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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6 MW Rice Husk based cogeneration plant at Bhageshwari Papers Private Limited

Version 01

02/04/2007

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

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Purpose

The purpose of the project activity is to utilize rice husk available in the region for effective generation of electricity for in-house consumption. The project activity is the 6 MW rice husk based cogeneration power plant generating electricity and steam for captive consumption. The project activity is helping in conservation of natural resources like coal and HSD.

Salient features of the project

Bhageshwari Papers Private Limited (BPPL), manufacturer of craft paper and MS Ingots is the promoter of the project activity. The major equipments of the project activity comprise of a new 6 MW condensing cum extraction turbine and one boiler. This cogeneration system replaced existing Diesel generating (DG) set, electricity from electricity board and one boiler.

Present Scenario

The total power requirement of the paper mill was being met by northern regional grid and DG sets and total process steam requirement was being met by coal fired boiler.

Project Scenario

The project activity, which is a 'carbon neutral fuel' based cogeneration plant, generates electricity in addition to steam to meet BPPL's captive electricity requirement thereby displacing power generation from DG sets and regional electricity grid. Apart from the electricity, project activity is saving the equivalent coal which otherwise would have been used for the steam generation in process plant. The new boiler is a high pressure boiler with 36 TPH steam production.

Project's contribution to sustainable development

This project activity has good contribution towards sustainable development and addresses the key issues:

Environmental well-being

1. Substituting the electricity requirement from DG set and regional electricity grid by cogeneration scheme thereby eliminating the generation of equivalent quantum of electricity using conventional fuel HSD used in DG and coal and other fossil fuels used in the electricity generation from regional grid.
2. Conserving coal by avoiding the process steam generation from coal fired boiler.
3. Mitigating the emission of GHG (CO_2) as rice husk is a carbon neutral fuel.

Socio-economic well being
1. Saving the coal and HSD and allowing it to be diverted to other needy sections of the economy
2. Contributing to a small increase in the local employment by employing skilled and un-skilled personnel for operation and maintenance of the equipment.

Technological well being
1. Adopting an advanced and sustainable technology for long term benefits.

A.3. Project participants:

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Name of Party involved ((host) indicates a host Party)	**Private and/or public entity(ies) project participants (as applicable)**	**Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)**
India (Host)	Bhageshwari Papers Pvt. Ltd, Muzaffarnagar (UP) (Private)	No

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

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

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The location of project activity site is shown in map below.


India
International boundary
State or union territory boundary
National capital
State or union territory capital
Road
Railroad
AFGHANISTAN
PAKISTAN
CHINA
NEPAL
BURMA
New Delhi
Arabian Sea
Bay of Bengal
INDIAN OCEAN
SRI LANKA
MUZAFFARNAGAR
(Uttar Pradesh)
SAHARANPUR
Uttranchal
HARIDWAR
BIJNOR
DELHI
MEERUT
To Haridwar
To Deoband
To Roorkee
To Ghaziabad
To Meerut
Jalalabad
Bidauli
Un
Thana Bhawan
Bubana Kalan
Chhapar
Charthawal
Sikri
Baghra
Shamli
Banal
Kairana
Bohpa
Sisauli
Taoli
Jauli
Shahpur
Mansurpur
Upper Ganga Canal
Jansath
Khandla
Burhana
Miranpur
Khatauli
58
National Highway
District Boundary
River
State Highway
Road
Railway Track
District Headquarter
Taluk Headquarter
Town

A.4.1.1. Host Party(ies):

>>
India.

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

>>
Uttar Pradesh

A.4.1.3. City/Town/Community etc:

>>
9th km, Bhopa Road

Muzaffarnagar 251 001

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

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The project activity site is located at Bhopa Road in district Muzaffarnagar. The project site is located 9 km from the heart of city. The site is well connected with road and rail network. The latitude and longitude for the district is 29.28 N and 77.44 E respectively.

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

>>
Type & Category
Main Category: Type I - Renewable energy power project
Sub Category: C – Thermal Energy for the User
As defined under *Appendix B of the simplified modalities and procedures for small-scale CDM project activities (Version 09, 23rd December 2006)* this category includes "**biomass based co-generating systems that produce heat and electricity for use on-site**". For co-generation and/or co-fired systems to qualify under this category, the energy output shall not exceed 45 MW thermal. E.g., for a biomass based co-generating system the capacity for all the boilers affected by the project activity combined shall not exceed 45 MW thermal. This project activity clearly qualifies in the above category since the net thermal energy output from the project activity is approximately 19 MWthermal (< 45 MWthermal).
The power requirement for operating the plant at BPPL was met by supplies from DG sets running on HSD and northern electricity grid before the project activity. BPPL set up the rice husk based cogeneration plant to meet its steam and power requirement from captive sources. The electricity produced by the project activity replaced the electricity supplied from DG set running on HSD and from regional electricity grid. The activity also replaced the steam being supplied from coal fired boiler with this cogeneration system.

Technology employed for the project activity

The plant installed one condensing cum extraction turbine along with 36 TPH high pressure boiler with steam parameters of 66 kg/cm^2 and 490^{o}C. This boiler is of modern design with fludised bed furnace suitable for outdoor installation with water scrubber for dust collection. Uninterrupted flow of rice husk to the boiler enabled by a twin bunker system; located in front of the boiler. In case of exigencies of biomass fuel scarcity, BPPL proposes to use coal as fuel. The plant has seven days storage capacity for rice husk.

