PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: Biomass based power project by Shri Shyam Warehousing and Power Pvt. Ltd, Banari, Chhattisgarh

Version 1.0

Date of PCN: 17/07/2023

UCR 1st CoU Issuance Period: 07 Years, 00 Months (Both Days Inclusive)
UCR 1st Monitoring Period: 01/01/2016 to 31/12/2022 (Both Days Inclusive)
UCR 1st Crediting Period: 01/01/2016 to 31/12/2022 (Both Days Inclusive)

PROJECT CONCEPT NOTE (PCN)

BASIC INFORMATION	
Title of the project activity	Biomass based power project by Shri Shyam Warehousing and Power Pvt. Ltd, Banari, Chhattisgarh
Scale of the project activity	Small Scale
Completion date of the PCN	17/07/2023
Project participants	**Project Proponent:** Shri Shyam Warehousing and Power Pvt. Ltd (SSWPPL) **Aggregator:** Carbon Equalizers, KATNI UCR ID : 660687753
Host Party	India
Applied methodologies and standardized baselines	**CLEAN DEVELOPMENT MECHANISM (CDM) UNFCCC Methodology** ***AMS-I.C.*** *Small-scale Methodology Thermal energy production with or without electricity* Version 22.0 **UCR Standard for Baseline Grid Emission Factor**
Sectoral scopes	01 Energy industries (Renewable/NonRenewable Sources)
Estimated total amount of average GHG emission reductions per year	33948 CoUs (33948 tCO_{2eq})
Estimated total amount of average GHG emission reductions for the entire monitoring period (2016-2022)	237636 CoUs (237636 tCO_{2eq})

SECTION A. Description of project activity

A.1. Purpose and general description of Carbon offset Unit (CoU) project activity >>

The project activity, **Biomass based power project by Shri Shyam Warehousing and Power Pvt. Ltd, Banari, Chhattisgarh** is located at Village: Banari, District: Janjgir, State: Chhattisgarh, Country: India.

The details of the UCR project activity are as follows:

Purpose of the UCR project activity:
The project activity involves the installation of a 10 MW biomass (rice husk) based cogeneration power plant to generate electricity by utilising the renewable biomass potential available in the region, thereby reducing GHG emissions. The project activity achieves GHG emission reductions by supplying the net electricity generated to the Northern, Eastern, Western, and North-Eastern (NEWNE) grid which is predominantly dependent on fossil fuel based power plants.

The project proponent (PP) Shri Shyam Warehousing and Power (P) Limited (SSWPPL) has entered into a long term power purchase agreement (PPA) with the Chhattisgarh State Power Distribution Company Limited (CSPDCL) dated **19.12.2007** for the supply of **10 MW_h** power to the grid and a supplementary PPA dated **16.04.2012** for the supply of **9 MW_h** power to the grid for a period of 20 years (source). Hence the commissioning date or start date of this UCR project activity is **19/12/2007**. Though the project is a co-generation project, the **PP is entitled to claim UCR CoUs based only on the renewable electrical energy supplied to grid** as per the UCR CoU program policy and guidelines related to small scale biomass to grid power projects. In the absence of project activity, the PP would have continued operating its existing two (2) units of rice husk fired boilers and the grid would have purchased fossil electricity from other power plants.

In India, the existing installed grid electricity generation capacity is predominately coal-based and therefore, electricity generation is a major source of carbon dioxide emissions. In order to meet the increasing demand of electricity, the capacity addition of power nowadays includes mainly large coal based power plants.

The generation of power from biomass residues will contribute to reducing greenhouse gas

(GHG) emissions in the current energy mix. As the project utilises rice husk as the source of fuel for the generation of electricity it will qualify as a renewable source of electricity. The project activity comprises the installation of a high pressure boiler of 50 tonnes per hour capacity (68 kg/cm^2, 490±5 °C) and an extraction bleed cum condensing type steam turbine generator set of 10 MW capacity. The project activity will also involve the installation of ancillary equipment to generate electricity for the grid from a renewable energy source (rice husk).

The project activity will involve the collection of rice husk within a 75 km radius of the plant. The project activity is expected to generate 10 MW of electrical power at 11 kV and supply to the Chhattisgarh State Electricity Board (part of the NEW NE regional grid) at 33 kV through the local substation. The necessary transmission lines from the power plant to the substation is laid by the project activity

The project activity supplies and displaces approximately **64152 MWh** of fossil energy (coal) fired with renewable (biomass) power from the grid each year.

The project activity uses rice husk as fuel for cogeneration power unit, which is a renewable bio-mass fuel and does not add any net carbon-dioxide to the atmosphere because of the carbon recycling during growth of rice. The term rice husk refers to the byproduct produced in the milling of paddy and forms 16-25% by weight of the paddy processed. In the majority of rice producing countries much of the husk produced from the processing of rice is either burnt for heat or dumped as a waste. India alone produces around 120 million tons of rice paddies per year, giving around 24 million tons of rice husks per year (source). Therefore, the project activity leads to zero CO_2 on-site emissions associated with rice husk combustion.

The export of electricity hence reduces GHG emissions by replacing the fossil fuel dominated grid based electricity with a renewable source of electricity. The high pressure boilers are fired by rice husk, a byproduct from the rice manufacturing process to generate steam, which in turn powers the steam turbine to generate electricity.

