PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: Biomass based Cogeneration Project at Haidergarh, Uttar Pradesh

Version 2.0

Date: 21/02/2023

First CoU Issuance Period: 9 years, 0 months

Date: 01/01/2013 to 31/12/2022

Project Concept Note (PCN)
CARBON OFFSET UNIT (CoU) PROJECT

BASIC INFORMATION	
Title of the project activity	Biomass based Grid Connected Cogeneration Project at Haidergarh, Uttar Pradesh
Scale of the project activity	Large Scale
Completion date of the PCN	21/02/2023
Project participants	First Climate (India) Private Limited (AGGREGATOR) M/s. Balrampur Chini Mills Ltd (Unit Haidergarh) (DEVELOPER)
Host Party	India
Applied methodologies and standardized baselines	**CDM UNFCCC Methodology** ACM0006: Electricity and heat generation from biomass (Ver. 16).
Sectoral scopes	01- Energy industries (renewable -/ non-renewable sources)
Estimated amount of total GHG emission reductions	63,805 CoU/Yr.

SECTION A. Description of project activity

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

The project **Biomass based Cogeneration Project at Pokhra, Uttar Pradesh** is located in Village **Pokhra**, Tehsil **Haidergarh**, District **Barabanki**, State **Uttar Pradesh**, and Country **India**.

The details of the registered project are as follows:

Purpose of the project activity:

The purpose of the project activity is to generate electricity using renewable biomass and supply surplus green electricity to the Indian grid; thereby reduce GHG emissions by displacing the fossil fuel dominated grid based electricity with biomass based renewable electricity. The commissioning date of the project was **01st November, 2003** but the crediting period considered for this UCR project is 01st January, 2013.

Haidergarh Chini Mills is a unit of Balrampur Chini Mills Ltd., located in Barabanki district of Uttar Pradesh. Plant has installed one biomass based high pressure boiler of capacity 120 TPH. Steam header of the boiler is connected with one extraction cum condensate turbine of capacity 20.25 MW and one 3 MW backpressure turbine which supplies process steam and generate electricity. After meeting the captive demand of electricity, surplus energy is exported to the grid. Plant has signed a PPA for 20.95 MW with state dis-com to supply surplus electricity to grid. Plant would primarily use bagasse along with other renewable biomass. Hence, the purpose of the project activity is to supply surplus electricity which is produced from renewable source to grid to enhance the percentage of renewable electricity in present grid mix.

In absence of the project activity, equivalent amount of electricity which are supplied by this project activity would have been supplied to the grid by fossil fuel based power plant connected to this grid. First i.e., 20.25 MW turbine was commissioned on 01/11/2003 and another 3 MW turbine was commissioned on 19/11/2012. Both the project has been commissioned after 2002. Hence, as per the UCR guideline, start date of the crediting period would be started from 01/01/2013.

Thus the project activity would replace the electricity, which would otherwise been soured from present grid mix which is dominated by the fossil fuel based power plant, by renewable electricity. The project activity is expected to supply approximately 70895 MWh of renewable power to the grid each year. Hence, the project activity is expected to reduce the anthropogenic emission by 63,805 t-CO2e/Yr.

A.2 Do no harm or Impact test of the project activity>>

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

- **Social benefits:**
- Improvement of air quality in the nearby region: Air pollution due to open dumping of biomass will be reduced which enables improved air quality in nearby regions.
- Employment creation: Besides providing direct employment to the local population in the operation of the boiler, the project activity also provides indirect employment to number of people in activities associated with biomass collection, processing and operation of the boiler.
- The project activity also encourages biomass related agro industries in the area to be setup. As there is no discrimination, the project activity contributes to the removal of social disparities by providing employment to all strata of the social structure throughout the lifetime of the project. The proposed project activity will increase employment amongst the rural area where biomass is available in abundance.

- **Environmental benefits:**
- Reduction of fossil fuels consumption: With the implementation of the proposed project activity, the renewable energy source will replace the fossil fuels source thus contributing to reduced GHG emissions.
- The project activity helps in proper utilization of agro waste, which otherwise would have been dumped openly.
- As the biomass residues have inherently low sulphur and nitrogen content, the problems of NOx and SOx emissions is almost nil.
- The biomass residues are dumped providing zero economic value and causing air pollution and soil pollution.