Fuel Handling System: Rice husk is loaded in the twin type bunkers, installed near the boiler with the help of conveyor belts. One drag chain conveyor for each bunker is provided for mixing of fuel in the twin bunker.
For generating maximum of 100 % steaming capacity of the boiler at rated parameters, about 8 TPH of Rice husk (100 % Rice husk firing) is required.
The plant also has coal handling facilities with necessary crushers and conveyors to meet the requirement in case of exigencies of biomass fuel scarcity.

The plant has Distributed Control System (DCS) for operation and generates a gross output of 6000 kW at the generator terminals. The power generation in the cogeneration plant is at 440 V level.

No transfer of technology is involved to host country because technology is available within India from reputed manufacturers.

The plant is designed with all other auxiliary plant systems like:
1. Rice husk and coal handling system
2. Ash handling system
3. Air pollution control devices
4. Water system consists of following sub-systems:
5. Raw water system
6. Condensate system
7. Water treatment system
8. Service and potable water system
9. Compressed air system
10. Fire protection system
11. Complete electrical system for power plant including, instrumentation and control systems etc.

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

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Years	Estimation of annual emission reductions in tonnes of CO_2 e
2007-08 (1st July to 30th June)	40663
2008-09	40663

Years	Estimation of annual emission reductions in tonnes of CO_2 e
2009-10	40663
2010-11	40663
2011-12	40663
2012-13	40663
2013-14	40663
Total estimated reductions (tonnes of CO_2 e)	**284641**
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2 e)	40663

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

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There is no public funding available for 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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According to appendix C of simplified modalities and procedures for small-scale CDM project activities, '***debundling'*** is defined as the fragmentation of a large project activity into smaller parts. A small-scale project activity that is part of a large project activity is not eligible to use the simplified modalities and procedures for small-scale CDM project activities.

According to para 2 of appendix C[1]

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;
- 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

[1] Appendix C to the simplified M&P for the small-scale CDM project activities, http://cdm.unfccc.int/Projects/pac/ssclistmeth.pdf

According to above-mentioned points of de-bundling, BPPL's project activity does not comply with above, therefore, considered as small scale CDM project activity.

SECTION B. Application of a baseline and monitoring methodology

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

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Main Category:
Type I - Renewable energy power project

Sub Category:
C – Thermal Energy for the User

The reference has been taken from the recent list of the small-scale CDM project activity categories contained in Appendix B of the simplified M&P for small-scale CDM project activities. (Version 09, 23rd December 2006)

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

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This project activity falls under the "Type I: Renewable energy projects" and "Category I C: Thermal energy for the user". According to the methodology:

For co-generation systems and/or co-fired systems to qualify under this category, the energy output shall not exceed 45 MW $_{thermal}$. E.g., for a biomass based co-generating system the capacity for all the boilers affected by the project activity combined shall not exceed 45 MW $_{thermal}$. In the case of the co-fired system the installed capacity (specified for fossil fuel use) for each boiler affected by the project activity combined shall not exceed 45 MW $_{thermal}$.

The project activity at BPPL is rice husk (biomass) based cogeneration plant; having the capacity of 19 MW $_{thermal}$. The project activity qualifies applicability criteria for the I.C and is within the limit of 45 MW $_{thermal}$.

The project activity uses the baseline approach mentioned in para 6 and 7 of the AMS I.C:

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.

For renewable energy technologies that displace electricity the simplified baseline is the electricity consumption times the relevant emission factor calculated as described in category I.D.

The project proponent was using the electricity from HSD and electrical grid and steam from coal based plant in the pre project scenario. Due to rising cost of HSD and electrical grid; project proponent has thought of the coal based cogeneration power plant. (The board resolution is submitted).

In the absence of the project activity the coal based cogeneration plant would be in operation due to well proven technology and cheaper in the cost. (Excel sheet for the cost is submitted with respect to HSD and electrical grid)

Thus the project activity falls under the category AMS I.C and the baseline approach is applied for the case what would have been replaced (Electricity and steam from coal based cogeneration plant) and same as considered as baseline.

B.3. Description of the project boundary:

