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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Renewable biomass based thermal energy generation by M/s Obeetee Private Limited at Sant Ravidas Nagar district, Uttar Pradesh
Date- 30/01/2008
Version -01

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

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Project Description

Obeetee Private Limited (OPL) is a leading producer and exporter of exquisite hand-knotted, hand-tufted and flat-woven carpets. The company is internationally recognized as the premier source for the finest handmade carpets. OPL as a responsible corporate and committed citizen realizes that energy conservation and environmental benign activities are key parameters for future businesses.

The project activity envisages installation of a 6 TPH biomass (rice husk) based boiler to meet the in-house requirement of steam at the OPL carpet manufacturing unit by utilizing the surplus biomass (rice husk) available in the region. The steam generated by the project activity will displace the equivalent quantity of steam that would have been generated by the combustion of fossil fuels, thus avoiding emissions of greenhouse gases to the atmosphere along with conservation of natural resources. The boiler will be of 6 TPH capacity with the outlet parameters of 11.25 $kg/cm^2_{(g)}$, and 188 ºC .

Pre-Project Scenario

In the pre-project scenario, the process demand of steam was met by one 3 TPH coal fired Lancashire boiler installed in the dye house.

Post Project Scenario

In the post project scenario, the steam supply from Coal based boiler will be displaced by the 6 TPH rice husk based boiler. The 3TPH coal fired boiler has been sold out as scrap.

Project Activity's Contribution to Sustainable Development[1]

The contributions of the project activity towards sustainable development are as follows:

Social well being – The project activity will result in generation of employment, both during the time of construction of the project activity and the operational phase wherein people, would be employed for running the facility once it gets commissioned. The project activity will also generate employment opportunities for transporters who will be engaged in transporting rice husk from nearby collection centers to the project site.

[1] http://cdmindia.nic.in/host_approval_criteria.htm

Economic well being – The project activity would require rice husk which would be procured from the nearby areas. This would lead to additional income generation for the local farmers who would be able to sell the rice husk for effective utilization in the project activity.

Environmental well being – The project activity will result in reduction in GHG emissions by replacing the fossil fuel based steam generation system with rice husk based steam generation system.

Technological well being – The technology stated for use in the project activity represents environmentally safe and sound technology for the application. The equipments, for the project activity, have been supplied by well established equipment manufacturers in the Indian market.

Thus it is ensured that the project activity contributes positively to the stipulated sustainable development indicators.

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)	Party involved wishes to be considered as project participant (Yes/No)
India	Obeetee Private Limited(OPL)	No

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

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

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A.4.1.1. Host Party(ies):

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Country: India

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

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State: Uttar Pradesh

A.4.1.3. City/Town/Community etc:

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District: Sant Ravidas Nagar(Badholi)
Village: Gopepur Gopiganj

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

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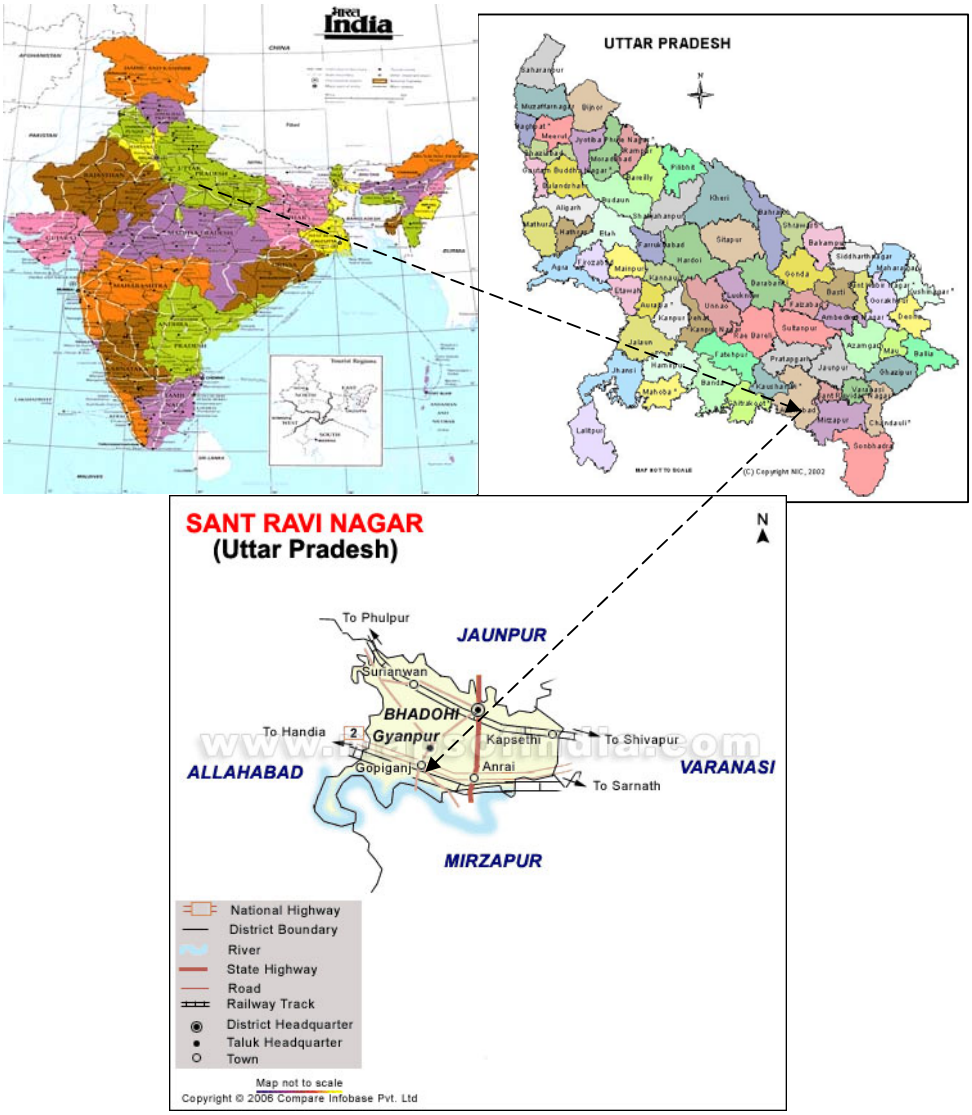
- The project activity is located at Gopepur Gopiganj village, Sant Ravi Das Nagar (Bhadohi) District, Uttar Pradesh , India.. The project activity is located at 25^0 18'N Latitude and $82^0$24'E Longitude at an elevation of 86.52 m above mean sea level.

. The accessibility to plant site is as follows:

- Nearest railway station: Gyanpur Road
- Nearest airport: Babatpur, Varanasi
- Nearest Highway: N.H. 2 (G.T.Road)

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



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

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As per 'Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories', the project activity falls under:
Sectoral scope: I - Energy industries (renewable/non renewable)
Main category: Type (I) - '*Renewable energy project activities'*
Sub – Category: I.C - '*Thermal energy for the user with or without electricity* (Version 12, EB33)*'.*

The project activity meets all the applicability criteria of small-scale CDM project activity category under Type-I: Renewable Energy Projects (C. Thermal energy for the user) of the indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories.

Technology of the project activity

The proposed project activity has been envisaged to meet the in house demand of steam of OPL carpet manufacturing facility by installing a 6TPH rice husk based boiler. The primary technology proposed for the project activity involves direct combustion of biomass in the boilers to generate thermal energy. During combustion chemical energy contained in the biomass is converted into thermal energy, which is utilized for steam/hot air generation.
The technical details of major components of the project activity are discussed below:

Steam Boiler

Model	MFTH 60 B
Type	Fluidized bed boiler
Pressure	11.25 kg/cm^2
Temperature	188^0C
Capacity	6 TPH
Make	M/s Thermax

Feed Pump

Type	Centrifugal
Capacity	$7.2m^3/h$
Motor RPM	2900
Make	M/s Grundfos

I.D Fan

Type	Centrifugal
Capacity	300 m^3 /min
Head	150mm
Motor	25 HP
Make	M/s Thermax

Fluidising air fan

Type	Centrifugal
Capacity	120 m^3/min
Head	625 mm
Motor	30 HP
Motor RPM	2900 RPM

There is no technology transfer involved in the project activity. The technology being used is environmentally safe and the project proponent is adhering to all the safety norms applicable to such projects.