- **Economic benefits:**

- Reduction of dependence from fossil fuels: The project activity will reduce the Production facility's dependence on fossil fuel. This will reduce the overall dependence of the whole region from the imports of fossil fuels.
- Project activity acts as a nucleus for other economic activities such as setting up of shops, hotels etc. in and around the area contributing to the economic development around the project activity site.
- Results in increased business opportunities for local contractors and suppliers during the various phases.

A.3. Location of project activity >>

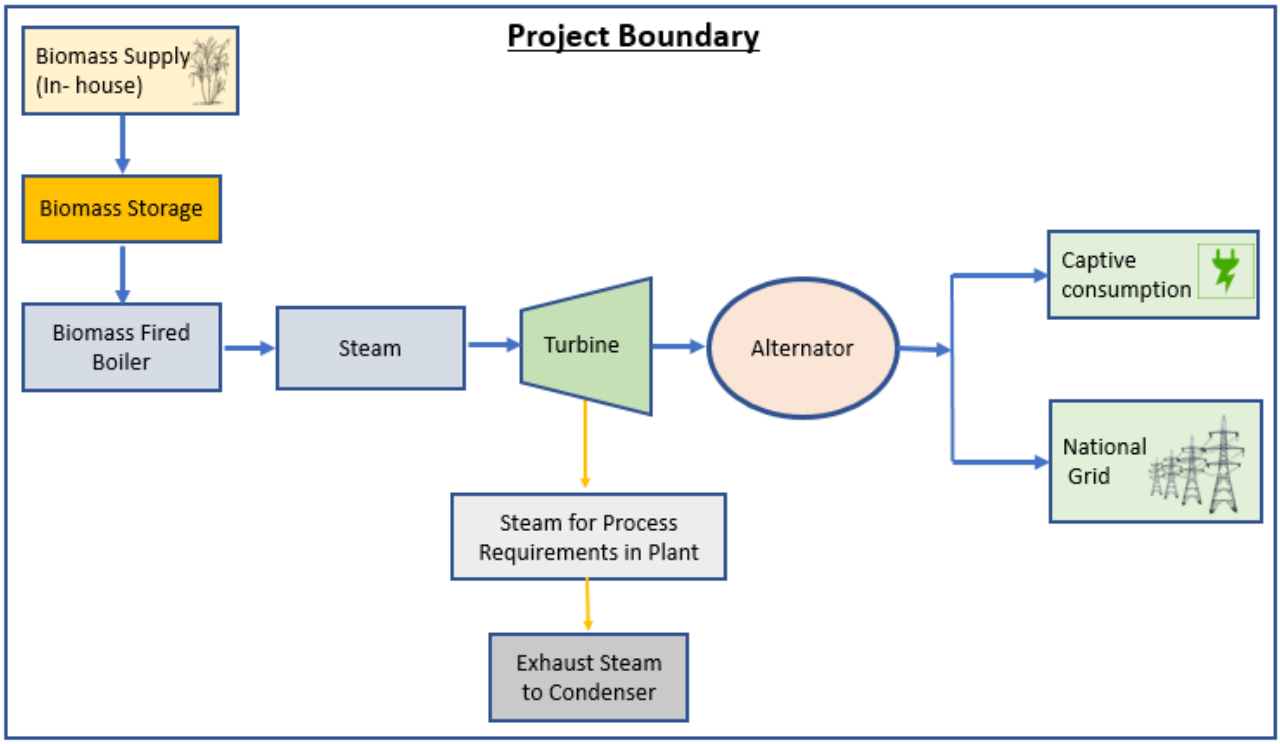
Country: India
District: Barabanki
Village: Pokhra
Tehsil: Haidergarh
State: Uttar Pradesh
Code: 225126

The project site is well connected by district and village roads to the nearest town. The geographic co-ordinates of the project location are:

Latitude: 26.5930° N
Longitude: 81.3063° E

A.4. Technologies/measures >>

Process flow chart:



The project activity involves generation of renewable electrical energy from the combustion of renewable biomass i.e. bagasse, to generate process steam and electricity for captive consumption and grid supply. Thus, the technology to be used in this project is indigenous and is environmentally safe & sound. Emission reductions will be claimed from electricity exported to grid only.

