



**CLEAN DEVELOPMENT MECHANISM
SIMPLIFIED PROJECT DESIGN DOCUMENT
FOR SMALL-SCALE PROJECT ACTIVITIES (SSC-CDM-PDD)
Version 02**

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**Revision history of this document**

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	<ul style="list-style-type: none">• 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.

**SECTION A. General description of the small-scale project activity.****A.1. Title of the small-scale project activity:**

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Rice husk based Co-generation project at Rampur
Version 01, Date 07/12/2006

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

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The purpose of the project activity is to install a combined heat and power generation (Cogeneration) plant, comprising a high pressure boiler and a back pressure turbine. Rice husk would be used as fuel in the project activity. The cogeneration plant would be used to meet the steam and power requirements of the distillery unit of Radico Khaitan Limited (RKL). Currently the steam requirement is being met by the rice husk fired low pressure boilers and power requirement of the distillery unit is being met by the on site diesel generator (DG) sets. The usage of a carbon neutral fuel (rice husk) for combined heat and power will result in reduction of GHG emissions which would have occurred due to the burning of fossil fuel (diesel) in the DG sets in the absence of the project activity.

RKL distillery unit will be procuring rice husk from Rampur and its neighbouring districts (Bareilly, Moradabad). The average production of rice (tonnes/year) in these areas¹ over the past few years has been as follows:

District / Year	Rampur	Bareilly	Moradabad
2001-02	333,515	364,008	314,024
2002-03	303,299	229,952	215,408
2003-04	293,339	339,273	291,536
Average	310,051	311,077	273,656
Rice husk (28% of the rice crop)	86,814	87,101	76,623
Total	250,538		

Thus, the production of rice husk in Rampur and neighbouring districts is of the order of 0.25 million tonnes per annum (MTPA). The requirement of rice husk for the project is approx 0.05 MTPA. Thus this substantiates that enough quantity of rice husk will be available for the project activity.

Project Activity's contribution to Sustainable Development

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 cogeneration 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 centres to the project site.

¹<http://upgov.up.nic.in/engspatrika/zspmenu.asp?state=V2>



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 power generation system (DG) with rice husk based cogeneration 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, will be 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)
Government of India (host)	Radico Khaitan Ltd.	No

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

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RKL has planned to put up a rice husk based co-generation plant comprising of a high pressure boiler (44 kg/cm² pressure) and a back pressure turbine(2.28 MW). The cogeneration plant will, displace the DG sets, which otherwise, would have been used to meet the power requirements of the distillery unit in the absence of the 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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India

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

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Uttar Pradesh

A.4.1.3. City/Town/Community etc:

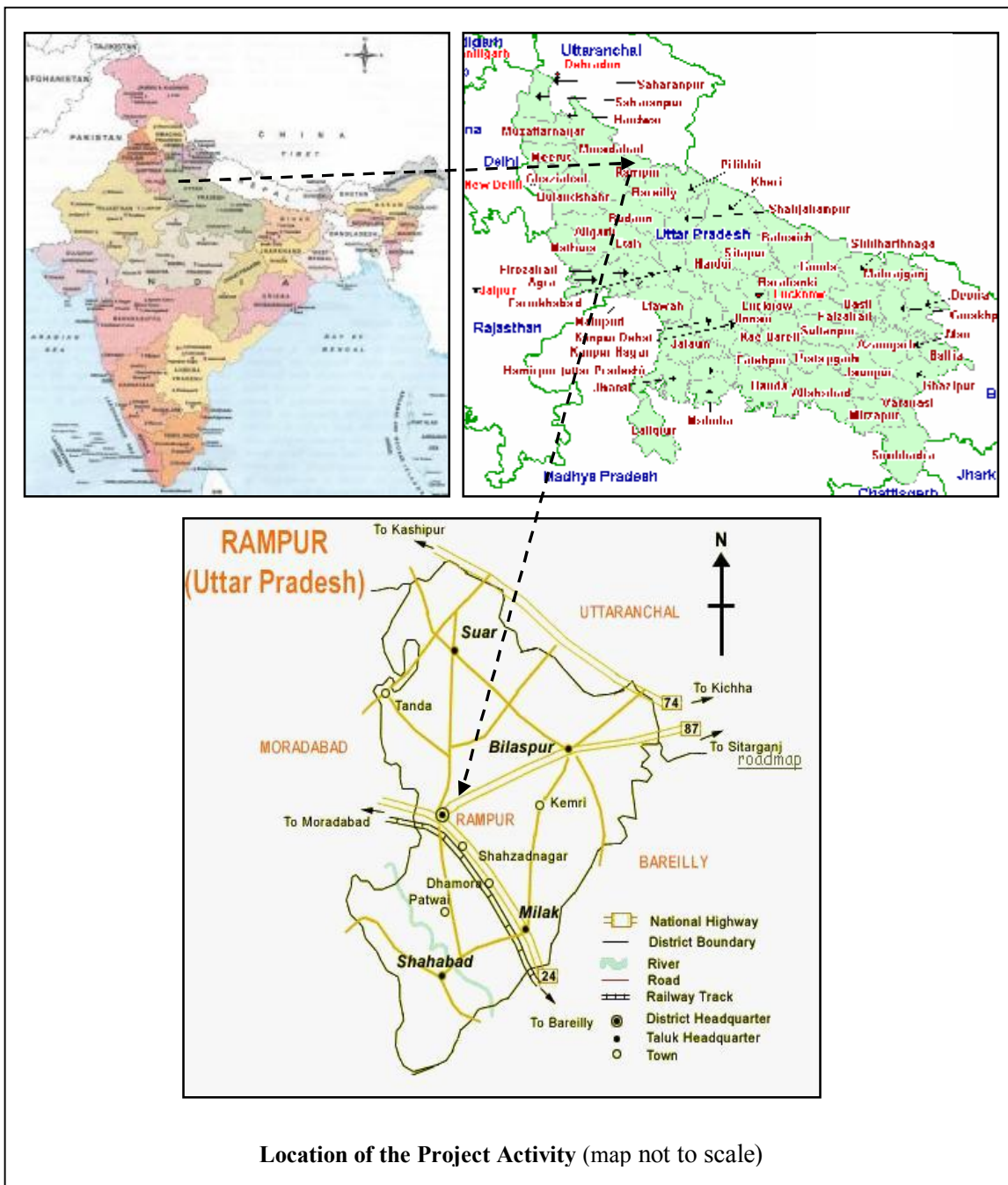
>>

Village Panwaria, Rampur

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

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The project activity is located RKL grain based distillery unit in Village – Panwaria, about 3 km from Rampur City, on Rampur -Bareilly National highway (NH-24).



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

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Main Category:

The project falls under the “Type I: Renewable energy projects”

Sub – Category:

D - Renewable electricity generation for a Grid



The criteria for a project activity to fall under the category “**Type I: Renewable energy projects**” is that the maximum output of the project activity should not exceed 15 MW. Since the project activity is a biomass (renewable energy) based cogeneration plant of capacity 2.28 MW hence, the project falls under the **Type I - Renewable energy projects** according to the **Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories**.

The project activity falls under the sub category **D - Renewable electricity generation for a Grid** which comprises renewable energy technologies that supply electricity to an electricity distribution system that is or would have been supplied by at least one fossil fuel or non-renewable biomass fired generating unit. Biomass-based co-generating systems that supply electricity to a grid are included in this category. 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 rating for all the boilers combined shall not exceed 45 MW_{thermal}.

This project activity is a rice husk based cogeneration project to produce heat steam and electricity for on-site use. The energy output calculation is as under:

Boiler Capacity:	30 TPH
	8.33 kg/s (30 *1,000/3,600)
Energy of steam:	3,300 kJ/kg (at 44 Kg/cm ² pressure and 440 °C temperature)
Energy of water (at 100 °C)	418 kJ/kg
Boiler rating:	8.33*((3,300 – 418)/1,000)
	24.007 MW _{thermal}

It clearly qualifies in the above category since the rating of the boiler is less than the stipulated limit of 45 MW_{thermal}.

