	6,61,277	6,98,918	7,15,616

Net Generation Total (GWh)			
	2006-07	2007-08	2008-09
NEWNE	4,65,361	4,96,119	5,09,776
South	1,52,206	1,57,315	1,57,336
India	6,17,567	6,53,434	6,67,112

Share of Must-Run (Hydro/Nuclear) (% of Net Generation)					
`	2004-05[9]	2005-06	2006-07	2007-08	2008-09
NEWNE	16.84%	18.0%	18.5%	19.0%	17.3%
South	21.60%	27.0%	28.3%	27.1%	22.8%
India			20.9%	21.0%	18.6%

Net Generation in Operating Margin (GWh)			
	2006-07	2007-08	2008-09

[9] The historical data share of low cost must run sources has been taken from version 03 of the CO2 baseline database

NEWNE	3,79,471	4,01,642	4,21,803
South	1,09,116	1,14,702	1,21,471
India	4,88,587	5,16,343	5,43,274

20% of Net Generation (GWh)			
	2006-07	2007-08	2008-09
NEWNE	93,072	99,224	1,01,955
South	30,441	31,463	31,467
India	1,23,513	1,30,687	1,33,422

Net Generation in Build Margin (GWh)			
	2006-07	2007-08	2008-09
NEWNE	93,524	1,00,707	1,02,589
South	30,442	31,613	31,606
India	1,23,965	1,32,320	1,34,195

Source: CO_2 baseline database, version 05, Central Electricity Authority, India[10]

[10] http://cea.nic.in/reports/planning/cdm_CO2/cdm_CO2.htm

Annex 4

MONITORING INFORMATION

In addition to the measures for monitoring listed in section B.7.2 the following systems will be put in place to monitor the project activity. Complete documentation for the operation and maintenance of the power plant will be provided to the project owner at the time of commissioning by the Agrinergy Pte Ltd. Additional training on CDM data monitoring will be provided to the operators of the power plant.

The monitoring of the project activity will be the responsibility of Shri Shyam Warehousing and Power Pvt Ltd. The monitored data will be reported to Agrinergy by the Plant Manager on a quarterly basis for the calculation and estimation of emission reductions. This data will be checked against initial estimates. If the project is not performing as expected, a report will be sent the project proponent outlining where the project is deviating in its generation of emission reductions.

The procedure for storage of records and performance documentation is as given below:

- All data and records of data will be stored in electronic and paper format on site and will be maintained for the crediting period and two years thereafter.
- All calibration reports will be stored in paper format on site and will be maintained for the crediting period and two years thereafter.

The data quality will be ensured by the cross-check measures detailed below:

- Electricity exported to the grid: the electricity exported will be metered both by electricity meters in the control room and by electricity meters located at the switchyard. Data from the meters in the control room will be recorded continuously. Data from the meters at switchyard will be recorded monthly by CSEB. In case there is a difference between the two records, CSEB records will prevail.

- Number of trips undertaken to transport biomass to the project site: the number of trucks will be continuously recorded at the weighbridge, as well as the transporters receipts and/or computer generated payment invoices will be continuously stored. In case there is a difference between the two records, the transporters receipts and/or computer generated payment invoices will prevail.

Measures to deal with possible monitoring data adjustment and missing data

The following are the measures that shall be taken to account for missing or adjusted data:

- Electricity export to the grid: In case both the data recorded by CSEB from the switchyard meters and the meters in the control room is missing, then the emission reductions for the corresponding period shall be set to zero.
- Consumption of biomass fuels: In case the data pertaining to quantity of biomass fuels is missing, then the average GCV of the biomass fuel fired during the corresponding period for which data is available shall be used to arrive at the weight of biomass fuels fired depending on the power generation during the particular period.

The organization will train the staff to ensure that the monitoring process is appropriate and effective. The CDM data will be collated monthly in an excel file maintained by the Plant Manager (a specific template will be provided by Agrinergy). A detailed monitoring report will be produced by the plant on a yearly basis.