The sugar mill demands both electrical and thermal energy to run the process. To meet the demand, plant has installed a biomass fired co-generation system at their facility.
As the project is a co-gen system, conventional Rankine cycle is considered. Equipment required for the project are as follows:

- Boiler and It's Auxiliaries
- Turbine and It's Auxiliaries
- Alternator
- Cooling Water System
- Air Pollution Controlling System
- BOP

Technical details of boiler, turbine and alternator are tabulated below:

Boiler:

Parameter	Unit	Details
Type of Boiler	-	Travelling Grate Boiler
Boiler Rated Capacity	TPH	120
Boiler Pressure (design)	Kg/cm^2	99.5
Steam Pressure at Main Steam stop valve	Kg/cm^2	86
Steam Temperature	Deg.C	515±5
Feed Water Temperature (Deaerator Outlet)	Deg.C	115
Feed Water Temperature (Economiser Outlet)	Deg.C	170
Fuel type	-	Biomass

Turbine:

Parameter	Unit	20.25 MW Turbine	3 MW Turbine
Inlet Steam Pressure	Kg/cm^2. A	84	64
Inlet Steam Temperature	Deg.C	510	510
Rated Speed	RPM	6171	8325

Alternator:

Parameter	Unit	20.25 MW	3MW
Type	-	4 Pole Synchronous generator	4 Pole Synchronous generator
Rated Capacity	KVa	25312.5	3750
Rated Power Factor	-	0.8	0.8
Generation Voltage	V	11000	11000
Frequency	Hz	50	50

A.5. Parties and project participants >>

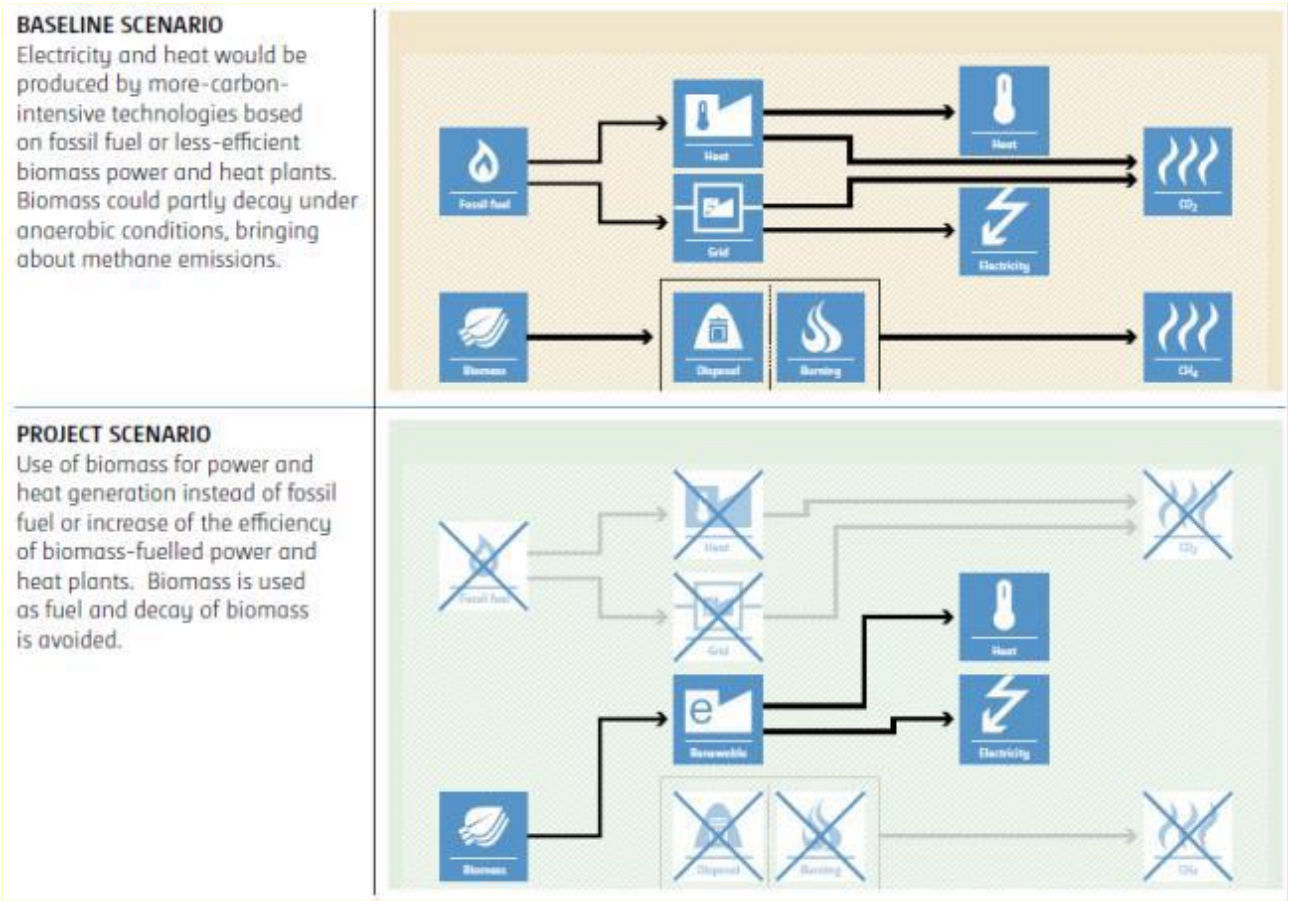
Party (Host)	Participants
India	**First Climate (India) Pvt. Limited (AGGREGATOR)** Contact Person: Partha P Chaudhuri Mobile: +91 9831012824 Address: 903 ERGO Tower, Plot No. A1-4, Block EP & GP, Sector V, Salt Lake, Kolkata 700 091 **Balrampur Chini Mills Limited (DEVELOPER)** FMC Fortuna, 2nd Floor, 234/3A A.J.C Bose Road, Kolkata 700 020