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

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Years	Annual Estimation of emission reduction in tonnes of CO_2e
2008-09	9,939
2009-10	9,939
2010-11	9,939
2011-12	9,939
2012-13	9,939
2013-14	9,939
2014-15	9,939
2015-16	9,939
2016-17	9,939
2017-18	9,939
Total estimated reductions (tonnes of CO_2e)	**99,390**
Total number of crediting years	10
Annual Average over the crediting period of estimated reduction (tonnes of CO_2e)	9,939

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

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No public funding as part of project financing from parties included in Annex I of the UNFCCC is 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:

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As per Appendix C of the Simplified Modalities and Procedures for Small-scale CDM project activities, the fragmentation of a large project activity into smaller parts is called as debundling. The guideline for debundling mentioned in paragraph 2 of appendix C is given as follows.

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

The proposed project activity is not a debundled component of a large project activity as the project proponents neither have any registered project activity within the previous 2 years for the same project category nor do they propose to set up another biomass based boiler within 1 km radius of the proposed small-scale activity.

SECTION B. Application of a baseline and monitoring methodology

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

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Title – Thermal energy for the user with or without electricity (Version 12, EB33)

The approved baseline methodology has been referred from the Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories.

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

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This project activity consists of installation of a rice husk based boiler of 6 TPH capacity to generate steam using rice husk. As stated earlier the project activity falls under:

Type-I Renewable energy projects

Category- I C Thermal energy for the user with or without electricity. (Version 12, EB 33)

The choice of the methodology is accurate for the project and is justifiable since the project activity meets all the applicability conditions stipulated in the methodology as discussed below:

<table>
<tr><th>Sl. No.</th><th>Applicability Conditions</th><th>Project Activity</th></tr>
<tr><td>1.</td><td>This category comprises renewable energy technologies that supply individual households or users with thermal energy that displaces fossil fuels. Examples include solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass for water heating, space heating, or drying, and other technologies that provide thermal energy that displaces fossil fuel. Biomass-based co-generating systems that produce heat and electricity are included in this category.</td><td>The project activity is thermal energy generation project using a rice husk based boiler that displaces equivalent amount of thermal energy that would have been generated by a fossil fuel based boiler. Since the project activity utilises rice husk for the generation of Thermal energy by displacing fossil fuel (coal), it meets the primary applicability criteria of the methodology.</td></tr>
<tr><td>2.</td><td>Where thermal generation capacity is specified by the manufacturer, it shall be less than 45 MW.</td><td>The thermal Generation capacity of project activity is less than 45MW as illustrated below:
<table>
<tr><td>Boiler Capacity</td><td>6</td><td>TPH</td></tr>
<tr><td></td><td>= 1.66666667</td><td>kg/s</td></tr>
<tr><td>Pressure</td><td>11.25</td><td>kg/cm^2</td></tr>
<tr><td>Temperature</td><td>188</td><td>deg C</td></tr>
<tr><td>Energy of Steam</td><td>2.79</td><td>MJ/Kg</td></tr>
<tr><td>Energy of water(at 100 deg C)</td><td>0.418</td><td>MJ/Kg</td></tr>
</table>
</td></tr>
</table>

		<table><tr><td>Boiler Rating</td><td>6 * (2.79-0.418)</td><td>MW</td></tr><tr><td></td><td>**3.95**</td><td>**$MW_{thermal}$**</td></tr></table> The project activity of OPL is designed for total thermal energy output of 3.95 $MW_{thermal}$ equivalent which is less than specified limit of 45 $MW_{thermal}$ and therefore qualifies the applicability criteria.
3.	For co-fired systems the aggregate installed capacity (specified for fossil fuel use) of all systems affected by the project activity shall not exceed 45 MW_{th} . Cogeneration projects that displace/ avoid fossil fuel consumption in the production of thermal energy (e.g. steam or process heat) and/or electricity shall use this methodology. The capacity of the project in this case shall be the thermal energy production capacity i.e. 45 MWth.	The project activity is neither a co-generation nor co-firing system, therefore this condition is not applicable in the case of OPL project activity.
4.	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 be lower than 45 MWth and should be physically distinct[2] from the existing units.	The project activity replaces the fossil fuel based thermal energy generation. There was no renewable energy based system prior to the project activity.

As stated above, the project activity under consideration meets applicability conditions of the Category I.C. This justifies the appropriateness of the choice of the methodology in view of the project activity and its certainty in leading to a transparent and conservative estimate of the emission reductions directly attributed to the project activity.

B.3. Description of the project boundary:

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As per the para 5 of AMS-I.C. ver 12, project boundary encompasses the physical and geographical site of the renewable energy generation. The project boundary covers the biomass based boiler, which starts from the biomass storage to the point of Steam supply to the OPL carpet manufacturing facility. Thus, project boundary includes biomass storage, biomass fired boiler, steam generation from the boiler and auxiliary consumption.

B.4. Description of baseline and its development:

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The baseline and its development have been carried out on the basis of criteria's provided as per AMS I.C/version 12. The project proponent has identified plausible project options for baseline scenario, which include all possible courses of actions that could be adopted in order to generate steam.

Further an assessment was conducted for each alternative to project activity with respect to the risks/barriers associated to implementation. The energy baseline was determined, which consists of the facility that would otherwise be built. The performance of the project activity and its associated emission reductions were evaluated with respect to the energy baseline scenario. Following are different alternatives which were assessed for determining baseline scenario at OPL:

Alternative 1- Coal based thermal energy generation
In absence of the proposed CDM project activity, OPL could have continued to generate thermal energy with coal as fuel to meet its process steam requirement. OPL had been historically using coal based boiler and could have continued to do so by installing another coal based boiler along with the earlier one which had a considerable operational life left. This alternative is in compliance with all applicable legal and regulatory requirements and may be a part of the baseline.
Therefore, Alternative 1 is being considered for further analysis to arrive at the baseline scenario.

Alternative 2- Furnace Oil based thermal energy generation
In absence of CDM project activity, OPL could have generated process steam using Furnace Oil as fuel, to meet its steam requirement. However this alternative would not be a credible and realistic alternative available with OPL as the steam generation cost would be very high thus making operation non-viable in absence of project activity.
Therefore, Alternative 2 may be excluded from further consideration.

Alternative 3- Natural gas based thermal energy generation
In absence of CDM project activity, OPL could have generated process steam with Natural gas as fuel, to meet its steam requirement. This alternative is in compliance with all applicable legal and regulatory requirements. However this alternative would not be a credible and realistic alternative available with OPL in absence of project activity due to non-availability of natural gas as fuel for steam generation to the plant.
Therefore, Alternative 3 may be excluded from further consideration.

Alternative 4- Biomass based thermal energy generation (Project activity without CDM)
In absence of CDM project activity, OPL could have generated thermal energy with biomass residues as fuel, to meet its process steam requirement. This alternative is in compliance with all applicable legal and regulatory requirements. However there exist barriers to implementation of biomass based thermal energy generation as illustrated below in section B.5., which would have prevented the implementation of such projects in the baseline scenario.