Technology of project activity

The project activity is a rice husk based cogeneration plant wherein high-pressure boiler and a back pressure turbine configuration will be used to generate power. Fluidized Bed Combustion (FBC) technology will be used for generating steam, which represents the best available technology as compared to pile burning and stoker fired boilers². The project activity will also have an electrostatic precipitator to control the emissions arising due to the combustions. The specifications of the systems in the project activity are as follows:

Boiler

Type:	Fluidized Bed Combustion (FBC)
Pressure:	44 kg/cm ²
Temperature:	440 °C
Capacity:	30 TPH
Fuel:	Rice Husk

Turbine

Type:	Back Pressure
Capacity:	2.28 MW

² <http://www.nrdcindia.com/pages/fbc.htm>



A.4.3. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed small-scale project activity, including why the emission reductions would not occur in the absence of the proposed small-scale project activity, taking into account national and/or sectoral policies and circumstances:

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The project activity will use a carbon neutral fuel (rice husk) for steam and power generation. Thus the GHG emissions due to the combustion of diesel in the DG sets will be avoided. In the absence of the proposed small scale project activity, the distillery unit would have used fossil fuel (diesel) in the DG sets to meet its power requirements thereby causing GHG emissions.

As per the Uttar Pradesh State Power Policy 2003, GoUP will come up with special policy framework to encourage augmentation of environment friendly generating capacity in the state particularly based on natural gas and renewable sources of energy. As of now no such policy has come into existence. The project activity is a voluntary initiative by RKL.

A.4.3.1 Estimated amount of emission reductions over the chosen crediting period:

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Years	Annual Estimation of emission reduction (in tonnes of CO ₂ e)
2007-2008	12,410
2008-2009	12,410
2009-2010	12,410
2010-2011	12,410
2011-2012	12,410
2012-2013	12,410
2013-2014	12,410
2014-2015	12,410
2015-2016	12,410
2016-2017	12,410
Total estimated reductions (tonnes of CO₂e)	124,100
Total number of crediting years	10 years
Annual Average over the crediting period of estimated reduction (tonnes of CO₂e)	12,410

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 convention is involved in the project activity.

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

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According to Appendix C, paragraph 2 of Simplified Modalities & Procedures for small scale CDM project activities, 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:

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

The project activity qualifies for the use of simplified modalities and procedures for small-scale CDM project activities as there is no registered small scale project or an application to register another small scale activity by Radico Khaitan Limited.

**SECTION B. Application of a baseline methodology:****B.1. Title and reference of the approved baseline methodology applied to the small-scale project activity:**

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Type I – Renewable energy projects**Category D – Renewable electricity generation for a Grid (version 09 - 28 July 2006)**

The reference has been taken from the “indicative simplified baseline and monitoring methodologies for small-scale CDM project activity categories”.

B.2 Project category applicable to the small-scale project activity:

>>

As per indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories the project activity falls under the Category I.D- Renewable electricity generation for a Grid.

As per paragraph 8 (Type 1.D. version 09, 28 July 2006) - For a system where all generators use exclusively fuel oil and/or diesel fuel, the baseline is the annual kWh generated by the renewable unit times an emission coefficient for a modern diesel generating unit of the relevant capacity operating at optimal load as given in Table B.1.

Table B.1. Emission factors for diesel generator systems (in kg CO₂equ/kWh) for three different levels of load factor³

Cases:	Mini-grid with 24 hour service	i) Mini-grid with temporary service (4-6 hr/day) ii) Productive applications iii) Water pumps	Mini-grid with storage
Load factors [%]	25	50	100
< 15 kW	2.4	1.4	1.2
>= 15 < 35 kW	1.9	1.3	1.1
>= 35 < 135 kW	1.3	1.0	1.0
>= 135 < 200 kW	0.9	0.8	0.8
> 200 kW	0.8	0.8	0.8

Thus for the project activity wherein the capacity is greater than 200 kW, the applicable emission factor will be 0.8 kg CO₂equ/kWh.