A.6. Baseline Emissions>>

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

In absence of the project activity, the energy supplied by the plant to grid would have been generated by fossil fuel dominated power plant connected to the grid. Due to the combustion of fossil fuel such as coal, emissions of carbon dioxide would have occurred. Since the project activity is using bagasse as fuel, which is a renewable and carbon neutral fuel, it is reducing greenhouse gas emissions.

Flow showing baseline scenario:



A.7. Debundling>>

This project is a greenfield project and not a debundled component of a larger project activity. No prior project activity was established in that location.

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

CATEGORY- ACM0006: Electricity and heat generation from biomass (Ver. 16)

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

This methodology is applicable to project activities that operate biomass (co-)fired power-and-heat plants. The co-gen plant can be considered as per the below applicability:

Applicability Criteria	Project Condition
The methodology is applicable under the following conditions: (a) Biomass used by the project plant is limited to biomass residues, biogas, RDF2 and/or biomass from dedicated plantations; (b) Fossil fuels may be co-fired in the project plant. However, the amount of fossil fuels co-fired does not exceed 80% of the total fuel fired on energy basis. (c) For projects that use biomass residues from a production process (e.g. production of sugar or wood panel boards), 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. sugar, rice, logs, etc.) or in other substantial changes (e.g. product change) in this process; (d) The biomass used by the project plant is not stored for more than one year; (e) 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. Drying and mechanical processing, such as shredding and palletisation, are allowed.	The project activity would use bagasse and other type of renewable biomass without any chemical, physical and biological processing. Biomass would not be stored in the project boundary more than one years. Project would not use any fossil fuel for co-firing. Hence the criteria points (a), (c), (b), (d) and (e) are applicable.