Parameters	Furnace Oil	Coal	Rice husk
Cost in Rs/Kg of steam	1.28	0.60	0.62
Technological Barriers	No	No	Yes 1. The ash generated after combustion of rice husk

			contains high percentage of silica which leads to rapid erosion of the equipments. 2. Due to high silica content and the shape of rice husk, equipments like ID fan, cone portion of air pre-heater and top portion of the stack get eroded which leads to high maintenance cost, frequent breakdown and increased downtime. 3. Presence of silica in rice husk ash also corrodes boiler tubes which require frequent maintenance of the boiler. Further, in rice husk fired boilers, escape of fluidized media along with flue gas is a common problem.
Compliance with all applicable legal and regulatory requirements	Yes	Yes	Yes
Conclusion	Since the levelised cost is much higher as compared to other alternatives, this is **not a baseline scenario**.	As the levelised cost of thermal energy generation using coal is lesser than other alternatives and also OPL has prior experience in oprating coal based thermal energy generation systems, **this is the baseline scenario.**	Since the levelised cost using rice husk as fuel is higher than that of coal, coal would have been the preferred alternative. Also as highlighted above there are various technological problems associated with using rice husk as fuel in the boiler, thus this cannot be a baseline scenario. Hence without the consideration of CDM revenues, this option is not sustainable.

Hence the only credible alternative among the above is thermal energy generation using coal which is chosen as the baseline scenario.

Baseline Emissions
Paragraph 6 of the Appendix B of the simplified modalities and procedures for small scale CDM project activities, states that *"For renewable energy technologies that displace technologies using fossil fuels, the simplified baseline is the fuel consumption of the technologies that would have been used in the absence of the project activity times an emission coefficient for the fossil fuel displaced. IPCC default values for emission coefficients may be used*"

Emission coefficient of fuel used in the baseline scenario
In absence of the project activity, the probable baseline scenario would have been steam generation using fossil fuel (coal). Thus to determine emission co-efficient OPL has used emission factor for coal as per 2006 IPCC Guidelines for National Greenhouse Gas Inventories for GHG emissions which is 96.1 tCO_2 /TJ.

Emission coefficient of fuel used in the project activity
The fuel used in the project activity is the biomass residues (rice husk), which is a carbon neutral fuel and therefore the emission coefficient (tC/TJ) is zero.

Baseline data requirement and data source

Sl. no	Parameter	Data source
1.	Emission coefficient of coal	2006 IPCC Guidelines
2.	Steam generated by boilers	Log books of the plant
3.	Boiler efficiency	For baseline calculations boiler efficiency has been taken as 82%

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

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The project activity meets the eligibility criteria to use simplified modalities and procedure for small-scale CDM project activities as set out in paragraph 6 (c) of decision 17/CP.7. As per the decision 17/cp.7 Para 43, a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.

Further referring to Appendix A to Annex B document of indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity categories, project participants shall provide a qualitative explanation to show that the project activity would not have occurred anyway, at least one of the listed elements should be identified in concrete terms to show that the activity is either beyond the regulatory and policy requirement or improves compliance to the requirement by removing barrier(s).

The project activity is associated with the following barriers to its implementation and it was felt that the benefits due to sale of carbon credits would help OPL to overcome these barriers.

Investment Barrier

OPL conducted an investment comparison analysis of various fuel options available with OPL for generation of thermal energy/steam. The fuel options available with OPL were – Furnace Oil, Coal and Biomass (Rice Husk). The analysis is presented in the following table:

A. EQUIPMENT DATA			
DESIGN PARAMETERS	**Oil fired Fired Thermax Boiler**	**Coal fired Fluidized Boiler**	**Husk Fired Fluidized Bed Boiler**
a. Model	SMC-60	MTFH-60	MTFH-60
b. Capacity	6000 Kg/hr	6000 Kg/hr	6000 Kg/hr
c. Pressure (Kg/ cm2)	10.54	11.25	11.25
d. Fuel	Furnace Oil	Coal	Husk
e. Type of Fuel Firing	Burner	Fluidized	Fluidized
f. Thermal Efficiency Based on NCV Of Fuel (%)	89	82	80
g. Connected Electrical Load Equipment(Kw)	32.7	64.20	64.20
h. Connected Electrical Load Peripheral Equipment(Kw)	6	13	13
OPERATING PARAMETERS			
i. Output	5500	5500	5500
j. Working Pressure (Kg/ cm2)	10	10	10
k. Feed Water Temp. Deg C.	60	60	60
l. Thermal Efficiency Based on NCV Of Fuel (%)	89	82	80
m. Fuel Consumption (Kg/ hr.)= i*630/(o*l/100)	403	649	1444
n. Actual load, Kw [=0.7 x (g+h)]	27.09	54.04	54.04
B. SITE DATA			
o. Gross Calorific value of Fuel Kcal/ kg*	9650	6510	3000
p. Cost Of Fuel (Rs/kg.)**	16.27	3.83	1.7
q. Cost of Electricity per unit	9.23	9.23	9.23
r. No. of qualified operators on 3 shift basis	4	4	4
s. Unskilled labours / helpers/firemen on 3 shift basis	0	17	21
t. Ash shifting charges per day (@ 250 per trolley)	0	500	1250
u. Total salary /expenses of Operators @ Rs 5000/- PM=r*12*5000	240000	240000	240000
v. Total Salary / expenses of unskilled Labour @ Rs 3800/- PM=s*12*3800	0	775200	957600
w. Interest on capital employed(% Per Annum)	10	10	10
x. Working hours per day	24	24	24
y. Total working days per year	340	340	340
C.INVESTMENT(APPRX.)			

Landed price of equipment with HRU	3651923	3651923	3651923
Landed price of multicyclone dust collector	NIL	340873	340873
Accessories- Chimney , Ducting, Structure, RO palnt, conveyor etc	5993746	5993746	5993746
Steam piping with fittings and insulation	944501	944501	944501
Fuel oil system - FO storage tank, piping, heat tracing etc	450000	NIL	NIL
Civil work- foundations, shed etc	1475890	1475890	1475890
Misc- IBR, Explosive liasioning	80000	80000	80000
Total Investment	**12596060**	**12486933**	**12486933**
D. SUMMARY OF OPERATING COSTS			
Fuel Cost per annum (Rs.)=m*p*x*y	53562844	20233076	20027700
Electricity Cost per annum (Rs.)=n*q*x*y	2040332.112	4070119.872	4070119.872
Manpower cost per annum (Rs.)=u+v	240000	1015200	1197600
Ash shifting charges per annum=t*Y	0	170000	425000
Interest on investment	1259606	1248693.3	1248693.3
Average Annual Maintenance Cost (AVG OF FIVE YEARS)	200000	150000	800000.00
Total Operating cost per annum (Rs.Lacs)	**573**	**269**	**278**
Cost in Rs/Kg of steam **Total operating cost*100000/(5500*340*24}**	**1.28**	**0.60**	**0.62**
(*): Calorific value: Coal-on the basis of SRI test report; Rice husk-As per Thermax specification sheet (Enclosed as Annexure-I)			
(**): Fuel price: Furnace Oil-Last three months avg. price; Coal-Last 13 months purchase price; Rice husk-Quotation from two suppliers (enclosed as Annexure-II)			

Above analysis clearly depicts the attractiveness of coal with respect to biomass (rice husk) in terms of cost of steam generation. Also, as stated earlier OPL was historically operating a coal based boiler for meeting its requirement of steam. It was only after consideration of benefits from CDM, that it made economic sense for OPL to implement a biomass based thermal energy generation system.

Prevailing practice Barrier

OPL is a carpet manufacturing unit at Mirzapur in the state of Uttar Pradesh. Mirzapur is famous for its carpets and there are many carpet manufacturers in the region. There is a need for continuous supply of steam and energy in the industry. The requirement of electricity/steam is met either through carbon intensive grid power or through captive fossil fuel based boilers/power plants. Although majority of manufacturing units in the state have grid connection but due to huge power shortage in the grid (power supply is only available for 7-8 hours during the day), they need to depend on their captive fossil fuel based boiler/power generation systems to meet their continuous demand of energy to enable their operations.