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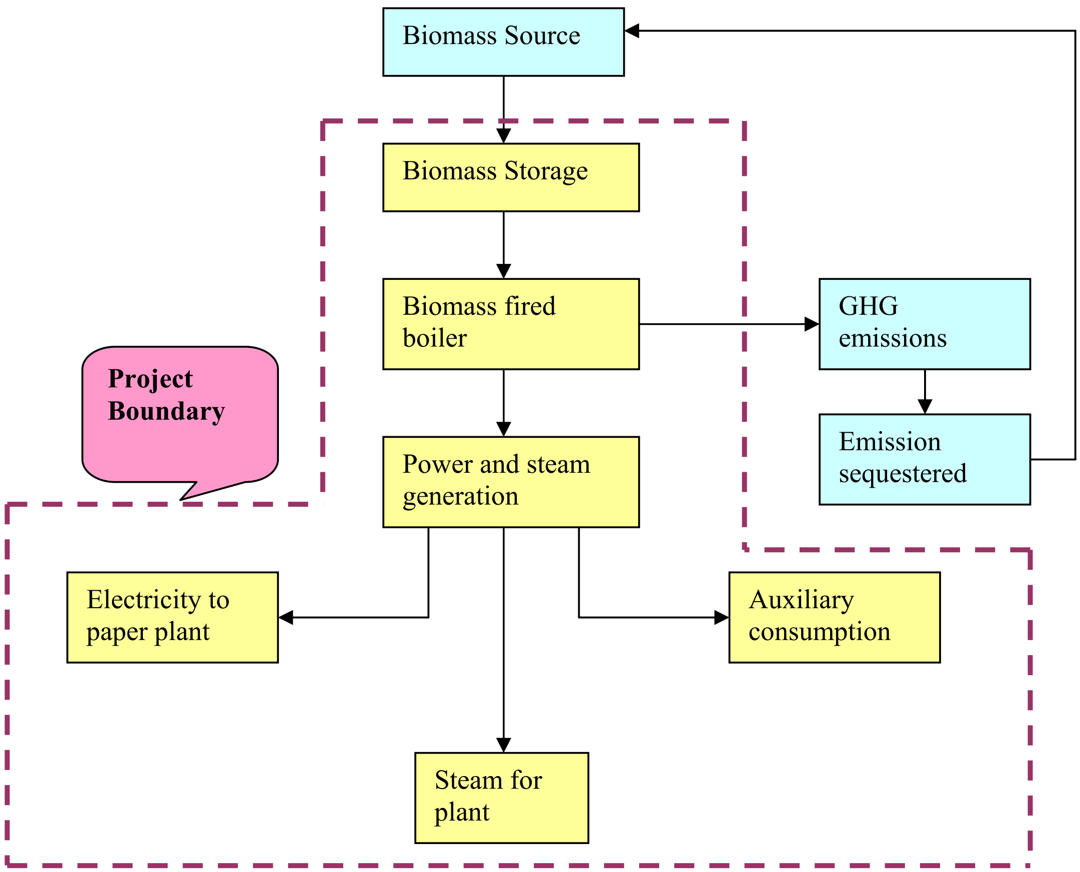
As mentioned under Type I.C. of '*Appendix-B*[2] *of the simplified modalities and procedures for small scale CDM project activities'*, project boundary encompasses the physical and geographical site of the renewable generation source. For the proposed project activity the project boundary is from the point of fuel storage to the point of electricity and steam supply to the paper mill where the project proponent has a full control.

Thus, project boundary covers fuel storage, boiler, steam turbine generator and all other accessory equipments.

Flow chart and project boundary is illustrated in the following diagram:

[2] Appendix B of the simplified modalities and procedures for small-scale CDM project activities, www.unfccc.int



B.4.	**Description of baseline and its development:**

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The baseline for the project activity is taken as the coal based cogeneration system which was the most lucrative option. The project proponent has collected actual plant run data on coal for the baseline justification. The different plant run data is given hereunder:

From Efficiency Test Run conducted on 12-11-2006

S. No.	Description	Units	Values
1	Actual plant power generation rate	kWh/hr	2772
2	Steam Flow rate from boiler	kg/hr	19250
3	Specific Steam Consumption	kg / kWh	6.9
4	Steam Pressure at Turbine inlet	kg / Sq. cm. (Abs)	65

5	Steam Temperature at Turbine inlet	degrees C.	478
6	BFW Temperature	degrees C.	114
7	Enthalpy of Steam at Turbine inlet	kcal / kg	804
8	Enthalpy of BFW	kcal / kg	117
9	Steam extracted from the plant	kg/hr	13916
10	Steam Pressure at Turbine extraction	kg / Sq. cm. (g)	8
11	Steam Temperature at Turbine extraction	degrees C.	244
12	Enthalpy of Steam at Turbine extraction	kcal / kg	702
13	Steam to condenser	kg/hr	5334
14	Plant heat rate	kcal / kWh	4767
15	Boiler Efficiency (assumed)	%	100
16	Overall Power Plant Efficiency	%	18
	Baseline Emissions (tCO_2/MWh)		
17	CO2 emission factor of coal used in captive power generation, IPCC	tCO2/TJ	96.1
18	Emission factor for captive power generation	tCO2/MWh	1.92

From Efficiency Test Run conducted on 12-12-2006

S. No.	Description	Units	Values
1	Actual plant power generation rate	kW	2800
2	Steam Flow rate from boiler	kg/hr	19570
3	Specific Steam Consumption	kg / kWh	7.0
4	Steam Pressure at Turbine inlet	kg / Sq. cm. (Abs)	64
5	Steam Temperature at Turbine inlet	degrees C.	446
6	BFW Temperature	degrees C.	115
7	Enthalpy of Steam at Turbine inlet	kcal / kg	785
8	Enthalpy of BFW	kcal / kg	116
9	Steam extracted from the plant	kg/hr	14500
10	Steam Pressure at Turbine extraction	kg / Sq. cm. (g)	8.1
11	Steam Temperature at Turbine extraction	degrees C.	256
12	Enthalpy of Steam at Turbine extraction	kcal / kg	708
13	Steam to condenser	kg/hr	5070
14	Plant heat rate	kcal / kWh	4677
15	Boiler Efficiency (assumed)	%	100

16	Overall Power Plant Efficiency	%	18
	Baseline Emissions (tCO_2/MWh)		
17	CO2 emission factor of coal used in captive power generation, IPCC	tCO2/TJ	96.1
18	Emission factor for captive power generation	tCO2/MWh	1.88