Assured supply of biomass fuel to the UCR project activity

Chhattisgarh, being a rice producing state has a very good opportunity of rice husk to use as a fuel for power plants. The total rice husk generation in the study area has been studied by the PP. Considering that the biomass requirement for the project is small and that there is sufficient biomass available in the region surrounding the site of the project activity, no such leakage is anticipated. However a survey has been undertaken ex-ante to ensure that there is surplus biomass in the region and hence the usage of biomass in the project activity does not lead to leakage elsewhere.

The biomass surplus assessment survey has been carried out wherein:

- Total generation of the biomass is 577,080 MT,
- Total consumption of the biomass in the project area is 6,240 MT and
- Total yearly consumption by the project activity is 79,604 MT.

Hence, the total surplus availability of the biomass in the project activity area is:

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

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

Hence, the percentage of available surplus biomass is 572% which is larger than the 25% of the

quantity of the biomass as per the "General guidance on leakage in biomass project activities". Therefore the leakage is not considered. As all the biomass fuel is available from within 75 km radius of project boundary and is in surplus of more than 25%, there are no leakage emissions to be considered.

There is no policy in India that mandates the generation of electricity **for grid supply from rice husk**, hence this is a voluntary project activity. The policy frameworks for rice husk based grid electricity supply are governed by the state electricity regulatory commissions which detail the terms of power purchase agreements for such investments.

A.2 Do No Net Harm To Environment or Society Test >>

The positive environmental impacts arising from the project activity are:
• Reduction in CO2 emissions, which would be generated under the baseline scenario, by the replacement of fossil fuels
• Reduction in the emissions of other harmful gases (NOx and SOx) that would have been emitted from the combustion of fossil fuels for power generation in power plants connected to the grid.
• Reduced ash production because rice husk has lower ash content (6-7%) than that of Indian coal (30-40%)

An Environmental Impact Assessment (EIA) is not required but the project has received a 'consent to establish' from the Chhattisgarh Pollution Control Board. The project activity has no significant impact on the environment. According to the environmental notification dated 1/12/2009, applicable during the commissioning of the project activity, "power plant up to 15MW, based on biomass and using auxiliary fuel such as coal/ lignite/ petroleum products up to 15% are exempt."(http://moef.nic.in/downloads/rules-andregulations/3067.pdf).

Hence, the project activity did not need to apply/conduct an Environmental Impact Assessment (EIA) of the proposed project activity.

The project activity will also contribute to an increase in the local employment by employing skilled and unskilled personnel for construction, operation and maintenance of the project activity. The generation of renewable electricity will also reduce the dependence on existing and planned fossil fuel based generation. The project contributes towards regional sustainable development in the following ways:
• Economic development by increased electricity generation
• Rural and infrastructural development
• Creates general awareness of the benefits of clean energy in the society/community
• Generation of clean electricity by the utilization of surplus biomass

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

There are social, environmental, economic and technological benefits which contribute to sustainable development.

- **Social benefits:**
  - The project activity contributes to employment generation in the local area for both skilled & unskilled people for operation and maintenance of the equipment. The Indian rice harvesting has been affected amid the COVID pandemic situation prevailing in the country, and SSWPPL has focused on continuing to work closely with the thousands of farmers who rely on SSWPPL for their sustenance and livelihoods.
  - It has created steady higher value jobs and skilled workers at the facility. The project activity is contributing to the national energy security by reducing consumption of fossil fuels.
  - The technology being used in the project is proven and safe for power generation. An increase in such kind of projects shall enable all the technology suppliers to continuously innovate and modernize on the technology front. The local people will know the technological advancement and will help in capacity building.

- **Environmental benefits:**
- The project activity is a renewable energy project, which utilizes biomass as a fuel for grid power generation, a move that is voluntary and not mandated under current environmental laws of India. Since this project activity generates green energy in the form of power, it has positively contributed towards the reduction in (demand) use of finite natural resources like coal and oil, minimizing depletion and in turn increasing its availability to other important purposes. Therefore, this project activity helps to environment sustainability by reducing GHG emission in the atmosphere.
- Avoids global and local environmental pollution, leading to reduction of GHG emissions.
- Enabling regional grid to divert the electricity displaced by the project activity to the nearby needy areas. Generally, a large amount of rice husk is dumped as waste which results in waste disposal problem and methane emission on decomposition.