	2003-04	2004-05	2005-06 (up to Feb., '06)

Energy shortage	13.2%	6153 MU	20.1%	10452 MU	21.6%	11041 MU
Peak deficit	16.5%	1189 MW	20.4%	1609 MW	19.4%	1587 MW

Before the implementation of the proposed project activity, OPL also had a fossil fuel (coal) based steam generation systems. The proposed project activity is the **"first of its kind"** initiative[2] in the carpet manufacturing industry to meet the thermal energy requirement by installing a biomass based boiler, utilizing biomass (rice husk) available in the region to provide continuous supply of steam to the manufacturing unit. Such an initiative in the sector will provide impetus to other carpet manufacturers in the area to establish biomass based steam/power generation systems.

Technological barrier

The carpet manufacturing unit of OPL is primarily export oriented, which means the quality of product and timeliness of product delivery is of utmost importance for the company. To ensure product quality and timely delivery, there is an ultimate need for continuous steam supply. The Steam thus forms a vital input and any disruption in the supply would affect the carpet manufacturing process leading to stoppage of production and subsequent production losses. As several carpets are manufactured at the same time, a disruption in steam supply means huge production losses to the company.

Considering the criticality of supply of steam, OPL was using a 3 Ton Lancashire coal fired boiler for their dyeing & drying activities at the manufacturing unit. This source of steam is more reliable, well proven, easier to operate and are subject to minimal breakdown as opposed to a rice husk based boiler (this is further illustrated below). Although fossil fuel based energy generation sources are more reliable but are carbon intensive and lead to emissions of greenhouse gases in the atmosphere. OPL being an environment conscious organization decided to implement a 6 TPH biomass (rice husk) based boiler in light of concerns on global warming caused due to accumulation of greenhouse gases. The rice husk based boiler would mitigate the emissions of greenhouse gases generated from the coal fired boiler. After the implementation of the project activity, the 3 Ton Lancashire coal based boiler has been sold out as scrap.

The project activity has following perceived technological and operational risks. The ash generated after combustion of rice husk contains high percentage of silica which leads to rapid erosion of the equipments. Due to high silica content and the shape of rice husk, equipments like ID fan, cone portion of air pre-heater and top portion of the stack get eroded which leads to high maintenance cost, frequent breakdown and increased downtime. Presence of silica in rice husk ash also corrodes boiler tubes which require frequent maintenance of the boiler. Further, in rice husk fired boilers, escape of fluidized media along with flue gas is a common problem. To compensate this and to maintain fluidized bed thickness, fluidizing media is required to be added at regular intervals. This leads to variation in the air requirement; also the fuel flow control with respect to the steam output is difficult in biomass fired boilers. Hence, the operation & control of biomass fired boiler requires skilled boiler operators.

In the carpet manufacturing process, the steam is essentially required for the process of dyeing and drying. The process of dyeing is done at 98ºC. The OPL carpet manufacturing unit at Mirzapur has 63 dyeing machines with a capacity ranging from 5 – 400 kg. There are 6 hydro-extractors and 3 dryers. The steam is used to increase the temperature of di-liquor in dyeing machines and to generate hot air in the

[2] Thermax Limited, one of the major boiler suppliers in India has certified that OPL is the first entrepreneur in the carpet manufacturing sector to have installed a biomass boiler for meeting its thermal energy requirement.

hunk dryers. Dyeing and drying are continuous processes requiring continuous flow of steam, any disruption in supply would lead to degradation/damage of various carpets at a single time leading to heavy production losses and OPL would be incurring huge financial burden. After dyeing and drying the steam is further required in the process of Latexing followed by drying in the drying chambers.

The problems with biomass (rice husk) are further aggravated due to the higher level of moisture and at times presence of impurities added. Many a times, the rice husk procured is mixed with impurities such as dust particle, stones and pebbles, and other biomass such as leaves, straw etc. The impurities present can damage the machinery and also provide incorrect estimates of the biomass requirement for power generation. In addition to this the effective cost of biomass is also increased affecting project's viability. The moisture content of rice husk may vary depending upon the season and also during transportation. In the monsoons, the moisture content will be comparatively more as compared to the other seasons. While transportation of fuel, precautions will have to be taken against unpredictable rainfall, and other weather conditions to ensure availability of biomass with least moisture levels. The presence of moisture (more than normal) would not only affect the net calorific value of biomass but also result in increased effective cost of it. This would create problems during combustion and also affect the economic viability of the project activity and as there is no structured market for biomass, OPL would have to depend on what ever is available and may have to face these problems. The perceived technological and operating risks of project activity would lead to events of boiler breakdown and CDM revenue from the project activity would help in covering the perceived technological and operational risks.

Other barriers

Collection, transportation & storage of biomass and risk of fluctuating prices:

The efforts are required from the project proponent in collection and transportation of the biomass residues (rice husk) from various locations to the project site as presence of a structured and established market is not there. OPL will have to put in resources to make sure the availability of the biomass in the project activity is regular. Other than this, due to seasonal availability of biomass residues, OPL would have to make good arrangement for storage of biomass residues at the project site that would entail investment in land and its management.

Formal markets for such products do not exist and as such in the future, it may not be possible to execute a long-term contract for procurement of biomass fuel for such steam generation. Furthermore, the bulk density of biomass is very low and as such transportation cost is much higher compared to conventional fuel.

To ensure a continuous and regular supply, a biomass management program will need to be prepared by the project proponent. It would include the following:

- Identification of the definite sources of biomass to the project site from the neighboring areas for the continuous operation of the boiler.

- Identification of the reliable agents, and transport to the project site.

- Construction of a bulk storage facility with enough space so that biomass can be brought to a certain level of moisture before use (this problem will be more during monsoon time when the moisture level in the biomass would be higher and it would also take more time to dry up the biomass along with sieving system to remove the impurities. All precautions should be taken by the project proponent to store the fuel from adverse weather conditions.

- An in-house facility to check the quality of fuel and to take immediate necessary action has to be appointed.

Another problem faced by OPL is with respect to the storage of rice husk. Rice husk has low specific gravity which requires proper handling and storage procedures at the project site, requiring a larger stocking area. The only storage space available in the OPL unit is in the vicinity of the latexing facility. Latexing is a major part of the carpet manufacturing process. A sticky substance called latex is applied at the back of the carpet to hold the carpet fibers firmly in place. Once the latex is applied, the carpets are left for drying. It is a common phenomenon that husk residues are carried away from their storage area to the latexing facility by air, where these residues permanently stick to the carpet, leading to deterioration of the product which cannot be exported as a result. This entails further production losses to the company as an indirect result of the biomass based steam generation system on site.

Assured supply of fuel
Continuous and uninterrupted supply of fuel (coal and FO) from nearby depots does not require OPL to deploy manpower. On the other hand, rice husk being an agricultural produce is dependent on the vagaries of the nature, has to be sourced from a large number of suppliers and is seasonal in nature. Getting assured supply of biomass is dependent on many uncontrolled parameters thereby increasing the risks in the project activity.

From the above paragraphs, it is clear that the project activity faced barriers, but in spite of that, OPL decided to implement this project after considering that additional revenues from CDM would help the project to mitigate above barriers.

Organisational barrier
The core business of OPL is the manufacture and export of high quality carpets. It has no prior experience in operating a biomass based steam generation system. These systems require highly skilled and trained staff to operate and maintain the boilers (especially rice husk based boilers which have the below mentioned problems), environmental equipments and controlling equipments. A considerable financial investment would be required to train the existing staff and appoint new personnel to carry out the daily operations. As the steam supply needs to be continuously maintained (being the requirement in manufacturing operations), regular maintenance of equipment is necessary and involves further investment.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>
The procedure followed for estimating the emissions reductions from this project activity during the crediting period are as per the following steps which corresponds with AMS I.C / version 12.