B.3. 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 implementation of the project activity is a voluntary step undertaken by RKL with no direct or indirect mandate by law.

The project activity will encounter a number of barriers during its construction and operation phase. Various barriers existent in the path of the project activity are listed below:

³ AMS-I.D. version 09, Paragraph 8

***Barrier due to prevailing practice***

The project activity proposed by RKL - Rice husk based Co-generation project - is “first of its kind” among the standalone distilleries in Uttar Pradesh, to operate only on rice husk as fuel. There are around 14 standalone distilleries in the state of Uttar Pradesh. Most of the standalone distilleries operating in Uttar Pradesh have grid power supply and use DG sets (as standby) for meeting their power requirements. RKL would be the first standalone distillery in the region to operate a rice husk based cogeneration system to meet the heat and power requirements of the distillery.

Technological barrier

The ash generated during rice husk burnings has low density and high silica content. Due to low bulk density, ash adheres to the boiler tubes, thereby affecting the heat transfer and reducing thermal efficiency. Due to high silica content, equipments like boiler tubes, ID fan, top portion of the stack get eroded which leads to high maintenance cost, frequent breakdown and increased downtime of the project boiler. Hence, the operation & control of biomass fired boiler requires skilled boiler operators to run the system at its full potential and with minimal down time. For overcoming the problem of corrosion of equipments, an Electro Static Precipitator (ESP) will be installed, although the air pollution norms could have been met by installing Mechanical Dust Collectors (MDC), which is much cheaper. Further, wet rice husk cannot be used as a fuel in the FBC boilers as it results in the problem of clinker formation, therefore proper storage of rice husk is required.

Other barriers***Policy barriers***

There is no policy, existent in the state, for the promotion of renewable energy sources based power generation. Due to lack of government policy the distillery industry had little or no incentive to move towards implementation of technologies which would lead to lower emissions.