From Efficiency Test Run conducted on 12-01-2007

S. No.	Description	Units	Values
1	Actual plant power generation rate	kW	2615
2	Steam Flow rate from boiler	kg/hr	18000
3	Specific Steam Consumption	kg / kWh	6.9
4	Steam Pressure at Turbine inlet	kg / Sq. cm. (Abs)	66
5	Steam Temperature at Turbine inlet	degrees C.	452
6	BFW Temperature	degrees C.	110
7	Enthalpy of Steam at Turbine inlet	kcal / kg	788
8	Enthalpy of BFW	kcal / kg	111
9	Steam extracted from the plant	kg/hr	13000
10	Steam Pressure at Turbine extraction	kg / Sq. cm. (g)	8.5
11	Steam Temperature at Turbine extraction	degrees C.	276
12	Enthalpy of Steam at Turbine extraction	kcal / kg	718
13	Steam to condenser	kg/hr	5000
14	Plant heat rate	kcal / kWh	4660
15	Boiler Efficiency (assumed)	%	100
16	Overall Power Plant Efficiency	%	18
	Baseline Emissions (tCO_2/MWh)		
17	CO2 emission factor of coal used in captive power generation, IPCC	tCO2/TJ	96.1
18	Emission factor for captive power generation	tCO2/MWh	1.87

From Efficiency Test Run conducted on 12-02-2007

S. No.	Description	Units	Values
1	Actual plant power generation rate	kW	2700

2	Steam Flow rate from boiler	kg/hr	19300
3	Specific Steam Consumption	kg / kWh	7.1
4	Steam Pressure at Turbine inlet	kg / Sq. cm. (Abs)	64
5	Steam Temperature at Turbine inlet	degrees C.	448
6	BFW Temperature	degrees C.	115
7	Enthalpy of Steam at Turbine inlet	kcal / kg	787
8	Enthalpy of BFW	kcal / kg	116
9	Steam extracted from the plant	kg/hr	14008
10	Steam Pressure at Turbine extraction	kg / Sq. cm. (g)	8
11	Steam Temperature at Turbine extraction	degrees C.	262
12	Enthalpy of Steam at Turbine extraction	kcal / kg	711
13	Steam to condenser	kg/hr	5292
14	Plant heat rate	kcal / kWh	4792
15	Boiler Efficiency (assumed)	%	100
16	Overall Power Plant Efficiency	%	18
	Baseline Emissions (tCO_2/MWh)		
17	CO2 emission factor of coal used in captive power generation, IPCC	tCO2/TJ	96.1
18	Emission factor for captive power generation	tCO2/MWh	1.93

From Efficiency Test Run conducted on 12-03-2007

S. No.	Description	Units	Values
1	Actual plant power generation rate	kW	2808
2	Steam Flow rate from boiler	kg/hr	19414
3	Specific Steam Consumption	kg / kWh	6.9
4	Steam Pressure at Turbine inlet	kg / Sq. cm. (Abs)	65
5	Steam Temperature at Turbine inlet	degrees C.	480
6	BFW Temperature	degrees C.	121
7	Enthalpy of Steam at Turbine inlet	kcal / kg	805
8	Enthalpy of BFW	kcal / kg	122
9	Steam extracted from the plant	kg/hr	13908
10	Steam Pressure at Turbine extraction	kg / Sq. cm. (g)	8.2
11	Steam Temperature at Turbine extraction	degrees C.	260
12	Enthalpy of Steam at Turbine extraction	kcal / kg	710

13	Steam to condenser	kg/hr	5506
14	Plant heat rate	kcal / kWh	4719
15	Boiler Efficiency (assumed)	%	100
16	Overall Power Plant Efficiency	%	18
	Baseline Emissions (tCO_2/MWh)		
17	CO2 emission factor of coal used in captive power generation, IPCC	tCO2/TJ	96.1
18	Emission factor for captive power generation	tCO2/MWh	1.90

The lowest value (1.87 t CO_2/MWh) is considered as the baseline emission factor.

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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In accordance with 'Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities, a simplified baseline and monitoring methodology listed in Appendix B may be used for a small-scale CDM project activity if project participants are able to demonstrate to a designated operational entity that the project activity would otherwise not be implemented due to the existence of one or more barrier(s) listed in attachment A of Appendix. B.

It is established here that the project activity has associated barriers to its implementation which would be overcome with the availability of carbon financing against a sale consideration of carbon credits that would be generated during project operation.

The alternatives for the project activity applicable with current laws and regulations:

1. Purchasing the electricity (100%) from the state grid: Purchasing electricity from grid is an alternative, but in current scenario it is not a feasible option as state grid is severely short of power supply. According to Uttar Pradesh Power Corporation Limited, grid has a peak supply deficit of 14.93% in year 2004-05[3].Hence it is not an economically viable option for power purchase.
2. Captive Co-generation unit using coal as fuel: Coal is the primary fuel for power generated in the state. More than 81% of total power generated[4] in the state is produced using coal. Coal is also an economical option for power generation as it does not face supply barriers. Price fluctuations of fuel are not high which makes it a less risky fuel option.
3. Captive Co-generation unit using biomass as primary fuel i.e. project activity: Propose plant location is situated in the agriculture belt of Uttar Pradesh. There is an abundant supply of crop

[3] Annex-3: Demand-Supply situation in Uttar Pradesh- Source: UPPCL

[4] Installed Generation Capacity as on 31.01.2005- Ministry of Power Data, **powermin.nic.in**

residue (mainly rice-husk) in the region[5]. However in normal practice it is burned in inefficient & improper way or is left for rotting in the fields. Supply related constraints are evident by the fact that despite availability of good quality biomass, it is not used for power generation in the state. There are barriers prohibiting implementation of the project activity.