Emission Reductions (ER_y)
The emission reduction due to the project activity is calculated as the difference between the baseline emissions and the sum of the project emissions and the leakage:

$$ER_y = BE_y - (PE_y + Leakage_y)$$

ER_y – Emission reduction in year y (**tCO_2e**)

Baseline emissions (BE_y)

As mentioned in the paragraph 10 of the methodology AMS I.C (Version 11), for steam produced using fossil fuels the baseline emissions are calculated as follows:

$$BE_y = (HG_y \times EFCO_2) / \eta_{th}$$

Where

BE_y – The baseline emissions from steam displaced by the project activity during the year y in tCO_2e

HG_y – The net quantity of heat supplied by the project activity during the year in TJ. It is calculated as product of quantity of steam generated and net enthalpy of steam. The net enthalpy of steam is calculated as difference of enthalpy of steam and enthalpy of feedwater. The enthalpy of steam is calculated from steam pressure and steam temperature..

$EFCO_2$ – The CO_2 emission factor per unit of energy of the fuel that would have been used in the baseline plant in (tCO_2/TJ), obtained from reliable local or national data if available, otherwise,IPCC default emission factors are used.

η_{th} – The efficiency of the boiler using fossil fuel that would have been used in the absence of the project activity.

According to AMS I C, efficiency of the baseline units (boiler using fossil fuel) shall be determined by adopting one of the following criteria:

- Highest measured efficiency of a unit with similar specifications,
- Highest of the efficiency values provided by two or more manufacturers for units with similar specifications,
- Maximum efficiency of 100%.

From the above three options, we choose to use the second option i.e. highest of the efficiency values provided by two or more manufacturers for units with similar specifications.

Project activity emissions (PE_y)

The GHG emission due to the combustion of biomass is neutralized by the sequestration done during the growth of the biomass, thereby making it a carbon neutral fuel. Further the rice husk contains negligible quantities of nitrogen and sulphur, the other green house gas from the combustion of rice husk can be considered as negligible. Therefore essentially there would not be any GHG emissions due to the project activity within the project boundary.

However, in case of emergencies, if any quantity of coal is used then the estimation of CO_2 emissions would be done as follows:

Project activity emissions due to combustion of coal
= (44/12) x Percentage of total carbon in coal x Quantity of coal used

Leakage emissions

As mentioned in the Paragraph 16 of the methodology AMS I.C (Version 12), leakages is to be considered if the energy generating equipment is transferred from another activity or if the existing

equipment is transferred to another activity. There is no transfer of energy generating equipment or existing equipment to another activity.

However, the only source of GHG emissions which are attributable to the project activity lying outside the project boundary will be the emissions arising during the transportation of rice husk (This would also not be very significant as rice husk is abundantly available in the nearby vicinity, thereby not much transportation distance of rice husk is involved in the project activity). The same have been estimated below:

Emissions due to transportation of rice husk		
Annual quantity of biomass required for the project activity	tonnes/year	9068
Annual quantity of biomass transported by truck	tonnes/year	9068
Biomass load per truck	tonnes	8
Total no. of trips		1134
Max. distance between project site and collection centres	km	50
Consumption of diesel per trip (to and fro)(@4km/lit)	litres	25
Total diesel consumption (in litres)	litres	28350
Density of Diesel	tonnes/1000ltr	0.85
Total diesel consumption (in tonnes)	tonnes	24.098
Calorific value of diesel	TJ/tonne	0.0430
Emission factor for diesel	t CO_2/TJ	71.40
Emissions due to transportation of biomass	**t CO_2 /year**	**74**

Since similar quantum of emissions would have occurred in the baseline also, due to the transport of coal for the onsite boiler. Also as per attachment C to appendix B of Indicative simplified baseline and monitoring methodology for selected small-scale CDM project activity categories (Point No.12, Page-3), as these emissions are less than 10 %, these can therefore be neglected in the context of SSC project activities.

As per para 18 in attachment C to appendix B of Indicative simplified baseline and monitoring methodology for selected small-scale CDM project activity categories, it has been specified that "The project participant shall evaluate if there is a surplus of the biomass in the region of the project activity, which is not utilised. If it is demonstrated that the quantity of available biomass in the region, 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.

Now according to attachment C to appendix B of Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories –"General guidance on leakage in biomass project activities" Version 2, for small scale activities involving renewable biomass, there are three types of sources that are potentially significant (>10% of emission reductions) and attributable to the project activities. These emission sources may be project emissions (if under the control of project participants, i.e. if the land area where the biomass is grown is included in the project boundary) or sources of leakage (if the source is not under control of project participants). The following table summarizes, for different types of biomass, the cases where the emission source is relevant and the cases where it is not.

Biomass type	**Activity / source**	**Shift of pre-project activities**	**Emissions from biomass generation / cultivation**	**Competing use of biomass**
Biomass from forests	Existing forests	-	-	x
	New forests	X	X	-
Biomass from croplands or grasslands (woody or nonwoody)	In the absence of the project the land would be used as cropland / wetland	X	X	-
	In the absence of the project the land would be abandoned	-	X	-
Biomass residues or wastes	Biomass residues or wastes are collected and used	-	-	x

For the project activity, the leakage emission sources can be identified as follows:

1. As the project activity utilizes only rice husk (biomass residue), the implementation of project activity did not lead to shifting of pre-project activities.
2. The rice husk being used in the project activity is a waste generated from the rice crop. This waste would have anyways been generated even in the absence of the project activity and would have burnt without being used productively. The plant uses the waste generated and does not need application of fertilizer and clearance of land. Hence there are no emissions due to the same.
3. The only possible source of leakage in the project activity can be competing uses of biomass - The biomass may in the absence of the project activity be used elsewhere, for the same or a different purpose. To establish the same, OPL hired an independent agency to carry out a biomass assessment study in the surrounding area (surrounding area refers to the area within 50 km radius of the project activity). The results of the study pertaining to the surplus availability of rice husk (the biomass residue type being used in the project activity) are as follows:

	Surplus Rice Husk (MT)
Allahabad	66,617
Bhadohi	13,430
Jaunpur	47,010
Mirzapur	23109
Varanasi	23,362
	173,528

Annual quantity of biomass (rice husk) required by the project activity is 9068 T/year. The above table shows that the surplus availability of rice husk in and around the project activity is to the tune of **173,528** T/year which is far larger than the requirement of OPL project activity.

To evaluate annually if there is a surplus of the biomass in the region (the region is defined as the area within 50 km radius of the project activity area) of the project activity, which is not utilized, a biomass assessment study will be carried out every year in the absence of the official data (available literature / data from the government sources) prior to the monitoring and verification of the project in the region. If the biomass assessment study demonstrates that the quantity of available biomass in the region, is at least 25% larger than the quantity of biomass that is utilised including the project activity, then this source of leakage will be neglected otherwise the leakage shall be estimated and deducted from the emission reductions.

If the project leakage effects cannot be ruled out with the approaches listed in AMS I C version 12, leakage effects for the year *y* shall be calculated as follows:

$$LE_y = EF_{CO2,LE} \cdot \sum_n BF_{LE,n,y} \cdot NCV_n$$

Where:
LE_y = Leakage emissions during the year *y* (tCO2/yr)
$EF_{CO2,LE}$ = CO_2 emission factor of the most carbon intensive fuel used in the country (tCO2/GJ)
$BF_{LE,n,y}$ = Quantity of biomass residue type *n* used for heat generation as a result of the project activity during the year *y* and for which leakage can not be ruled out using one of the approaches L1, L2, L3 or L4 (tons of dry matter or liter)
NCV_n = Net calorific value of the biomass residue type *n* (GJ/ton of dry matter or GJ/liter)
n = Biomass residue type *n* for which leakage can not be ruled out using one of the approaches L1, L2, L3 or L4

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

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Data / Parameter:	**$EFCO_2$**
Data unit:	tCO_2/TJ
Description:	CO_2 emission factor for coal
Source of data used:	IPCC 2006 guidelines for National Greenhouse Gas inventories got stationary combustion
Value applied:	96.1
Justification of the choice of data or	The emission factor data will be applied as per the latest IPCC 2006 guidelines for national Greenhouse gas inventories for stationary combustion

description of measurement methods and procedures actually applied :	Conversion from C atom to CO_2 (26.2*44/12)
Any comment:	

Data / Parameter:	**Specific Fuel Consumption of rice husk**
Data unit:	kg of rice husk / MWh of thermal energy
Description:	The fuel consumption per unit of thermal energy generated
Source of data used:	Technical specification sheet provided by the boiler manufacturer.
Value applied:	269.8 kg/MWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	Design values provided by the technology supplier
Any comment:	This value is being fixed ex-ante for the crediting period.