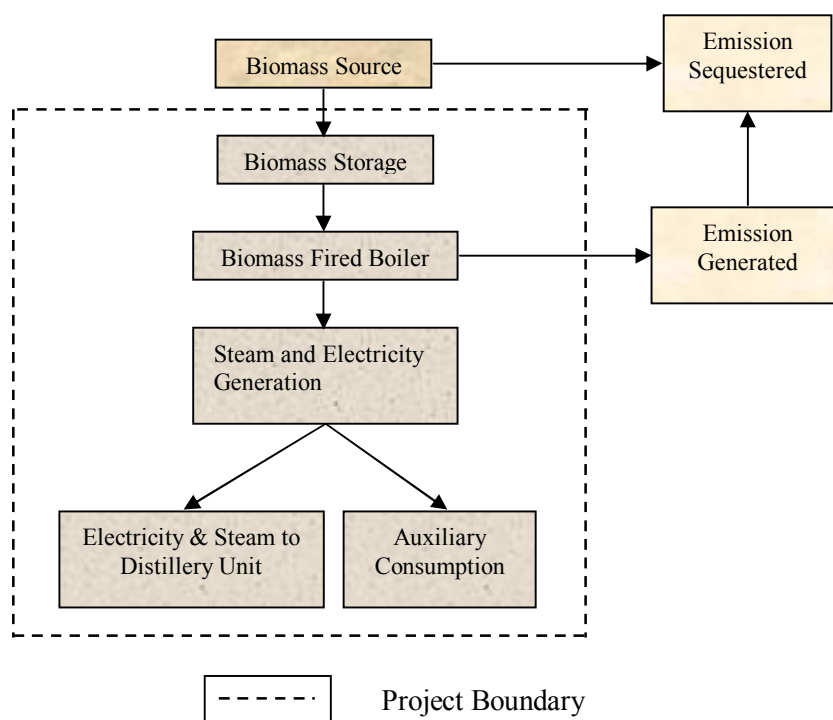
Storage of rice husk

The quantity of rice husk required for the project activity is large. Rice husk, being a low bulk density fuel, requires huge storage area. Its seasonal availability asks for huge storage area to store it for non seasonal periods. Therefore, large protective area has to be made available for this purpose, which can't be used for other productive uses. Open storage of rice husk is not advisable as it leads to lot of seasonal problem such as fuel wetting during monsoon, fuel loss due to winds and possibility of fire hazards during dry summers, etc.

B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the small-scale project activity:

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As per the paragraph 6 of AMS-I.D. version 9, project boundary encompasses the physical and geographical site of the renewable generation source. The project boundary covers the biomass based cogeneration power plant, which starts from the biomass storage to the point of power supply to distillery unit. Thus, project boundary includes biomass storage, biomass fired boiler, electricity and steam generation from the cogeneration system, auxiliary consumption and electricity supplied to distillery unit. The project boundary is illustrated in the following diagram:



B.5. Details of the baseline and its development:

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The baseline for the proposed project activity has been arrived at, using the methodology specified in the applicable project category for small-scale CDM project activities contained in Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories.

The use of DG sets has been considered for baseline calculations since the project activity replaces the DG sets by cogeneration plant for supply of electricity to Rampur distillery. The baseline is the annual kWh generated by the project activity multiplied by the emission coefficient of 0.8 kg CO₂/kWh as per the table B.1.

Date of completion of base line: DD/MM/YY
07/12/06

Name of person/entity determining the baseline:
Radico Khaitan 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 small-scale project activity:**

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C.1.1. Starting date of the small-scale project activity:

>>

15/10/2005

C.1.2. Expected operational lifetime of the small-scale project activity:

>>

25 years

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

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The project activity will use the fixed crediting period.

C.2.1. Renewable crediting period:

>>

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

>>

Not selected

C.2.1.2. Length of the first crediting period:

>>

Not selected

C.2.2. Fixed crediting period:

>>

10 years

C.2.2.1. Starting date:

>>

01/03/2007

C.2.2.2. Length:

>>

10 years

**SECTION D. Application of a monitoring methodology and plan:**

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D.1. Name and reference of approved monitoring methodology applied to the small-scale project activity:

>>

Title: Monitoring Methodology for the category I D – Renewable electricity generation for a grid

Reference: ‘Paragraph 13’ as provided in Type I.D.(version 9) of Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-Scale CDM Project Activity Categories.

Paragraph 13 states that monitoring shall consist of metering the electricity generated by the renewable technology. In the case of co-fired plants, the amount of biomass and fossil fuel input shall be monitored.

D.2. Justification of the choice of the methodology and why it is applicable to the small-scale project activity:

>>

As per the provisions of paragraph 12 of Simplified Modalities and Procedures for Small Scale CDM Project Activities the “Project participants may use the simplified baseline and monitoring methodologies specified in Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories, if they meet the applicability criteria of Small scale CDM project activity. Since the project activity is a small-scale CDM project of Type I.D category, the monitoring methodology and plan has been developed in line with the guidance provided in paragraph 13 of AMS-I.D.

Description of monitoring plan

The gross power produced and auxiliary power consumed will be monitored separately using two meters. The monitoring and verification system would mainly comprise of these meters as far as power supplied to the distillery unit is concerned. The rice husk input is also to be monitored. All monitoring and control functions will be done as per the internally accepted standards of Radico Khaitan Limited. All instruments will be calibrated and marked at regular intervals so that the accuracy of measurement can be ensured all times.

The project uses a carbon neutral fuel and does not causes ant GHG emissions. Emissions occurred due to transportation of rice husk is very small (less than 3% of the emission reductions) and will be similar due to that by the transport of diesel for the diesel generators. Therefore, the net direct off-site emissions are negligible and hence not included in the calculation of the emission reduction units.