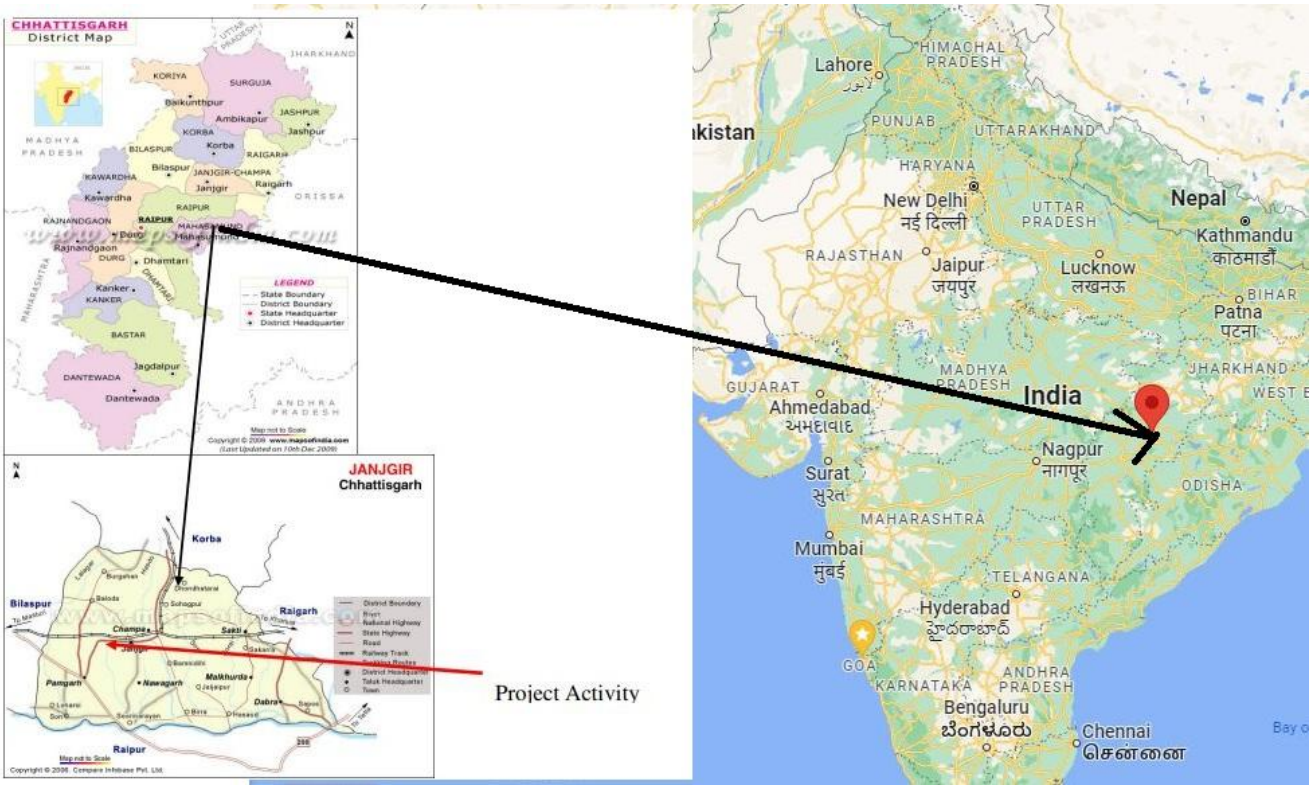
  Indirect capacity building by providing a case example to other rice mills in the region for switching to high capacity cogeneration configuration, for exporting electricity to grid.

  In addition to the reduction in carbon dioxide (CO2) emissions the project implementation will result in reduction of other harmful gases (NOx and SOx) that arise from the combustion of coal used in power generation.

- **Economic benefits:**
- The project activity creates employment opportunities during the project stage and operation and maintenance of the boiler and turbines.
- The project activity helps in conservation of fast depleting natural resources like coal and oil thereby contributing to the economic well being of country as a whole.
- The various other benefits due to the project activity ensure that the project is contributing to the sustainable development of the region by bringing in green technologies and processes to a backward region. The technology is indigenous and by implementing such projects the country is showcasing its GHG mitigation actions in its efforts to combat climate change.

A.3. Location of project activity>>

Country: India
Village: Banari,
District: Janjgir,
State: Chhattisgarh
Latitude 21^0 59’ 51.83” N
Longitude: 82^0 31’ 04.59”E



A.4. Technologies/measures>>

The UCR project activity produces renewable energy from the combustion of a renewable biomass. The technology employed is a biomass fired plant which consists mainly of a boiler and turbine generator. The technology employed is domestically available in India and the main equipment i.e. boiler and turbine are supplied by well-known Indian manufacturers.

All the equipment are designed as per industry guidelines, meet the environmental and safety guidelines and comply with the criteria laid down by the state Pollution Control Board ensuring that the project activity will install environmentally safe technology. The project generates electricity using a 50 TPH (tonnes per hour) AFBC boiler and a 10000 kW_h (10 MW_h) capacity extraction bleed cum condensing type steam turbo-generator. The technical parameters of boiler and turbo-generator are given below:

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

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

The steam generated from the boiler is 47.06tph, out of which 0.1tph and 0.25tph is go in a sealing and ejector process respectively whereas 46.71tph is going to turbine. From turbine 12tph of steam is consumed in the process, 29.03tph is utilised for condenser and 6.66tph is utilised in the de-aerator. The power generated from the project activity is exported to the CSEB grid at Banari 220kV/33kV sub-station at 33kV through an independent single circuit 33kV overhead line from the proposed project activity. The sub-station is located at a distance of 200m from the project activity.