In the case of fuel switch project activities, the use of biomass or the increase in the use of biomass as compared to the baseline scenario is technically not possible at the project site without a capital investment in: (a) The retrofit or replacement of existing heat generators/boilers; or (b) The installation of new heat generators/boilers; or (c) A new dedicated supply chain of biomass established for the purpose of the project (e.g. collecting and cleaning contaminated new sources of biomass residues that could otherwise not be used for energy purposes); or (d) Equipment for preparation and feeding of biomass.	This is not a fuel switch project activity. Hence, this criterion is not applicable.
If biogas is used for power and heat generation, the biogas must be generated by anaerobic digestion of wastewater[3], and: (a) If the wastewater generation source is registered as a CDM project activity, the details of the wastewater project shall be included in the PDD, and emission reductions from biogas energy generation are claimed using this methodology; (b) If the wastewater source is not a CDM project, the amount of biogas does not exceed 50% of the total fuel fired on energy basis.	There is no production of biogas and hence this criteria is not applicable.
In the case biomass from dedicated plantations is used, the "TOOL16: Project and leakage emissions from biomass" shall apply to determine the relevant project and leakage emissions from cultivation of biomass and from the utilization of biomass residues.	The dedicated plantation is not applicable to the project and there are no leakage emissions from the utilization of biomass residues as the plant uses its own waste as fuel. Hence the given clause is not applicable to the project so concerned.

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

There is no double accounting of emission reductions in the project activity due to the following reasons:

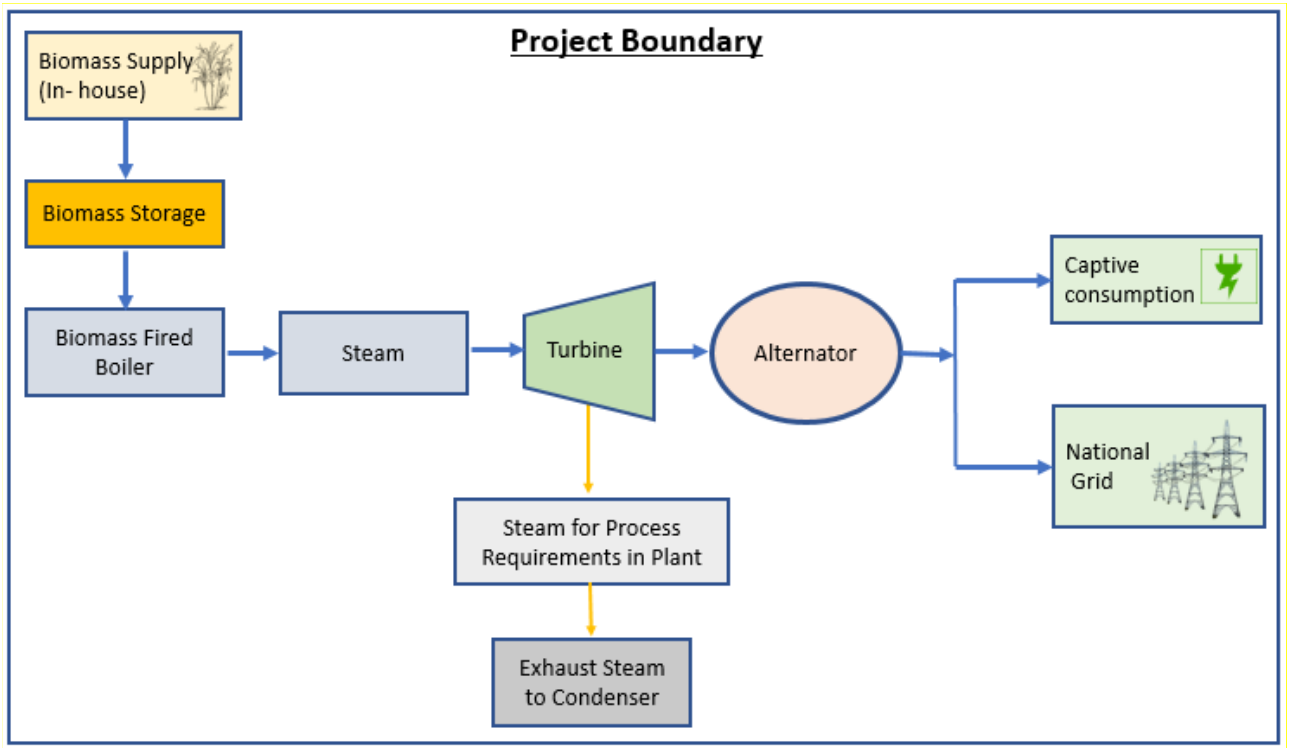
- Project has dedicated commissioning certificate and connection point.
- The project is a new greenfield project and neither registered previously in any other voluntary or compliance program, nor a de-bundled component of any large scale project or PoA.