Quantity of rice husk used in the boiler as fuel

The amount of rice husk entering the plant will be measured and records of the same will be maintained. The weighing system will be calibrated regularly to ensure the accuracy of the measurements. The amount of rice husk purchased will be based on invoices / receipts from fuel contractors.

Quality of rice husk used in the boiler

The properties of the rice husk used as fuel in the boiler would be determined from ultimate analysis of the fuel samples.



Operational Parameters of the power generating Unit

Total Electricity Generated

The total electricity generated by the cogeneration project will be measured in the plant premises to the best accuracy and will be monitored and recorded, on a continuous basis by the electronic power and energy meter. The integrated readings will be recorded on manual log books on a daily basis.

Auxiliary Consumption

The total quantum of electricity consumed by the auxiliaries would affect the total electricity supplied to the manufacturing facility and therefore the amount of GHG reductions. The electricity consumed by plant auxiliaries will be recorded in the plant premises to the best accuracy. This will be monitored and recorded on a continuous basis by the electronic power and energy meter. The integrated readings will be recorded on manual log books and maintained for reference.

Power exported to the distillery unit

It will be calculated based on deduction of auxiliary consumption from the total electricity generated.

Verification

The performance of the rice husk based cogeneration project leads to CO₂ emission reductions. In other words, the longer the power plant runs and supplies power to the distillery unit, more would be the emission reductions. The major activities to be verified are as under

- Verification of various measurement and monitoring methods
- Verification of instrument calibration methods
- Verification of measurement accuracy

**D.3 Data to be monitored:****>>Parameters affecting the emission reduction potential of the project activity**

ID No	Data Variable	Data unit	Source of data	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/paper)	For how long is archived data to be kept?	Comment
1	Total electricity generated	kWh	Electronic Power and Energy meter, Daily log books	m	Daily	Total	Paper	2 years after end of crediting period	Measured in plant premises and monitored and recorded every shift (8 hours). Along with the energy meter recording the kW, Ampere and power factor will also be monitored on an hourly basis. This will help in cross-checking the gross generated figure. The generation figures can be cross checked from the published audited annual report of RKL. These meters are separate from the meters installed at the DG sets. Thus ensuring that the energy produced by biomass power plant and the energy produced by DG sets is metered and recorded separately.
2	Auxiliary consumption	kWh	Electronic meter, Daily log books	m	Daily	Total	Paper	2 years after end of crediting period	Measured in plant premises and monitored and recorded continuously. These meters are separate from the meters installed at the DG sets. Thus ensuring that the energy produced by biomass power plant and the energy produced by DG sets is metered and recorded separately.



3	Power supplied to plant	kWh	Daily log books	c	Daily	Total	Paper	2 years after end of crediting period	The difference between D.3.a).1 and D.3.a).2 provides the total amount of power supplied to the plant.
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a) Fuel related parameters affecting the project activity

ID No.	Data variable	Data unit	Source of data	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/paper)	For how long is archived data to be kept?	Comment
1	Rice husk quantity	MT	Invoice	m	Weekly	100%	paper	CP+2 years	To be monitored at purchase, storage and usage.
2	Rice husk calorific value	Kcal/kg	Test reports	m	-	Sample testing	paper	CP+2 years	Obtained through sample testing

D.4. Qualitative explanation of how quality control (QC) and quality assurance (QA) procedures are undertaken:

Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored. (data items in tables contained in section D.3 (a to b) above, as applicable)

Data	Uncertainty level of data (High/Medium/Low)	Are QA/QC procedures planned for these data?	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
D.3.(a)1	Low	Yes	This data will be used for calculation of emission reductions by project activity. The gross generation figure can be cross checked by the voltage meter, ammeter and power factor meter readings which are recorded on an hourly basis. A spare master meter is also in place in case the power meter goes out of order or the calibration is disturbed.
D.3.(a)2	Low	Yes	This data will be used for calculation of emission reductions by project activity. The auxiliary consumption figure can be cross checked by the voltage meter, ammeter and power factor meter readings which are recorded on an hourly basis. A spare master meter is also in place in case the auxiliary meter goes out of order or the calibration is disturbed.
D.3.(a)3	Low	Yes	This is a calculated value