The plant is designed with all other auxiliary plant systems like

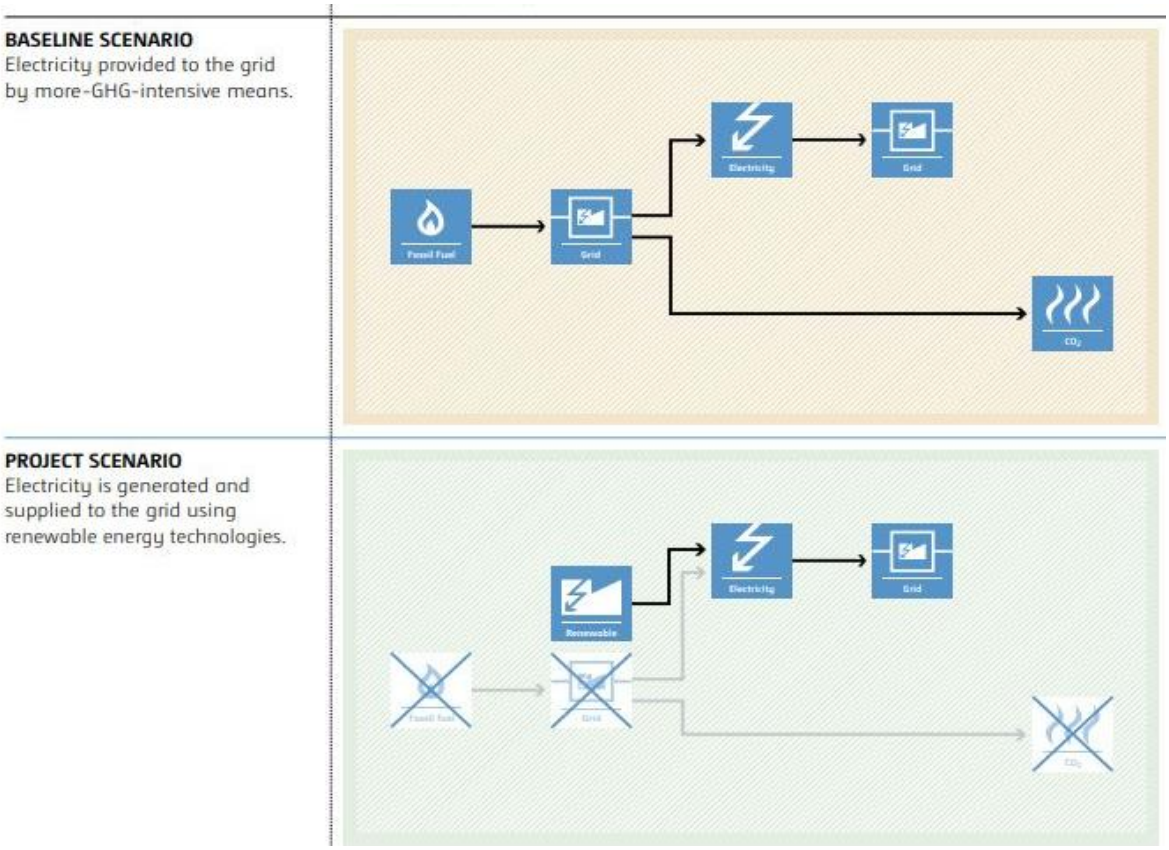
- Rice husk handling system with storage and processing arrangements,
- High pressure feed water heaters,
- Ash handling system,
- Water treatment plant,
- Compressed air system,
- Air conditioning system,
- Main steam, medium pressure and low pressure steam systems,
- Fire protection system,
- water system which include raw water system, circulating water system, condensate system, De-Mineralised water system and service with potable water system and
- The electrical system for its successful operation.

A.5. Parties and Project Participants>>

Project activity does not involve any public funding from Annex I Party, which leads to the diversion of the official development assistance.

Party (Host)	Participants/Aggregator
India	Project Owner: Shri Shyam Warehousing and Power Pvt. Ltd, Banari, Chhattisgarh Aggregator: Carbon Equalizers, KATNI UCR ID : 660687753 Contact: Mr Vikas Chamadia Email: vikaschamadia@rediffmail.com **Mob**: 9303068600

A.6. Baseline Emissions>>



The approved baseline methodology has been referred from the indicative simplified baseline and monitoring methodologies for selected large scale UNFCCC CDM project activities that involve generation of power and heat in thermal power plants, including cogeneration plants using biomass.

The applicable methodology and simplified modalities and procedures for small scale CDM project activities is "*the baseline scenario is displacement of more-GHG-intensive electricity generation in grid.*"

For project activities that do not displace captive electricity generated by an existing plant but displace grid electricity import and/or supply electricity to a grid, the emission factor of the grid shall be calculated as per the procedures detailed in **AMS-I.D**

The applicable baseline scenario is

- *"displacement of more-GHG-intensive electricity generation in grid."*

Emission coefficient of fuel used in the baseline scenario

The CO_2 emission factor for grid connected power generation in year y calculated using UCR Standard emission factor is 0.9 tCO2/MWh for the period 2013-2022.

A.7. Debundling>>

This project is not a debundled component of a larger registered carbon offset project activity.

SECTION B. Application of methodologies and standardized baselines

B.1. References to methodologies and standardized baselines >>

SECTORAL SCOPE - 01 Energy industries (Renewable/Non-renewable sources)

TYPE I - **Renewable Energy Projects (Small Scale)**

UCR Positive List Environmental Additionality

CATEGORY- ***AMS-I.C. Small-scale Methodology***
Thermal energy production with or without electricity Version 22.0

Typical project(s):
Thermal energy production using renewable energy sources including biomass-based cogeneration and/or trigeneration. Projects that seek to retrofit or modify existing facilities for renewable energy generation are also applicable.