- No previous project was located at the same location.

B.4. Project boundary, sources and greenhouse gases (GHGs)>>

In line with the methodology, the project boundary encompasses the industrial facility of DCM, equipment installed for the operation of cogeneration plant, the biomass storage facility, the facility (sugar unit) consuming the energy (electrical and thermal) generated by the project activity plant and its supply to the grid;
Plant would use the bagasse and other biomass as renewable fuel for the boiler. Quantity of the biomass required would mostly be generated in-house.

Project boundary of this project is illustrated below:



The table below provides an overview of the emission sources included or excluded from the project boundary for determination of baseline and project emissions

Source		GHG	Included	Justification/Explanation
Baseline	Electricity and heat generation	CO2	Yes	Main emission source
		CH4	No	Excluded for simplification. This is conservative.
		N2O	No	Excluded for simplification. This is Conservative.

	Uncontrolled burning or decay of surplus biomass residues	CO2	No	Excluded for simplification
		CH4	No	Excluded for simplification. This emission source is assumed to be very small
		N2O	No	Excluded for simplification.
Project Activity	On-site fossil fuel consumption	CO2	No	Project Activity does not use fossil fuel.
		CH4	No	Project Activity does not use fossil fuel.
		N2O	No	Project Activity does not use fossil fuel.
	Off-site transportation of biomass	CO2	No	Biomass is not transported to the outside of the plant premises.
		CH4	No	Biomass is not transported to the outside of the plant premises.
		N2O	No	Biomass is not transported to the outside of the plant premises.
	Combustion of biomass for electricity and heat	CO2	No	Biomass is a carbon neutral fuel. Hence, excluded.
		CH4	No	Not applicable, as not considered in baseline scenario either
		N2O	No	Excluded for simplification. This emission source is assumed to be small
	Wastewater from the treatment of biomass	CO2	No	Biomass does not undergo any treatment. So no wastewater is generated.
		CH4	No	Biomass does not undergo any treatment. So no wastewater is generated.

		N2O	No	Biomass does not undergo any treatment. So no wastewater is generated.
	Cultivation of land to produce biomass feedstock	CO2	No	Not applicable, as the biomass is not sourced from dedicated plantations.
		CH4	No	Not applicable, as the biomass is not sourced from dedicated plantations.
		N2O	No	Not applicable, as the biomass is not sourced from dedicated plantations.

B.5. Establishment and description of baseline scenario (UCR Standard or Methodology) >>

In absence of the project activity equivalent energy would have been generated and supplied to the grid by the power plants connected to the grid which are dominated by fossil fuel fired power generation unit.

Emission Reductions are calculated as follows:

$ER_y = BE_y - PE_y - LE_y$

Where,
ER_y = Emissions reductions in year y (t CO_2)
BE_y = Baseline emissions in year y (t CO_2)
PE_y = Project emissions in year y (t CO_2)
LE_y = Leakage emissions in year y (t CO_2)

Baseline emissions are calculated as follows:

$$BE_y = EL_{BL,GR,y} \times EF_{EG,GR,y} + \sum FF_{BL,HG,y,f} \times EF_{FF,y,f} + EL_{BL,FF/GR,y} \times min(EF_{EG,GR,y}, EF_{EG,FF,y}) + BE_{BR,y}$$

Where,
BE_y = Baseline emissions in year y (t CO_2)
$EL_{BL,,}$ = Baseline electricity sourced from the grid in year y (MWh)
$EF_{EG,,}$ = Grid emission factor in year y (t CO_2/MWh)
$FF_{BL,,,}$ = Baseline fossil fuel demand for process heat in year y (GJ)
$EF_{FF,,}$ = CO2 emission factor for fossil fuel type f in year y (t CO_2/GJ)
$EL_{BL,/GR,y}$ = Baseline uncertain electricity generation in the grid or on-site or off-site power-only units in year y (MWh)

$EF_{EG,,}$ = CO_2 emission factor for electricity generation at the project site or off-site plants in the baseline in year y (t CO_2/MWh)
$BE_{BR,}$ = Baseline emissions due to disposal of biomass residues in year y (t CO_2e)
f = Fossil fuel type

Generation of captive thermal and electrical energy is a common practice across the sugar sector. The fuel used for the project activity is entirely biomass fired and no fossil fuel is required to run the plant. In absence of the project activity, plant would not have exported green power to grid and consequently other plants which are dominated by fossil fuel would generate electricity and supply equivalent energy to grid. Hence the emission reduction can only be calculated for the replacement of equivalent grid- mix energy, which would be exported to grid by this project activity, with renewable electricity.