Investment barrier

The main investment barriers for the project activity are discussed below:

1. The project participants are small scale paper manufacturing unit and an investment of this magnitude was impossible for it alone therefore it has approached financial institutions to finance the project (Please see the breakup of project financing below).
2. In an event of any technical failures or delay in the project activity there is a grave risk of interests building up and threatening the financial capacity of BPPL. The project activity actually got delayed and project proponent pays additional interest on the money taken from bank.
3. After the success of this project activity it is natural that there will be similar projects which will push the biomass prices upwards. Therefore escalation of biomass prices due to increase in demand for this fuel could hamper the financial prospects of the project activity. The detailed analysis of the same is done in the section below.
4. Conceiving this project without CDM benefits would have been impossible. The CDM fund will help the project proponent to run the cogeneration plant smoothly in-spite of rising biomass prices. CDM funding to project participants would also encourage other paper industries to follow suit and thereby contribute towards GHG emission reduction. The sister unit of the project participants has gone for the same project activity with the expectation of CDM revenue. The project proponent gained the knowledge from the same and has started the environmentally sustainable activity.

The major investment barrier to the project is the perceived risk in case of reduced supply of rice husk or increased rice husk prices in future. Investors are worried that shortage in supply of rice husk in future, may lead to steep rise in prices of rice husk which might render the project financially unstable.

This is evident from the fact that the cost of rice husk during the financial closure was around INR 1,800-1900/ton. Current prevailing prices of rice husk are INR 2250/ton (25% more). This escalation in the rice prices is expected to continue in future. Te table below represents the cost per million Kcal of the different fuel used. It is clear from the table that the use of rice husk is costlier than the coal.

Calorific value of rice husk	3150	Kcal/kg
Calorific value of coal	4000	Kcal/kg
Cost of Rice husk	1800	Rs/ton

[5] Based on Biomass assessment report of region that the availability of rice husk is more than 25% of the all the users.

Cost of coal	1600	Rs/ton
Cost per million Kcal from Rice husk	571	INR/million Kcal
Cost per million Kcal from Coal	400	INR/million Kcal

As per the prevailing prices of CER the CDM fund will compensate the increase in the rice husk prices (The differences in the cost of different fuel. This CDM fund is expected to increase in future and the rice husk price as well. The CDM revenue will help to improve the sustainability of the project which will otherwise be rendered financially unstable.

The project proponent has taken secured and unsecured loans from banks and paying huge interest for the project. This interest is an additional burden on project proponent. The details of finance are as below:

Means of Finance	INR in millions
Loan from state bank of India	91
Equity shares	27
Internal accruals	4
Total	**122**

Project proponent is paying the money back at interest rate of 9.25%.

Due to high initial investment in starting the cogeneration plant and due to its associated financial risk mentioned above it was not possible for the project proponent to install cogeneration power plant. The project proponent had an alternative to continue to produce from the DG set and purchase power from state electricity grid and could have invested the money (used to install cogeneration plant) for enhancing the installed capacity of the paper mill which would have delivered assured higher returns in view of favourable market for paper industry in Uttar Pradesh. In spite of these factors, BPPL is one such entrepreneur to initiate this GHG abatement project under Clean Development Mechanism. It is ascertained here that, if BPPL is successful in securing the proposed carbon financing, it will help in offsetting this barrier and encourage other entrepreneurs to come up with similar project activities.

Other Barriers

Energy is not a core business of BPPL. They are mainly manufacturers of craft paper and iron ingot. The rice husk based cogeneration project activity is a steep diversification from the core business fields to power sector economics, where the project proponent has to meet challenges of techno-commercial problems associated with the project activity.

Apart from this UP's paper industry does not have any incentive to invest in high efficiency biomass cogeneration for electricity generation. In such circumstances they will continue to use rice husk for in-efficient burning in low pressure boilers with no electricity generation.

Fuel Supply Barriers

Biomass, though abundant in supply, doesn't have proper logistics network for collection and delivery. In normal practice it burned in improper way or is left for rotting in the field. It has also been observed (Rice-husk procured in the plant in past one year) that biomass prices increase significantly due to increased demand in the power plant. This happens due to lack of proper collection mechanism and delivery of biomass, this leads to short-term shortage and thus increased prices.

This is a fuel availability risk, and to ensure continuous & economical fuel supply project participants will have to invest in developing a viable fuel supply mechanism.

The barriers discussed above are sufficient to hinder growth of the cogeneration plants in sector. While the country has a clean energy strategy, the reality is that coal will continue to dominate in the near term and the paper industry will burn coal in inefficient boilers unless financial incentives, such as carbon financing, exist.

This project activity is a renewable energy project with net zero CO_2 emission due to the carbon sequestration. Paddy re-grows at the same rate as it is being harvested, and acts as a sink for atmospheric carbon dioxide and the net flux of CO_2 to the atmosphere is zero. The project activity will save coal (which was used for steam generation) and fossil fuel (used for electricity generation in baseline scenario). The estimated emission reduction from the project activity is **40663** ton/annum.