B.6.3 Ex-ante calculation of emission reductions:

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As described in the section B.6.1, the project activity emissions and the leakage emissions are negligible and hence not considered. The baseline emissions are calculated as follows:

Parameter	Value	Description
HG_y	84.8 TJ	The Net quantity of steam in TJ is calculated as the product of energy of steam for 6 TPH Boiler (at 7.4 kg/cm^2 and 188^0 C) and yearly production of steam Enthalpy of Steam = 2762.3 kJ/kg (at 7.4 kg/cm^2 and 188^0 C) Yearly Generation of steam = 34373.34 T Net quantity of Steam = (Enthalpy of Steam - Enthalpy of feed-water) * Q_{Steam} = (2815.3 – 348.15) kJ/kg * 34373.34 T = 84.8 TJ
$EFCO_2$	96.1 tCO_2/TJ	IPCC 2006 guidelines for National Greenhouse Gas inventories got stationary combustion
η_{th}	82 %	The efficiency of the boiler has been assumed to be 82% based on design efficiency given by boiler suppliers.

$BE_y = (HG_y \times EFCO_2) / \eta_{th}$

= (84.8 TJ * 96.1 tCO_2/TJ)/0.82 ---------- (Values taken from the table above)
= 9,939 tCO_2

= **9,939 tCO_2e**

$ER_y = BE_y - (PE_y + Leakage_y)$
= **9,939 tCO_2e**

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

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Emission Reductions

S.No.	Operating Years	Baseline Emissions (Tonnes of CO_2)	Project activity Emissions (Tonnes of CO_2)	Estimation of Leakage (tonnes of CO_2e)	Emission Reductions, (Tonnes of CO_2)
1.	2008-2009	9,939	0	0	9,939
2.	2009-2010	9,939	0	0	9,939
3.	2010-2011	9,939	0	0	9,939
4.	2011-2012	9,939	0	0	9,939
5.	2012-2013	9,939	0	0	9,939
6.	2013-2014	9,939	0	0	9,939
7.	2014-2015	9,939	0	0	9,939
8.	2015-2016	9,939	0	0	9,939
9.	2016-2017	9,939	0	0	9,939
10	2017-2018	9,939	0	0	9,939
	Total	**99,390**	0	0	**99,390**

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

B.7.1 Data and parameters monitored:

Data / Parameter:	**$Q_{biomass}$**
Data unit:	MT
Description:	The quantity of rice husk used to generate steam in the boiler
Source of data to be used:	Plant records and log books
Value of data	9,068
Description of measurement methods and procedures to be applied:	Monitoring: The quantity of rice husk fed into the boiler is controlled via screw feeder having variable drive arrangement on basis of steam pressure. The no. of revolutions of screw feeder is indicated in RPM meter. This total no. of rpm is recorded on shift basis in boiler log book. The quantity of rice husk consumed is calculated by simply multiplying the total no. of revolution by quantity of rice husk fed in a revolution. Data type: Measured Archiving procedure: Paper and Electronic Recording Frequency: Daily Responsibility: Boiler Operator
QA/QC procedures to be applied:	The amount of Rice husks used can be cross checked by the purchase orders and stock inventory for rice husk.
`Any comment:	The data will be archived till 2 years after the crediting period

Data / Parameter:	**$NCV_{biomass}$**
Data unit:	Kcal/kg
Description:	Net calorific value of rice husk
Source of data to be used:	Third party laboratory test reports
Value of data	3,260
Description of measurement methods and procedures to be applied:	Monitoring: NCV Test certificate from a Government Approved Laboratory analysis. Data type: Estimated Archiving procedure: Paper and Electronic Recording Frequency: Once in three years Responsibility: Boiler Operator Calibration Frequency: Not applicable.
QA/QC procedures to be applied:	The calorific value of the rice husk is fairly constant and thus no QA/QC procedures are required.
Any comment:	The data will be archived till 2 years after the crediting period

Data / Parameter:	Q_{Steam}
Data unit:	Tons
Description:	Quantity of steam generated in the rice husk based boiler
Source of data to be used:	Plant records/log books
Value of data	34,373.34
Description of measurement methods and procedures to be applied:	The quantity of steam generated is monitored through the steam flow meter. It indicates the total quantity (in tonnes) of steam delivered for process from the main steam drum of boiler Monitoring: Log books Data type: Measured Archiving procedure: Paper and Electronic Recording Frequency: Daily/Hourly Responsibility: Boiler Operator Calibration Frequency: Calibration of instrument will be carried out once in a year
QA/QC procedures to be applied:	The parameter is monitored and logged in log sheets. Based on the logged data, a report consisting of the parameter is prepared by Shift in charge in hard copy and is forwarded to CDM Coordinator on monthly basis. The data used is reviewed by conducting an inter department review meeting once in 6 months. The Coordinator CDM will discuss the data (received from respective departments) with CDM Team member of concerned departments. Once the data is compiled and checked, it will be handed over to Verifier (OPL official) for Verification. After data verification, Auditor (OPL official) will be informed to carry out the Audit for concerned data.
Any comment:	The data will be archived till 2 years after the crediting period

Data / Parameter:	**S_P**

Data unit:	Kg/cm^2
Description:	Pressure of the steam at the outlet of the rice husk based boiler
Source of data to be used:	Plant records/Log books
Value of data	7.4
Description of measurement methods and procedures to be applied:	The steam pressure would be measured using pressure gauge. This parameter is used to calculate the Net Enthalpy of steam. Monitoring: Log book Data type: Monitored Archiving procedure: Paper and Electronic Recording Frequency: Daily/Hourly Responsibility: Boiler Operator Calibration Frequency: Calibration of Pressure gauge will be carried out once in a year
QA/QC procedures to be applied:	The parameter is monitored and logged in log sheets. Based on the logged data, a report consisting of the parameter are prepared by Shift in charge in hard copy and are forwarded to CDM Coordinator on monthly basis. The data used is reviewed by conducting an inter department review meeting once in 6 months. The Coordinator CDM will discuss the data (received from respective departments) with CDM Team member of concerned departments. Once the data is compiled and checked, it will be handed over to Verifier (OPL official) for Verification. After data verification, Auditor (OPL official) will be informed to carry out the Audit for concerned data.
Any comment:	The data will be archived till 2 years after the crediting period.

Data / Parameter:	**$T_{Feed\ water}$**
Data unit:	ºC
Description:	The temperature of feed water
Source of data to be used:	Plant Log sheets
Value of data	83.16
Description of measurement methods and procedures to be applied:	Feed water temperature is measured in the plant premises by using temperature gauge. This parameter is used to calculate the Net Enthalpy of steam. Monitoring: Log book Data type: Monitored Archiving procedure: Paper and Electronic Recording Frequency: Daily Responsibility: Boiler Operator Calibration Frequency: Calibration of Temperature gauge will be carried out once in a year
QA/QC procedures to be applied:	The parameter is monitored and logged in log sheets. Based on the logged data, a report consisting of the parameter is prepared by Shift in charge in hard copy and is forwarded to CDM Coordinator on monthly basis. The data used is reviewed by conducting an inter department review meeting once in 6 months. The Coordinator CDM will discuss the data (received from respective departments) with CDM Team member of concerned departments.

	Once the data is compiled and checked, it will be handed over to Verifier (OPL official) for Verification. After data verification, Auditor (OPL official) will be informed to carry out the Audit for concerned data.
Any comment:	The data will be archived till 2 years after the crediting period.