Data	Uncertainty level of data (High/Medium/Low)	Are QA/QC procedures planned for these data?	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
D.3.(b)1	Medium	No	This data will be used as supporting information to calculate emission reductions by project activity.
D.3.(b)2	Low	No	The calorific value of the rice husk is fairly constant and thus no QA/QC procedures are required

D.5. Please describe briefly the operational and management structure that the project participant(s) will implement in order to monitor emission reductions and any leakage effects generated by the project activity:

>>

Radico Khaitan Limited would ensure accuracy of the measurement system as follows:

- The shift in-charges will be responsible for the hourly data recording of the relevant parameters and also the recording of the total energy generated for every 8 hour shift. Any discrepancy observed in the readings (based on the past data) will be addressed promptly. The mechanical and electrical managers will ensure that the data is properly archived.
- The managers will be qualified technical personnel with high experience in the relevant field. All the shift in-charges will be adequately qualified.

D.6. Name of person/entity determining the monitoring methodology:

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Radico Khaitan Limited.

The entity is also a project participant as listed in Annex 1 of this document.

**SECTION E.: Estimation of GHG emissions by sources:**

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E.1. Formulae used:

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E.1.1 Selected formulae as provided in appendix B:

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Not applicable

E.1.2 Description of formulae when not provided in appendix B:

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E.1.2.1 Describe the formulae used to estimate anthropogenic emissions by sources of GHGs due to the project activity within the project boundary:

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Because of the use of rice husk as fuel there will be no GHG emissions due to the project activity within the project boundary. The GHG emission due to the burning of rice husk is actually negated by the sequestration done during the growth of rice, thereby making it a carbon neutral fuel.

E.1.2.2 Describe the formulae used to estimate leakage due to the project activity, where required, for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities

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As prescribed in 1.D., leakage estimation is only required if renewable energy technology is equipment transferred from another activity, or if the existing equipment is transferred to another activity. This does not apply to the project case. However, the only source of considerable 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. The same have been estimated below (taking very conservative estimates).

Emissions due to transportation of rice husk

1. Total rice husk required	50,000	tonnes/year
2. Rice husk transported by truck	50,000	tonnes/year
3. Rice husk load per truck	8	tonnes
4. Total number of Trips	6,250	
5. Max distance between the Project site and collection centers	50	km
6. Consumption of diesel per trip (to and fro @ 4 km/ lit)	25	Liters
7. Total Diesel Consumption	156,250	Liters
8. Calorific Value of Diesel	0.0000283	TJ/lit
9. Emission Factor for Diesel	74.1	tCO ₂ /TJ
10. Total Emissions due to transportation of Rice husk	328	tCO ₂

As per paragraph 4 of “Attachment C to Appendix B - Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories”, for small-scale energy CDM project activities involving renewable biomass, sources causing emissions greater than 10% of the emission reductions are attributable to the project activity. Since the



emissions due to the transportation of rice husk are only about 3% of the emission reductions by the project activity, they are not attributable to the project activity.

Moreover, similar quanta of emissions would occur during the transportation of diesel for the diesel generators in the baseline, therefore these emissions have not been considered in the calculation of emission reductions.

E.1.2.3 The sum of E.1.2.1 and E.1.2.2 represents the small-scale project activity emissions:

>>

There are no emissions due to the small-scale project activity.