In view of the above mentioned prohibitive barriers and GHG emission reductions, it is understood that the project activity is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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As established in Section above the project activity falls under Category I.C. Generation of electricity for captive consumption using rice husk as fuel in BPPL's cogeneration plant will lead to mitigation of GHG emissions from the fossil fuel based plants, which supply steam and power to BPPL. In order to monitor the mitigation of GHG due to at the project activity at BPPL, the total electricity produced and auxiliary consumption need to be measured.

The baseline scenario for the project activity is the coal based cogeneration system. The baseline is established in terms of the actual plant operation from coal and the heat rate is calculated based on actual data.

The net electricity supplied to manufacturing facility of BPPL by the project activity multiplied by the baseline emission factor will form the baseline emissions for the project activity.

The project activity is rice husk based cogeneration power plant and based on the methodology both steam and power should be monitored. In the cogeneration system the power is more important with respect to steam because the cogeneration system is meeting power demand first. Therefore steam is free. Direct monitoring of power generation will be most important for emission reduction calculation.

Based on the project activity this monitoring methodology is best suited for transparent and conservative emission reductions.

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

Data / Parameter:	**$BE_{electricity}$**
Data unit:	ton CO_2/MWh
Description:	Carbon emissions from the electricity generated in coal based cogeneration plant
Source of data used:	Plant
Value applied:	1.87
Justification of the choice of data or description of measurement methods and procedures actually applied :	The value is calculated based on several trails in the existing system. The lowest value is considered for the calculation and most conservative value is considered for calculations.
Any comment:	Data will be kept for crediting period + 2 years.

Data / Parameter:	**Emission factor of Coal**
Data unit:	ton CO_2/TJ
Description:	Carbon emissions factor of Coal used
Source of data used:	Plant
Value applied:	96.1
Justification of the choice of data or description of measurement methods and procedures actually applied :	Table 2.2, 2.6 IPCC 2006 value is used.
Any comment:	Data will be kept for crediting period + 2 years.

B.6.3 Ex-ante calculation of emission reductions:

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Baseline Emissions:

Emissions from electricity (tCO_2/annum) = Quantity of electricity generated (MWh/annum) x Baseline emission factor ($BE_{electricity}$) (tCO_2/MWh)

<u>Project emissions:</u>

The project activity leads to GHG on-site emissions in the form of CO_2 emissions from combustion of rice husk. The CO_2 emissions from rice husk combustion process will be consumed by the paddy plantations, representing a cyclic process of carbon sequestration. Since the husk contains negligible quantities of other elements like Nitrogen, Sulphur etc. release of other GHG emissions are considered negligible.

In case of exigencies of biomass fuel scarcity, BPPL proposes to use coal as fuel.
In case coal is used the CO_2 emissions during the usage of coal will be calculated in the following manner:
Tonnes of CO_2 = Quantity of coal used in tonnes x Net calorific value of coal x CO_2 emission coefficient of coal in kg CO_2/TJ (IPCC 2006 value)
Diesel generator (DG) sets will be used as standby. However the emissions from the usage of DG sets are not considered in the project activity emissions since the electricity generated by DG sets would be monitored separately.

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

>>

Year	Estimated Project Activity Emissions (tonnes of CO_2e)	Estimated Baseline Emissions (tonnes of CO_2e)	Estimated leakage(tonnes of CO_2e)	Estimated Emission Reduction (tonnes of CO_2e)
2007-08 (1st July to 30th June)	0	40663	0	40663
2008-09	0	40663	0	40663
2009-10	0	40663	0	40663
2010-11	0	40663	0	40663
2011-12	0	40663	0	40663
2012-13	0	40663	0	40663
2013-14	0	40663	0	40663
Total	**0**	**284641**	**0**	**284641**

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

>>

The monitoring plan will consists of monitoring the gross electricity generated and auxiliary consumption. The net electricity generation will be calculated with the difference between gross and net electricity generation. The coal use and steam produced will be monitored separately. The calorific value of the coal used will be monitored from the laboratory.

B.7.1 Data and parameters monitored:

>>

Data / Parameter:	**Gross Electricity**
Data unit:	KWh
Description:	Gross electricity generated from cogeneration plant
Source of data to be used:	Plant.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	23693
Description of measurement methods and procedures to be applied:	Monitoring: electronic meters at the plant and DCS will measure the data. Data Type: measured Frequency: Daily Archiving Policy: Paper & Electronic Responsibility: Manager (power plant) would be responsible for regular calibration of the meter. Calibration Frequency: Once in every year.
QA/QC procedures to be applied:	Yes, Quality Management System will be used and the same procedures would be available at the project site
Any comment:	Data archived: Crediting period + 2 yrs

Data / Parameter:	**Auxiliary Electricity**
Data unit:	KWh
Description:	Auxiliary electricity consumption in cogeneration plant
Source of data to be used:	Plant.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	2000
Description of measurement methods and procedures to be applied:	Monitoring: electronic meters at the plant and DCS will measure the data. Data Type: measured Frequency: Daily Archiving Policy: Paper & Electronic

	Responsibility: Manager (power plant) would be responsible for regular calibration of the meter. Calibration Frequency: Once in every year.
QA/QC procedures to be applied:	Yes, Quality Management System will be used and the same procedures would be available at the project site
Any comment:	Data archived: Crediting period + 2 yrs