Type of GHG emissions mitigation action:
Renewable energy. Displacement of more-GHG-intensive thermal energy production, displacement of more-GHG-intensive thermal energy and/or electricity generation. This methodology is applicable to project activities that operate biomass (co-)fired power and-heat plants. The project activity includes the installation of new plants at a site where currently power or heat generation occurs. The new plant replaces or is operated next to existing plants (capacity expansion projects).

Scope:
This methodology comprises renewable energy technologies that supply users i.e. residential, industrial or commercial facilities with thermal energy that displaces fossil fuel use. These units include technologies such as solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass and other technologies that provide thermal energy that displaces fossil fuel.

Applicability: Biomass-based cogeneration and trigeneration systems are included in this category. Emission reductions from a biomass cogeneration or trigeneration system can accrue from the following activities:

(a) Electricity supply to a grid

For project activities that do not displace captive electricity generated by an existing plant but displace grid electricity import and/or **supply electricity to a grid**, the emission factor of the grid shall be calculated as per the procedures detailed in ***AMS-I.D.***

UCR CoU Standard is used to determine the baseline grid emission factor for the 2013-2022 period for conservativeness.

B.2. Applicability of methodologies and standardized baselines>>

The project activity involves the generation of electricity from the combustion of rice husk, a renewable biomass and the electricity is supplied to the grid. Since the project activity utilises biomass (rice husk) for the generation of power and supplies it to the local grid, it displaces fossil fuel (coal), and hence it meets the primary applicability criteria of the methodology.
The project activity is a biomass based cogeneration plant producing both heat and electricity. The total installed capacity of project activity is **10 MW** which is below the small scale specified limit of 15MW. The project is a biomass based co-generating system that supplies electricity (i) to the grid, (ii) thermal energy to the existing facilities. The project activity claims for emission reductions only from the supply of electricity to the grid.
The project activity involves the installation of **10MW** biomass cogeneration system at the adjacent rice mill. It is physically distinct from the existing units as a new set of equipment has been installed as part of the project activity which are not connected to the existing equipment, thus meeting the criteria of the methodology.
The project activity is a new power plant and does not involve retrofit or modification of an existing facility. The steam produced is used for captive consumption by the adjacent rice mill and not delivered to another facility or facilities within the project boundary.
The biomass used by the project plant is not stored for more than one year. The biomass used by the project plant is not processed chemically or biologically (e.g. through esterification, fermentation, hydrolysis, pyrolysis, bio- or chemical degradation, etc.) prior to combustion. The project activity is not using biomass fuel in briquette form.
The Project Activity uses biomass residues from a production process (e.g. production of rice in mill), and the implementation of the project does not result in an increase of the processing capacity of (the industrial facility generating the residues) raw input (e.g. rice) or in other substantial changes (e.g. product change) in this process
The project activity is not charcoal based biomass energy generation. The project activity unit does not exceed the limit of 25% co-firing fossil fuel criteria as per the UCR Protocol for such projects. Co-firing with rice husk is limited to 15% with coal fines within the project activity.
Biomass generated power is used for direct grid supply and for meeting the captive needs at the facility. The project activity involves the grid-connected rice husk based electricity generation capacity involving the installation of facilities for allowing the export of electricity to the regional grid
The project activity also does not include any GHG emissions related to the decomposition or burning of biomass. The baseline heat emissions for the project activity are not included in the project boundary nor does it claim for emission reductions from heat.

B.3. Applicability of double counting emission reductions>>

The biomass boilers and turbines are constructed by the project proponent within the project boundary. The biomass boilers, turbines and energy meters have unique IDs, which is visible on the units. The Monitoring Report has the details of the same and will be provided to the UCR verifier during the verification process.

The UCR project activity had been validated and registered as a prior UNFCCC CDM project activity under the title: ***Biomass based power project by Shri Shyam Warehousing and Power Pvt. Ltd***. (Project ID 7261). Details as below:

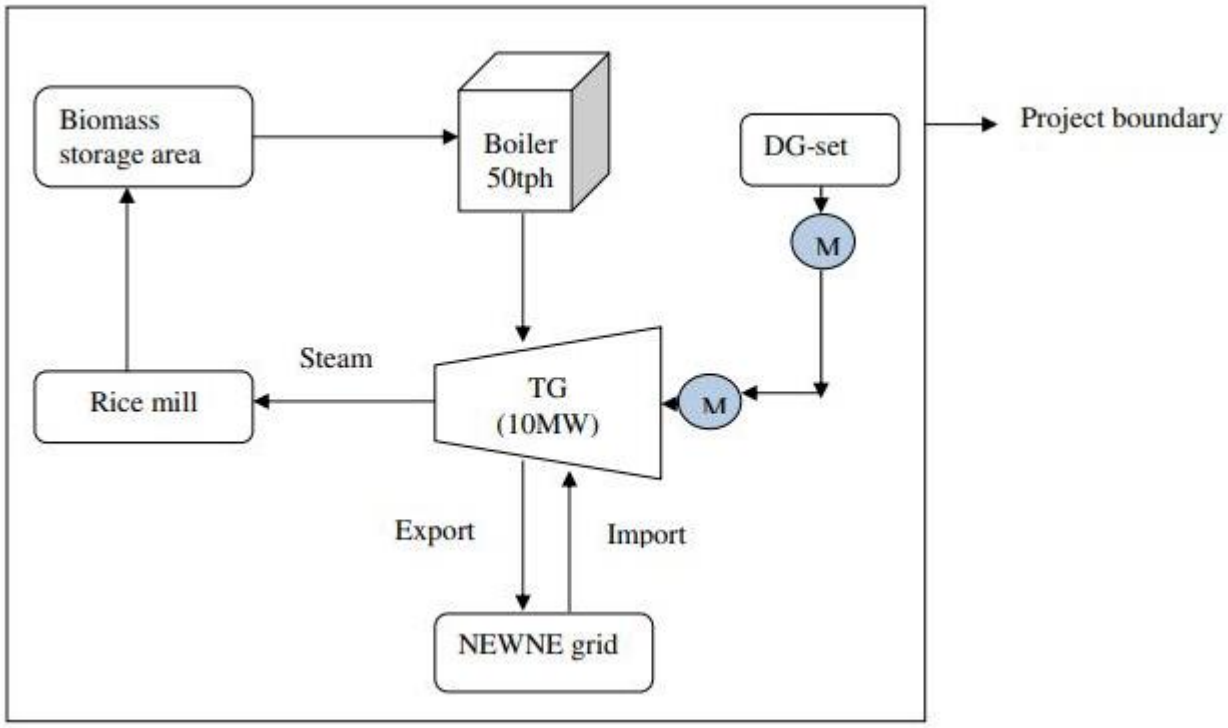
CDM Registration Date	13/12/2012
Crediting Period	13/12/2012-12/12/2019 (Renewable –Expired) Renewal under CDM no longer possible
CERs Issued (Period 1)	None
Monitoring Report (Period 1)	13/12/2012 to 31/12/2015. Displayed on the CDM Registry

The PP has indicated that they would not be pursing the CDM program for carbon credits post 31/12/2015. Hence the UCR project activity has never been issued voluntary carbon credits for the current 2016-2022 vintage years and there is no double counting of the credits envisioned. Additionally, the same has been stated in the undertaking provided in the Double Counting Avoidance Assurance Document (DAA) by the PP.

B.4. Projectboundary,sourcesandgreenhousegases(GHGs)>>

As per the methodology, the spatial extent of the project boundary encompasses:
(a) All plants generating electricity and/or thermal energy located at the project site, whether fired with biomass, fossil fuels or a combination of both;
(b) All power plants connected physically to the electricity system (grid) that the project plant is connected to;
(c) Industrial, commercial or residential facility, or facilities, consuming energy generated by the system and the processes or equipment affected by the project activity;
(a) the project power plant and all power plants connected physically to the electricity system that the project activity is connected to.

Hence, the project boundary of the project activity includes the following:
• Adjacent rice mill
• Biomass storage area
• Steam and power generating equipment i.e. boiler and turbine
• Regional grid



Leakage Emissions (LE_y)
Leakage emissions is not applicable as the project activity does not use technology or equipment transferred from another activity.

Hence $\mathbf{LE_y} = 0$

	Source	GHG	Included?	Justification/Explanation
Baseline	GHG Emissions from fossil fuel in Grid Baseline Power Generation	CO_2	**Included**	Major source of GHG emissions
		CH_4	Excluded	Excluded for simplification. This is conservative
		N_2O	Excluded	Excluded for simplification. This is conservative
Project Activity	On-site fossil fuel and electricity consumption due to the project activity (stationary or mobile)	CO_2	**Included**	Fossil fuel co-fired with biomass is included as a project emission source. For microscale and small-scale project activities, a default emission factor for accounting cultivation of rice husk is recommended and applied.
	Cultivation of biomass	CH_4	Excluded	Excluded for simplification. This is conservative
		N_2O	Excluded	Excluded for simplification. This is conservative

Project Emissions (PEy)

The project emissions (PEy) under the methodology may include

- CO_2 emissions from transportation of biomass residue to the project site,
- CO_2 emissions from on-site consumption of fossil fuels due to project activity,

Project emissions arise from the CO2 emissions due to the on-site consumption of fossil fuels due to the project activity. As the project activity uses 15% coal fines, we consider project emissions due to the consumption of coal. These emissions are calculated as per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".

$PE_{FC,j,y}$ = are the CO_2 emissions during the year y due to fossil fuels co-fired by the generation facility in tons of CO_2, in process j during the year y (tCO_2 / yr);

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

$FC_{i,j,y}$ = the quantity of fuel type i combusted in process j during the year y (mass or volume unit / yr);

$COEF_{i,y}$ = the CO_2 emission coefficient of fuel type i in year y (tCO_2 / mass or volume unit);

i = the fuel types combusted in process j during the year y.

The coefficient of emission factor of the fuel is calculated in accordance with the option 'B' of the "Tool to calculate project or leakage CO2 emissions from fossil fuel consumption" which states that "The CO_2 emission coefficient ***$COEF_{i,y}$*** is calculated based on net calorific value and CO_2 emission

factor of the fuel type i as follows:"

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

Where:
COEF $_{i,y}$ = the CO_2 emission coefficient of fuel type i in year y (tCO_2/ mass or volume unit);
NCV $_{i,y}$ = the weighted average net calorific value of the fuel type i in year y (GJ/ mass or volume unit);
EF $_{CO2,i,y}$ = weighted average CO_2 emission factor of fuel type i in y

B.5. Establishmentanddescriptionofbaselinescenario >>

T

he baseline scenario identified at the PCN stage of the project activity is:

"*the net quantity of electricity generation as a result of the project activity (incremental to baseline generation) during the year y in MWh times the CO_2 emission factor for the electricity displaced due to the project activity during the year y in tons CO_2/MWh*."