E.1.2.4 Describe the formulae used to estimate the anthropogenic emissions by sources of GHGs in the baseline using the baseline methodology for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities:

>>

Formula used to determine the baseline emissions is as follows:

$$\text{Baseline emissions} = \text{Annual kWh generated by project activity} \times 0.8 \text{ kg CO}_2/\text{kWh}$$

E.1.2.5 Difference between E.1.2.4 and E.1.2.3 represents the emission reductions due to the project activity during a given period:

>>

Following formula is used to determine emission reduction:

$$\text{CO}_2 \text{ emission reduction due to project activity} = (\text{Baseline emission}) - (\text{Project emissions})$$

E.2 Table providing values obtained when applying formulae above:

>>

Year	Baseline Emission factor (tCO ₂ /GWh)	Net Power produced (GWh)	Baseline emissions (ton of CO ₂)	project emissions (ton of CO ₂)	Emission reductions (ton of CO ₂)
2007-2008	800	15.51	12,410	0	12,410
2008-2009	800	15.51	12,410	0	12,410
2009-2010	800	15.51	12,410	0	12,410
2010-2011	800	15.51	12,410	0	12,410
2011-2012	800	15.51	12,410	0	12,410
2012-2013	800	15.51	12,410	0	12,410
2013-2014	800	15.51	12,410	0	12,410
2014-2015	800	15.51	12,410	0	12,410
2015-2016	800	15.51	12,410	0	12,410
2016-2017	800	15.51	12,410	0	12,410
TOTAL		155.1	124,100	0	124,100

A carbon intensive energy equivalent of ‘155.1’ GWh for a period of 10 years would be replaced by clean power from the 2.28 MW rice husk based cogeneration plant thereby reducing ‘124,100’ tonnes of CO₂ emissions (emission factor as 0.8 kg CO₂e / kWh).

**SECTION F.: Environmental impacts:****F.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:**

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As the project investment is less than INR 500 million so carrying out an Environmental Impact Assessment (EIA) is not mandatory for the project activity⁴ as per Indian legislation.

Harnessing the low cost energy with acceptable impact on the environment is the philosophy of the project. The use of rice husk (a carbon neutral fuel) for steam and electricity generation, will not lead to GHG emissions. The emission of other pollutants like carbon monoxide and soot into atmosphere which usually occur due to open burning and methane emissions if the rice husk is left to decay in the farmlands will also be eliminated.

The project activity does not have any significant adverse impact on the environment. Adequate mitigation measures will be adopted for the adverse impacts of the project activity on the environment, if any. The emissions due to combustion of rice husk in the boilers during operation will be checked by installing an electrostatic precipitator to comply with the state pollution control board regulations. The flue gases will be discharged into the atmosphere at an appropriate stack height of about 45 meters.

There will not be any significant impact on surface water quality and ground water hydrology due to the project activity. Extensive water recycling would be carried out in the plant. No water from the cogeneration plant would be discharged outside the factory.

The replacement of the diesel generators by the cogeneration project activity will result in reduced noise levels which are usually associated with the operation of DG sets. To further check the problem of noise pollution, plantation will be done in and around the mill.

There will a negligible effect on the flora and fauna of the region due to increase in industrial and domestic activity.

⁴ [http://envfor.nic.in/legis/eia/so-60\(e\).html](http://envfor.nic.in/legis/eia/so-60(e).html)

**SECTION G. Stakeholders' comments:****G.1. Brief description of how comments by local stakeholders have been invited and compiled:**

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The comments from local stakeholders were invited through a public hearing meeting.

G.2. Summary of the comments received:

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The project activity extracted positive comments from various stakeholders. The local residents appreciated the project activity as it generated a source of employment and revenue for them during the, construction and operation phase of the project and procurement of raw material for the project activity, respectively.

The project activity was also appreciated by the employees of RKL as it would contribute towards reducing the company's expenses and reducing GHG emissions. Replacement of DG sets will also result in reduced noise pollution, vibrations etc.

NOC certificates from UPPCB under Water Act and Air Act have been achieved.

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

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No concerns were raised during the consultation with the stakeholders. Further, the web posting of the PDD would suffice for public viewing and comments.

**Annex 1****CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY**

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding as part of project financing from Parties included in Annex 1 to the convention is involved in the project activity.