Data / Parameter:	**Coal**
Data unit:	Ton/annum
Description:	Coal consumption in cogeneration plant
Source of data to be used:	Plant.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0
Description of measurement methods and procedures to be applied:	Monitoring: Weigh bridge will monitor the data. Data Type: measured Frequency: Monthly Archiving Policy: Paper & Electronic Responsibility: Manager (power plant) would be responsible for regular calibration of the meter. Calibration Frequency: Once in every year.
QA/QC procedures to be applied:	Yes, Quality Management System will be used and the same procedures would be available at the project site
Any comment:	Data archived: Crediting period + 2 yrs

Data / Parameter:	**Calorific value**
Data unit:	Kcal/kg
Description:	Calorific value of coal used
Source of data to be used:	Plant.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	4000
Description of measurement methods and procedures to be applied:	Monitoring: Lab Data Type: measured Frequency: Once in a month Archiving Policy: Paper & Electronic Responsibility: Manager (power plant) would be responsible for regular calibration of the meter. Calibration Frequency: Once in every year.
QA/QC procedures to be applied:	Yes, Quality Management System will be used and the same procedures would be available at the project site
Any comment:	Data archived: Crediting period + 2 yrs

Data / Parameter:	**Steam**
Data unit:	Ton
Description:	Steam generated in power plant
Source of data to be used:	Plant.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	20
Description of measurement methods and procedures to be applied:	Monitoring: steam flow meter at plant Data Type: measured Frequency: Daily Archiving Policy: Paper & Electronic Responsibility: Manager (power plant) would be responsible for regular calibration of the meter. Calibration Frequency: Once in every year.
QA/QC procedures to be applied:	Yes, Quality Management System will be used and the same procedures would be available at the project site
Any comment:	Data archived: Crediting period + 2 yrs

B.7.2 Description of the monitoring plan:

>>

Emission monitoring and calculation procedure will follow the following organisational structure. All data and calculation formula required to proceed is given in the section B in PDD.

Organisational structure for monitoring plan

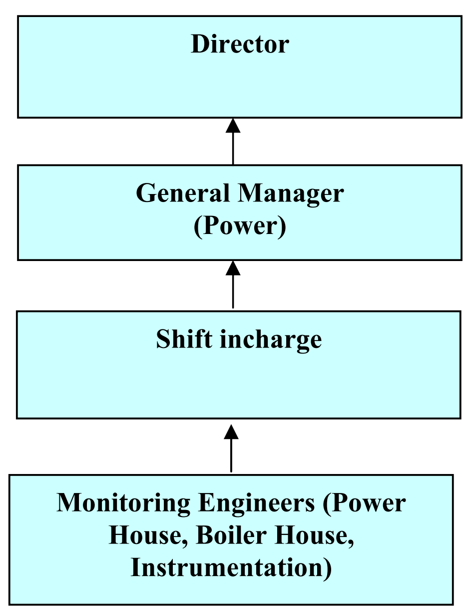

Table --: Monitoring and calculation activities and responsibility

Monitoring and calculation activities	Procedure and responsibility
Data source and collection	Data is taken from the power plant. Data will be monitored with the installed electronic data recording system.
Frequency	Monitoring frequency should be as per section B of PDD.
Internal Review	All received data is reviewed by the engineers in the power plant.
Data compilation	All the data is compiled and stored in power plant.
Emission calculation	Emission reduction calculations will be done annual based on the data collected. Engineers/Executives of power plant will do the calculations
Review	General Manager, power will review the calculation.
Emission data review	Final calculations is reviewed and approved by Director.
GHG performance and uncertainties assessment	The director will review the calculation and make the GHG performance review. The director will address the uncertainties as per inter procedure laid down for CDM project.
Record keeping	All calculation and data record will be kept with the power plant.

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

>>

Date of completing the final draft of this baseline and monitoring methodology:
02/04/2007

Name of person/entity determining the baseline:
BPPL, Muzaffarnagar (UP)
The person/entity is also a project participant as 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:

>>
03/09/2004 (Date of release of purchase order for the major equipments)

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

>>
25 years

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

C.2.1. Renewable crediting period

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

>>
Date of registration of the project activity. For calculation purposes 1st July 2007 is taken as the start date of crediting period.

C.2.1.2. Length of the first crediting period:

>>
7 years 0 months.

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
NA

C.2.2.2. Length:

>>
NA

SECTION D. Environmental impacts

>>

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 project does not fall under the purview of the Environmental Impact Assessment (EIA) notification of the Ministry of Environment and Forest, Government of India. However the design philosophy of this cogeneration project activity is driven by the concept of providing the low cost energy with acceptable impact on the environment hence the environment and safety aspects of the project activity can be are discussed as follows:

Particulate matter and gases

The elements polluting the air that are discharged from the Cogeneration power plant are,

1. Dust particulate from fly ash in flue gas
2. Nitrogen oxide in flue gas
3. Sulphur di-oxide in flue gas

Water scrubber is installed for the plant steam generator to contain the dust emission from plant to a level of less than 115 mg/Nm3. The water scrubber is designed such that the dust concentration at the ESP outlet will be 115 Mg/Nm3 even during the plant is fired by coal in future. Adequate height of the stack for the Rice husk fired boiler, which disburses the pollutants has been provided as per guidelines given by the pollution regulations for dust and sulphur-di-oxide emissions into the atmosphere.

The temperatures encountered in the boiler while burning the specified fuels, are low enough not to produce nitrogen-oxides. Hence, no separate measures are taken to contain the nitrogen oxide pollutants.