Given that steam and electric power generation for internal consumption is part of the present project activity, ***emission reductions are only claimed from on-site incremental power generation that is injected to the grid***. Therefore, the baseline scenario is the emission of GHG from the present electricity generation mix of the grid in the northern region.

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:

ERy = BE$_y$- (PE$_y$+ LE$_y$)

BE$_y$= Baseline emissions in year y (t CO_{2e})

As mentioned in the methodology the baseline emissions are calculated as follows:

$$BE_y = EG_{pj,y} * EF_{grid,y}$$

Where:
EG $_{grid,y}$ = Quantity of net electricity generation that is fed into the local grid as a result of the implementation of the project activity in year y (MWh)

EF$_{grid,y}$ = The CO_2 emission factor for grid connected power generation in year y calculated using UCR Standard emission factor (0.9 tCO2/MWh).

PE$_y$ = Project activity emissions

Project emissions (**PE** $_y$) involve emissions resulting from the cultivation of biomass, transportation of biomass, processing of biomass, transportation of biomass residues and processing of biomass residues. As an alternative to the monitoring of the parameters needed

to calculate the emissions from the biomass (rice husk) transportation, PP is allowed to apply the following option:

(a) *For microscale and small-scale project activities, a default emission factor of 0.0142 tCO_2/tonne of biomass*. *(source: TOOL16 Methodological tool Project and leakage emissions from biomass Version 05.0*)

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

$\mathbf{LE_y}$ = Leakage emissions = 0

For this methodology, it is assumed that transmission and distribution losses in the electricity grid are not influenced significantly by the project activity and are therefore not accounted for and also the UCR grid emission factor results in conservative estimates of the carbon credits.

Estimated yearly MWh grid supply = 64152 MWh
Estimated yearly ERs = 33948 CoUs

B.6. Prior History>>

The project activity has received no public funding. The project activity was registered under the UNFCCC CDM carbon program in the past. Details have been explained in the relevant section (B3) of this PCN.

The project activity has not applied to any other GHG program for generation or issuance of carbon offsets or credits for the current crediting period.

B.7.Changes to start date of crediting period >>

There is no change in the start date of crediting period (01/01/2016-31/12/2022).

B.8. Permanent changes from PCN monitoring plan, applied methodology or applied standardized baseline >>

There are no permanent changes from registered PCN monitoring plan and applied methodology.

B.9.Monitoring period numberand duration>>

1st UCR Monitoring Duration: 07 years, 00 months
1st UCR Monitoring Period: 01/01/2016 to 31/12/2022 (Both Days Inclusive)

B.10.Monitoringplan>>

The monitoring of electricity data revolves around the power generation from the turbine generators and the auxiliary consumption of the power plant. All auxiliary units at the power plant are metered and there are also main meters attached to each turbine generator to determine their total generation.

Main meter and check meter with accuracy of 0.2 has been installed at the grid substation of the Chhattisgarh State Electricity Board (CSEB) to monitor the net electricity exported to the grid. A representative of the project owner and the CSEB takes the main meter reading once in a month as agreed in the signed Power Purchase Agreement (PPA). The data is collated on monthly basis and is

considered for emission reduction calculation. The Site Head is responsible for the monthly JMR (electricity exported and electricity imported). He is responsible in transmitting the monthly data to the Plant Manager. The electricity meter is calibrated annually by state utility. The Instrumentation Engineer is in charge of maintaining the records of the calibrations on site.

Fuel consumption

The consumption of fuel for the generation of electricity is monitored at the weighbridge installed at the factory. The weighbridge records can be tallied against transporters receipts or against the computer generated payment invoices. The Plant Manager collates monthly the consumption of all types of fuels and the number of trucks of the daily data. The Instrumentation Engineer is in charge of the calibrations and of maintaining the records of the calibrations of the weighbridge at the site.

Operational records and other evidences have been documented, collected and archived in either hard-copies or electronic manners. The energy generation is metered by calibrated meters. The biomass consumption is measured by Weigh Bridge calibrated after every two year by state government organisation. Steam quantity, temperature and pressure are measured by calibrated meters. The date of calibration and next due date of calibration can be checked against the calibration certificates. All the values can be checked from the source data ie. plant records. The calorific value of biomass can be checked against the third party analysis reports.

Though the project is a co-generation project, the **PP shall claim UCR CoUs only based on the electrical energy supplied to grid**, hence, the parameters for steam generation, pressure of steam temperature of steam, feed water inlet temperature are not applicable as per the applied methodology AMS-I.C version 22.0.

All the meters are checked and calibrated each year by an independent agency and they are maintained as per the instructions provided by their suppliers. Hence there are no uncertainties or adjustments associated with data to be monitored. An internal audit team, comprising of personnel from the factory but from a department other than utility, reviews the daily reports, monthly reports, procedure for data recording and maintenance reports of the meters. This team checks whether all records are being maintained as per the details provided in the PCN. The audit team also enlists the modifications/corrective actions required, if any, in more accurate monitoring and reporting. All the data and reports will be kept at the offices of the rice mill until 2 years after the end of the crediting period or the last issuance of CoUs for the project activity, whichever occurs later.