The equation reduces to:

$BE_y = EL_{BL,GR,y} \times EF_{EG,GR,y}$

Where,
BE_y = Baseline emissions in year y (t CO_2)
$EL_{BL,GRy,}$ = Baseline electricity sourced from the grid in year y (MWh)
$EF_{EG,,}$ = Grid emission factor in year y (t CO_2/MWh)

Plant is exporting surplus energy to grid after captive consumption. Hence as per para 45 of the methodology, ($EL_{BL,} - CAP_{EG,al,y}$) would be the quantity of electricity supplied to the grid by the project activity which is greater than zero.

Therefore,

$EL_{BL,GR,y,}$ = Net electricity exported to grid

Referring to TOOL 16 “Project and leakage emissions from biomass”

The project and leakage emissions for the project activity are 0.

$PE_y = 0$

$LE_y = 0$

Estimated Annual or Total baseline emission reductions (BEy) = 63,805 CoUs /year (63,805 tCO2eq/yr)

B.6. Prior History>>

The project activity titled “BCML Haidergarh Bagasse Co-generation Project (India)” with Project ID 1069, was submitted to CDM for claiming carbon credits for a fixed crediting period (01 Nov 03 - 31 Oct 13) but it was later withdrawn before registration.
Hence, the project is not registered on any other GHG abatement mechanism and would not claim credits under any such mechanisms except UCR.

Therefore, project will not cause double accounting of carbon credits (i.e. COUs).

For more details, refer to this link: https://cdm.unfccc.int/Projects/DB/SGS-UKL1175343929.72/view

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

There is no change in the start date of crediting period.

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 number and duration>>

First Issuance Period: 9 years, 0 months – 01/01/2013 to 31/12/2022

B.8. Monitoring plan>>

Following parameters being used in emission reductions determination (Fixed Ex-Ante)

Data/Parameter	$EF_{Grid,y}$
Data unit	tCO2 /MWh
Description	Combined Margin Grid Emission Factor
Source of data Value(s) applied	UCR default value as per UCR Standard Version 6.0
Value applied	0.9
Measurement methods and procedures	N/A
Monitoring frequency	Ex-ante fixed parameter
Purpose of data	For estimation of baseline emission.

Data and parameters that require to be monitored at the Project location from time to time is tabulated below:

Data / Parameter:	$EL_{BL,GR,y}$
Data unit:	MWh/year
Description:	Quantity of net electricity supplied to the grid as a result of the implementation of the project activity in year y (MWh)
Source of data:	Monthly Joint Meter Readings (JMRs)
Measurement procedures (if any):	Generally, the calculation is done by the Authority/Discom and the project proponent has no control over the authority for the calculation. Therefore, based on the joint meter reading certificates/credit notes, the project shall raise the invoice for monthly payments. EL = E(export)- E(import) However, for ER calculation value would be directly sourced from JMR.
Monitoring frequency:	Data Type: Measured Monitoring equipment: ABT Energy Meters at grid interface.

	Frequency: Continuous monitoring and Monthly recording from Energy Meters, Archiving Policy: Paper & Electronic
Value applied:	To be applied as per actual data
QA/QC procedures:	Calibration of the Main meters will be carried out once in five (5) years as per National Standards (as per the provision of CEA, India) and faulty meters will be duly replaced immediately as per the provision of power purchase agreement. Cross Checking: Quantity of net electricity supplied to the grid will be cross checked from the invoices raised by the project participant to the grid.
Purpose of date: Any comment:	The Data/Parameter is required to calculate the baseline emission. All the data will be archived till a period of two years from the end of the crediting period.