Dry fly ash

The ash will be collected manually by using Trolleys. The dry fly ash from the economiser, air heater and ESP hoppers will be collected by dense phase ash handling system and stored in ash bunker, will be used for land filling in the nearby lowland areas. Provision is made in the system for water spray to eliminate dust nuisance in the plant.

Wastewater

Effluent from water treatment plant: Hydrochloric acid and sodium hydroxide is used as regenerants in the water treatment plant. The acid and alkali effluent generated during the regeneration process of the ion-exchangers are drained into a lined underground neutralizing pit. Generally these effluents are self neutralizing. The effluent is then pumped into the effluent treatment ponds which form part of the main paper unit as well as cogeneration power plant's effluent disposal system. The neutralizing pit are sized with sufficient capacity. The rejects from plant has high TDS which could be diluted and used for cleaning purposes in the project activity. This water also could be used for plantation.

Chlorine in cooling water: In the condenser cooling water, residual chlorine of about 0.2 ppm is maintained at the condenser outlet. This chlorine dosing is done mainly to prevent biological growth in the cooling tower system. This value would not result in any chemical pollution of water and also meets the national standards for the liquid effluent.

Monitoring

The characteristics of the effluents from the plant are monitored and maintained to meet the requirements of State Pollution Control Board and the minimum national standards for effluent from thermal power plants. Air quality monitoring is also undertaken to ensure that the dust pollution level is within limits.

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:

>>

As per the impacts discussed in the above section, there are no significant impacts envisaged on implementation of the project.

SECTION E. Stakeholders' comments

>>

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

>>

BPPL organised stakeholder consultation with the objective to inform the interested stakeholders on the environmental and social impacts of the project activity and discuss their concerns regarding the project activity.

BPPL representatives presented the salient features of the company and the project activity to the stakeholders and requested their suggestions/objections. The project proponent has sent the letters to different stakeholders for their views for the project activity. The opinions expressed by them were recorded and are available for validation.

The other stakeholders identified for the project activity are as under:

1. Local population /Village panchayat
2. State Pollution Control Board
3. Consultants
4. Equipment suppliers

Stakeholders list includes the government and non-government parties, which are involved in the project activity at various stages. At the appropriate stage of the project development, stakeholders /relevant bodies would be involved to get the clearance.

E.2. Summary of the comments received:

>>

Stakeholders Involvement

The local community mainly comprises of local population around the project area. In addition to this, it also includes local manpower since; the project activity provides direct and indirect employment opportunities to local populace thus encouraging the project activity.

The project activity did not cause to any displacement or adverse social impacts on the local population and is helping in improving the quality of life for them.

State Pollution Control Board (SPCB) has prescribed standards of environmental compliance and monitor the adherence to the standards. BPPL has received NOC from SPCB.

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

The project proponent has received comments from local population in appreciation for such an effort on BPPL's part. They have no objection to the installation of the proposed cogeneration plant. The copies of the comments received from the stakeholders are available for validation.

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

>>

In view of various direct and indirect benefits (social, economical, environmental), no concerns were raised during the consultation with stakeholders, hence it is not required to take due account of the comments.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Bhageshwari Paper Pvt Ltd
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Represented by:	
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Salutation:	Mr.
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Middle Name:	
First Name:	Divesh
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Direct FAX:	+91 131 2468391
Direct tel:	
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

NO PUBLIC FUNDING IS INVOLVED IN PROJECT ACTIVITY.

Annex 3

BASELINE INFORMATION

Power scenario in UPPCL

UTTAR PRADESH-ENERGY & AVAILABILITY OF POWER BY THE END OF IX PLAN AND ONWARDS

Year	Energy Requirement/availability in Million Units						Peak Demand in MW			
	Energy Demand As per XVI EPS	Availability			Shortage		Peak Demand As per XVI EPS	Availability	Shortage	
		State Generation	Import	Total	In MU	(%)			in MW	(%)
2000-01	46763	22506	18505	41011	5752	12.30	7477	5648	1829	24.46
2001-02	50087	22814	19060	41874	8213	16.40	8018	5716	2302	28.71
2002-03	53671	23124	24633	47757	5914	11.02	8601	6889	1712	19.90
2003-04	57531	24607	26280	50887	6644	11.55	9230	7470	1760	19.07
2004-05	61681	24563	31910	56473	5208	8.44	9907	7994	1913	19.31
2005-06	66103	24563	40139	64702	1401	2.12	10626	9040	1586	14.93
2006-07	70803	26312	43189	69501	1302	1.84	11384	9967	1417	12.45

Source: UPPCL

Annex 4

MONITORING INFORMATION

Small scale project category		
Temperature of steam	483	deg C
Steam pressure	64.8	kg/cm2
Enthalpy	3377	KJ/kg
Max steam production	2000 0	kg/hr
Capacity of Boiler in MW thermal	19	MW thermal
Baseline Coal based cogeneration system		
Emissions from electricity		
Heat rate	4660	Kcal/kWh
Electricity generated per day	6573 6	kWh/day
Operating days	330	Days
Total electricity generated per annum	2169 3	MWh
Emission factor of electricty generation from extraction cum condensing turbine and coal based cpp	1.87	tCO2/MWh
Emissions from electricity	4066 3	tCO2/annum
Emissions from steam	0	tCO2/annum
The steam will be free from the cogeneration system		
Total Emissions	**4066** **3**	tCO2/annum