Emergency preparedness plans have been laid out to meet with situations leading to unintended emissions. These emergency situations have been identified as:

1. Fire in the fuel yard
2. Fuel spoilage due to water. These emergency situations haven been taken care by putting up a fire safety system and a water drainage system in the fuel yard. T

Parameters	Description
$Q_{S,y}$	Quantity of steam supplied per year measured at recipient's end
$T_{steam,y}$	Temperature of steam at the recipient's end
$P_{steam,y}$	Pressure of steam
$E_{steam,y}$	Enthalpy of the saturated steam supplied to the recipient

$T_{Feedwater}$	Temperature of boiler feed water
$E_{Feedwater}$	Enthalpy of feed water
$EG_{thermal,y}$	Net quantity of thermal energy supplied by the project activity during the year y
$B_{Biomass,y}$	Net quantity of biomass consumed in year y (on dry basis)
$MC_{biomass}$	Moisture content of the biomass

Data/Parameter	**NCV_k**
Data unit	GJ/t
Description	Net Calorific Value of Biomass Residue Type *K*
Source of data Value(s) applied	Measurements will be carried out by reputed labs and reported in dry biomass basis.
Measurement methods and procedures	On site and in labs
Monitoring frequency	Every 6 months
Purpose of data	Quality control

Data/Parameter	$Q_{biomass,yr}$
Data unit	MT/yr
Description	The quantity of rice husk used to generate steam in the boilers each year
Source of data Value(s) applied	Plant records and log books receipts
Measurement methods and procedures	Monitoring: The quantity of biomass fed into the boiler is controlled. Data type: Measured Responsibility: Boiler Operator
Monitoring frequency	Daily
QA/QC	The amount of biomass used can be cross checked by the purchase orders and stock inventory.

Data/Parameter	**$EG_{project\ plant,\ y}$**
Data unit	MWh
Description	Net quantity of electricity generated in the project plant during the year y
Source	PP factory records

Measurement methods and procedures	This value will be determined annually from the records maintained at the factory. All auxiliary units at the power plant are metered and there is also a main meters attached to each turbine generator to determine their total generation.
Monitoring frequency	The hourly recordings of data is to be taken from energy meters located at the project activity site. This data is to be recorded hourly by the shift attendant and entered into logbooks on site. This hourly data is to be signed off at the end of every shift by an engineer in charge of the shift and again at the end of each day and signed off by the power plant manager. The energy meters are calibrated annually by an independent third party
QA/QC	Net electricity production has been calculated by deducting auxiliary consumption from gross generation of the plant. Digital meters calibration procedures are planned. Daily productions details are kept in log books and electronic data base. Energy meters are of class 0.2 with tolerance of 0.5%. All Meters are calibrated by accredited external third party, as per standard procedures, periodically.

Data/Parameter	**$EF_{grid,y}$**
Data unit	Grid Emission Factor
Description	tCO_2/MW_h
Source of data Value(s) applied	UCR CoU Standard Default for Indian grid 0.9 tCO_2/MW_h for the period 2017-2021
Measurement methods and procedures	NA
Monitoring frequency	NA
QA/QC	The parameter is conservative.
Purpose of data	To estimate baseline emissions

Data/Parameter	**$EG_{grid,y}$**
Data unit	MWh
Description	Quantity of net electricity supplied to the grid in year y (MWh)
Source of data Value(s) applied	JMR and/or Monthly Meter Readings

Measurement methods and procedures	Type: Measured Data type: Monitored This parameter may be checked with the necessary invoices or JMR (issued by the state grid) each month.
Monitoring frequency	Daily
QA/QC	The metering for energy exported and imported is carried out using the two way energy meter located at common metering point/interconnection point. The meter is capable of continuous monitoring. The monthly recording has been done manually and the records are maintained electronically. Joint meter reading is done in the presence of an official from state electricity board and project owner. Energy meters on existing turbines are calibrated on annual basis by NABL accredited labs. Electricity generation in these units are recorded and kept in log books for verification purpose. Energy meters are of class 0.2 with tolerance of 0.5%. All Meters are calibrated by accredited external third party, as per standard procedures, periodically
Purpose of data	To estimate baseline emissions

Data/Parameter	**$FC_{coal,j,y}$**
Data unit	Tonnes/yr
Description	Quantity of coal fines used in the project activity in the year y
Source of data Value(s) applied	Calculated
Measurement methods and procedures	Plant records
Monitoring frequency	Manually
QA/QC	Measured Daily and recorded monthly. The amount of coal used in the project activity is measured via a calibrated weighbridge system as and when consumed on continuous basis. Weigh bridge undergoes maintenance / calibration subject to appropriate industrial standards, at least annually. The data recorded is cross checked against purchase receipt. Cross check is also made via the measurements with an annual energy balance that is based on purchased quantities and stock changes, and the calibration frequency is once in three years.
Purpose of data	To estimate project emissions

Data/Parameter	**$EF_{CO2,coal,y}$**
Data unit	tCO2 /GJ
Description	CO2 emission factor for coal

Source of data Value(s) applied	Calculated
Measurement methods and procedures	CEA
Monitoring frequency	Annually
QA/QC	A default value is applied as per IPCC guidelines.
Purpose of data	To estimate project emissions