Data / Parameter:	Annual Demonstration of Surplus biomass
Data unit:	Tonnes
Description:	Surplus rice husk in the region
Source of data to be used:	Annual rice husk generation from50 km region
Value of data	Data shall be estimated on reports
Description of measurement methods and procedures to be applied:	Data shall be estimated on reports and other official source available for that region, which can prove that the rice husk is available in excess of 25 percent of total demand. Different approaches as listed down in AMS I C Version 12 may be used.
QA/QC procedures to be applied:	Only official sources and certified reports shall be used in order to keep the uncertainties low with respect to the authenticity of the data
Any comment:	The data will be archived till 2 years after the crediting period.

Data / Parameter:	**h_f**
Data unit:	Kj/kg
Description:	Feed water Enthalpy
Source of data to be used:	Plant records
Value of data	348.15
Description of measurement methods and procedures to be applied:	Monitoring: Plant record Data type: Calculated Archiving procedure: Paper and Electronic
QA/QC procedures to be applied:	The parameter is calculated from the monitored feed-water temperature. The data used is reviewed by conducting an inter department review meeting once in 6 months. The Coordinator CDM will discuss the data (received from respective departments) with CDM Team member of concerned departments. Once the data is compiled and checked, it will be handed over to Verifier (OPL official) for Verification. After data verification, Auditor (OPL official) will be informed to carry out the Audit for concerned data.
Any comment:	The data will be archived till 2 years after the crediting period.

Data / Parameter:	**h_g**
Data unit:	kJ/kg
Description:	Steam Enthalpy
Source of data to be used:	Plant records
Value of data	2815.3
Description of measurement methods and procedures to be applied:	Monitoring: Plant records Data type: Calculated Archiving procedure: Paper and Electronic

QA/QC procedures to be applied:	The parameter is is calculated from the monitored steam pressure. The data used is reviewed by conducting an inter department review meeting once in 6 months. The Coordinator CDM will discuss the data (received from respective departments) with CDM Team member of concerned departments. Once the data is compiled and checked, it will be handed over to Verifier (OPL official) for Verification. After data verification, Auditor (OPL official) will be informed to carry out the Audit for concerned data.
Any comment:	The data will be archived till 2 years after the crediting period.

Data / Parameter:	Coal Quantity
Data unit:	MT/year
Description:	The quantity of coal that may be used in the power plant during the crediting period
Source of data to be used:	
Value of data	--
Description of measurement methods and procedures to be applied:	Measured in plant premises Electronic weighing and record on paper, whenever it has been used
QA/QC procedures to be applied:	Weigh bridge will be calibrated at regular intervals.
Any comment:	The data will be archived for Crediting Period (CP)+2 years

Data / Parameter:	Carbon content of coal
Data unit:	%
Description:	The carbon content of the type of coal that will be used.
Source of data to be used:	Sample testing
Value of data	--
Description of measurement methods and procedures to be applied:	Test certificates will be obtained from the supplier of the coal
QA/QC procedures to be applied:	--
Any comment:	The data will be archived for Crediting Period (CP)+2 years

B.7.2 Description of the monitoring plan:

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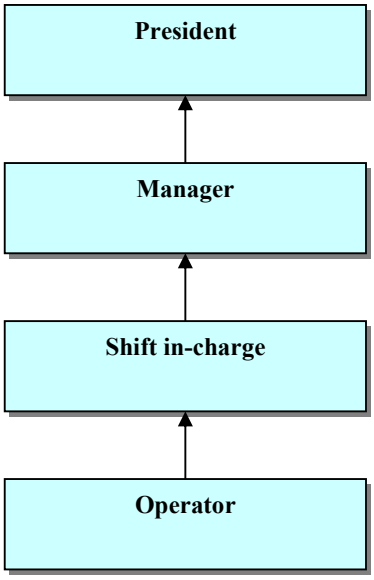
The monitoring plan has been drawn as per the guidance provided in the monitoring section of 'Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories Type I - Category 1.C - version 12 – EB 33

As per the requirement of monitoring methodology, following parameters will be monitored:

- Rice husk Quantity
- Quantity of steam generated in the rice husk based boiler
- Steam Pressure
- Feed water temperature
- Surplus biomass availability

Structure of OPL's CDM cell

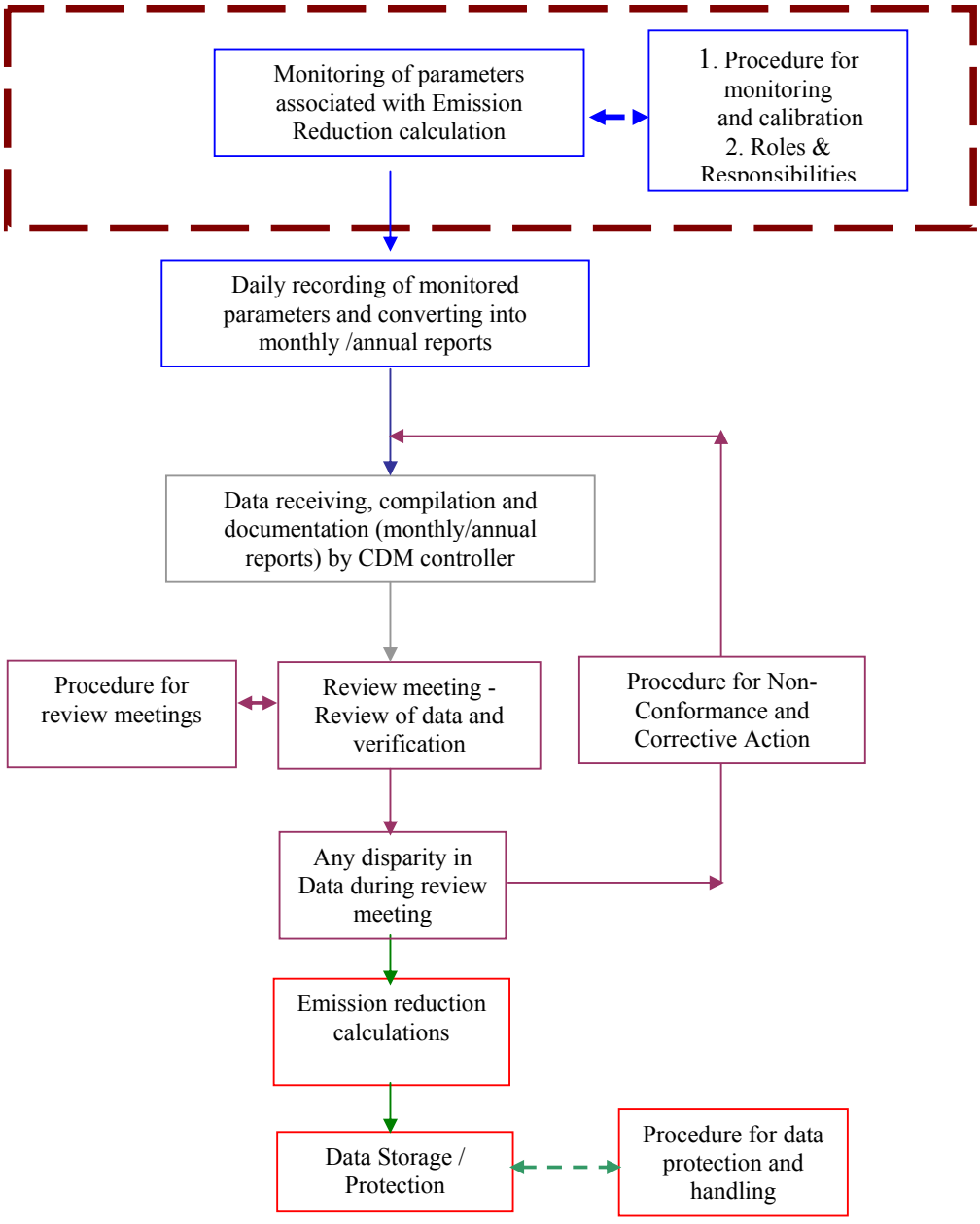


The above parameters are monitored by the operator and will be logged in the log sheets. Based on the logged data recorded in panel log sheets, a report constituting above parameters will be prepared by Shift in charge in hard copy and will be forwarded to CDM Coordinator on monthly basis. The report received from the respective department through hard copies will be compiled by Coordinator, CDM. The reports will be retained till 2 years after the end of crediting period or the last issuance of CERs for this project activity, which ever occurs later.

To ascertain the Quality Control and Quality Assurance of the monitored parameters following procedure is adopted:

- The data used will be reviewed by conducting an inter department review meeting once in 6 months. The Coordinator CDM will discuss the data (received from respective departments) with CDM Team member of concerned departments. Once the data is compiled and checked, it will be handed over to Verifier (OPL official) for Verification. After data verification, Auditor (OPL official) will be informed to carry out the Audit for concerned data.
- The control panel log sheet will be audited regularly.
- The instruments used for monitoring data will be calibrated once in a year.

The flow chart for CDM data monitoring, recording and storage is given below:



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

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01/01/2008

M/s Obeetee Private Limited.
The entity is also a project participant listed in Annex 1 of this document.

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:

>>
18 August 2005 (the date of purchase order of the boiler)

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

>>
25 years

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

The project activity uses a fixed crediting period of 10 years

C.2.1. Renewable crediting period

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

>>
Not Applicable

C.2.1.2. Length of the first crediting period:

>>
Not Applicable

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
01/03/2008

The project participant hereby confirms that the crediting period will not commence prior to the date of registration.

C.2.2.2. Length:

>>
10 years 0 months

SECTION D. Environmental impacts

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

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The ministry of Environment and forests(MoEF),Government of India ,under the environment impact Assessment Notification vide S.O.1533 dated 14/10/06 has listed a set of industrial activities in Schedule of the notification which for setting up new projects or modernization /expansion will require environmental clearance and will have to conduct an Environmental Impact Assessment(EIA) study. OPL project activity does not require EIA to be conducted as the activity is not included in schedule I.

The project activity is to install rice husk fired boiler for steam generation. The generated steam is utilized for meeting the process requirement. In the baseline scenario the steam was generated through a coal based boiler, to meet OPL's Process requirement. The project activity has replaced coal based boiler with rice husk based boiler for steam generation thus the project activity is environment friendly and leads to GHG emission reduction.

The CO_2 emission due to the combustion of rice husk is neutralized by the photosynthesis process of paddy crops. Hence, it "recycles" atmospheric carbon and does not add to the greenhouse effect. And also the rice husk contains negligible quantities of nitrogen and sulphur, hence the other green house gas from the combustion of rice husk can be neglected. The coal being a carbon intensive fuel leads to GHG emissions hence implementation of the project activity will lead to GHG emission reduction.

Although the project activity would not cause negative impacts over the environment, the following measures were considered during the design stage in the purview of environment:

Environmental Imapcts	Mitigation methods
Particulate matter and gases	In order to minimize the dust emission from plant to a level of less than pollution control regulations, a highly efficient multi cyclone dust collector is installed for this project.
Dry fly ash	Fly ash is collected from various source points like MCD hoppers, air-heater / hoppers and the ash collected from the furnace are used for land-filling in the nearby regions. The furnace ash and bank are collected manually. The dry fly ash from the air heater and MCD hoppers is collected into Hessian bags and transported with the help of tractor trolleys and then dumped into the ash yard as low lying land filling.
Water Pollution	OPL has effluent treatment plant and all the discharges will be treated and will be brought under the prescribed norms given by

	UPPCB.

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 environmental impacts are not considered to be significant by the project participant or the host party.

SECTION E. Stakeholders' comments

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

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The local stakeholder comment invitation and compilation process involved is as follows:
The local stakeholders are those who face the immediate effect due to the project activity which involves effect on the local environment, social life and economics.
Stakeholders have been identified on the basis of their involvement at various stages of project activity. The list of relevant stakeholders includes all the organizations, which were/ would be communicated / applied to get necessary clearances. The stakeholders identified for the project are as under:

- Local villagers and representative of village governing bodies
- Employees of OPL
- Equipment suppliers
- State pollution control board
- Ministry of Environment and Forests

OPL organised a consultation meeting with the stakeholders to inform them about the environmental impacts of the project activity and discuss their concerns regarding this project activity. The stakeholders were invited through a personal invitation letter from OPL for a consultation and discussion session at the factory premises of OPL situated in the Sant Ravi Das Nagar district of Uttar Pradesh.

Ministry of Environment & Forests (MoEF) would be providing the host country approval for the project activity. OPL has obtained consent to operate plant and submits regularly environmental statement to the Uttar Pradesh state Pollution Control Board (UPPCB). It also complies with all the other regulatory requirements applicable for them.

E.2. Summary of the comments received:

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During the consultation meeting, Mr. I.B Singh stated the purpose of the meeting and explained to the stakeholders in layman terms the concept of steam generation using rice husk in the boiler, the technology being employed by OPL and how it would result in reduced GHG emissions and the social and environmental benefits of the project. He also explained to them as to how climate change was affecting people world over and how OPL's proposed project would help in mitigating GHG emissions. Subsequently he introduced them to CDM and explained to them the concept of CDM. He also informed the stakeholders about OPL's similar initiatives. Mr. V.K Sharma, then invited the stakeholders to present their comments on how the project activity had affected their lives and what were their expectations from the project activity.

Local stakeholders were very positive about the project and its associated benefit. They appreciated OPL for carrying out such initiative.

The employees also appreciated OPL's efforts as the project activity would further help company's commitment to being an environment friendly organisation. They too stated that OPL should continue taking such initiatives resulting in social, environmental and economical benefits for the company.

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

CDM – Executive Board

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All the comments raised by local stakeholders have been properly taken care of and stated in the minutes of the meeting. The stakeholders were satisfied with the explanations given by members of OPL and appreciated the initiative taken by OPL in their area. Moreover, As per UNFCCC requirement the PDD will be published at the validator's website for public comments.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Obeetee Private limited
Street/P.O.Box:	Gopepur Gopiganj Distt Sant Ravi Das Nagar(Bhadohi)
Building:	----------
City:	----------
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URL:	----------
Represented by:	----------
Title:	President
Salutation:	Mr.
Last Name:	Kapoor
Middle Name:	----------
First Name:	Rajesh
Department:	Operations
Mobile:	93350-78516
Direct FAX:	----------
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Personal E-Mail:	rajesh.kapoor@obeetee.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding as part of project financing from parties included in Annex I of the convention is involved in the project activity

Annex 3

BASELINE INFORMATION

Baseline Emission		
Emission due to displacement of thermal energy (Coal)		
Annual quantity of steam supplied to process from rice husk based boiler	34373.338	tonnes
Enthalpy of steam @ 7.4 kg/cm2	2815.3	kJ/kg
Enthalpy of feed water at 83.16°C	348.15	kJ/kg
Net Enthalpy of steam	2467.15	kJ/kg
Net quantity of steam/heat supplied by the project activity during the year	84.80	TJ
Efficiency of Coal based Boiler	82	%
Estimated Fuel energy input	103.42	TJ
Emission factor- Coal	96.1	tCO_2/TJ
Baseline Emissions	9938.64	tCO_2/yr
Total Baseline emissions	**9,939**	tCO_2/yr
Project Emisssions		
Emission due to project activity	0	tCO_2/yr
Leakage		
Leakage due to transportation of biomass	0	tCO_2/yr
Emission Reduction		
Emission reduction due to project activity	**9,939**	tCO_2/yr
Total CER for ten years crediting period	99,390	tCO_2/yr

Annex 4

MONITORING INFORMATION

The monitoring information has already been outlined under section B.7.2.