PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: "**9.8 MW Biomass based power generation by Mahindra Power Pvt. Ltd. in Champa-Janjgir District, Chattisgarh" Version 1.0**

Date 31/01/2023

First CoU Issuance Period: 10 Years, 00 Months

Date: 01/03/2017 to 28/02/2027

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

BASIC INFORMATION	
Title of the project activity	9.8 MW Biomass based power generation by Mahindra Power Pvt. Ltd. in Champa-Janjgir District, Chattisgarh
Scale of the project activity	Small Scale Project Activity
Completion date of the PCN	31/01/2023
Project participants	Mahendra Power Private Limited
Host Party	India
Applied methodologies and standardized baselines	AMS-I.D.: Grid connected renewable electricity generation --- Version 10.0[1]
Sectoral scopes	**1-** Energy industries (renewable - / non-renewable sources)
Estimated amount of total GHG emission reductions	556295CoUs **(556295 tCO2eq)**
Estimated amount of total GHG emission reductions per annum	**55629.50 (tCO2eq per annum)**

[1] CDM: Grid connected renewable electricity generation --- Version 18.0 (unfccc.int)

SECTION A. Description of project activity

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

The project 9.8 MW Biomass Based Power Plant at Lahari Power & Steels Limited in Champa-Janjgir District, Chattisgarh is located in Village:Mahuda, Tehsil:Champa, District Janjgir-Champa, State Chhattisgarh, and Country India.

The details of the registered project are as follows:

Purpose of the project activity:

Mahendra Power Private Limited (MPPL), has set up a 9.8 MW Biomass based power generation unit at Janjgir Village in Champa District in the state of Chhattisgarh, India.
This is a Greenfield project.

The project activity is establishing a 9.8 MW biomass-based power plant at Madwa Village of Champa-Janjgir District in Chhattisgarh State, India. The project activity will utilise surplus biomass residues to generate electricity for a grid system owned by the state-owned power utility, Chhattisgarh State Electricity Board (CSEB). The location of the project activity was selected considering all the requirements like biomass availability, water availability, power evacuation facilities etc after due survey has been made by the project proponent. The Champa-Janjgir district is one of the largest paddy growing areas in the state of Chhattisgarh. Paddy, Wheat and Maize are major biomass producing crops cultivated in surrounding areas within 75 km radius of the project location. Many rice mills and saw mills are located in this area supplying agro-residues namely rice husk and saw dust respectively. The project will generate power by sustainable means without any negative impact on environment and the generated electricity will be exported to 220/132 kV/33kV/11kV Banari substation of CSEB, which is at a distance of 4 km from the project site. The whole process supports in climate change mitigation as it leads to emission reduction of 556,295 tonnes of CO2eq. over the crediting period of 10 years.
Hence, project activity is displacing the estimated annual net electricity generation i.e., 61810.56 MWh/ys from the Indian grid system, which otherwise would have been generated by the operation of fossil fuel-based grid-connected power plants. The project activity doesn't involve any GHG emission sources.

Since the project activity will generate electricity through biomass energy, a clean renewable energy source, it will not cause any negative impact on the environment and thereby contributes to climate change mitigation efforts.

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

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

Social benefits:

- The project would level up (which is a major concern in India) collection, processing and supply of the biomass fuels envisaged.
- Create jobs for operating the plant as well for fuel collection system, transportation of fuel material to the project plant from sources.
- The generation of eco-friendly green power and contribution to the availability of quality power in the rural area where the plant is located which brings about socio economic development of rural.

Environmental benefits:

- The project activity utilises biomass potential available for power generation, which otherwise is dominated by fossil fuels such as coal, lignite and gas.
- The project contributes to climate change mitigation, through renewable energy generation and reducing the demand for fossil fuel based power.

Economic benefits:

- Employment generation for the local population which results in economic well being.
- Generation of additional income for rural farmers due to creation of commercial value for the neglected biomass in and around the project region would bring in additional investment consistent with the needs of the people.

Rational: as per 'Central Pollution Control Board (Ministry of Environment & Forests, Govt. of India)', final document on revised classification of Industrial Sectors under Red, Orange, Green and White Categories, it has been declared that renewable energy project activity falls under the "White category". White Category projects/industries do not require any Environmental Clearance such as 'Consent to Operate' from PCB as such project does not lead to any negative environmental impacts. Additionally, as per Indian Regulation, Environmental and Social Impact Assessment is not required for renewable energy projects.

PP had proposed to implement a 9.9 MW non-conventional renewable energy source (i.e., biomass)

The GHG emissions of the combustion process, mainly CO2 are sequestered by Crop Husk/ mustard / bagasse / soya / corn crop plantation, representing a cyclic process. So, the project leads to zero net GHG on-site emissions. The stakeholders identified for the project are as under.

• Elected body of representatives administering the local area (village Panchayat)
• Chhattisgarh Rajya Vidyut Prasaran Nigam Ltd (CRVPNL)
• Chhattisgarh Renewable Energy Corporation Limited (CREC)
• Chhattisgarh State Pollution Control Board (CSPCB)
• Ministry of Environment Forest & Climate Change (MoEF & CC), Government of India
• Ministry of Non-conventional Energy Sources (MNES)
• Non-Governmental Organizations (NGOs)
• Consultants Equipment Suppliers
• Biomass suppliers and farmers
• Biomass collectors

Stakeholder list includes the government and non-government parties, which are involved in the project at various stages. PP has not only communicated with the relevant stakeholders under statutory obligations but also has engaged the other stakeholders in a proactive manner in expressing and accounting their opinions on the project. The feedback and inputs received from stakeholders confirm that no negative impact is foreseen by the stakeholders.

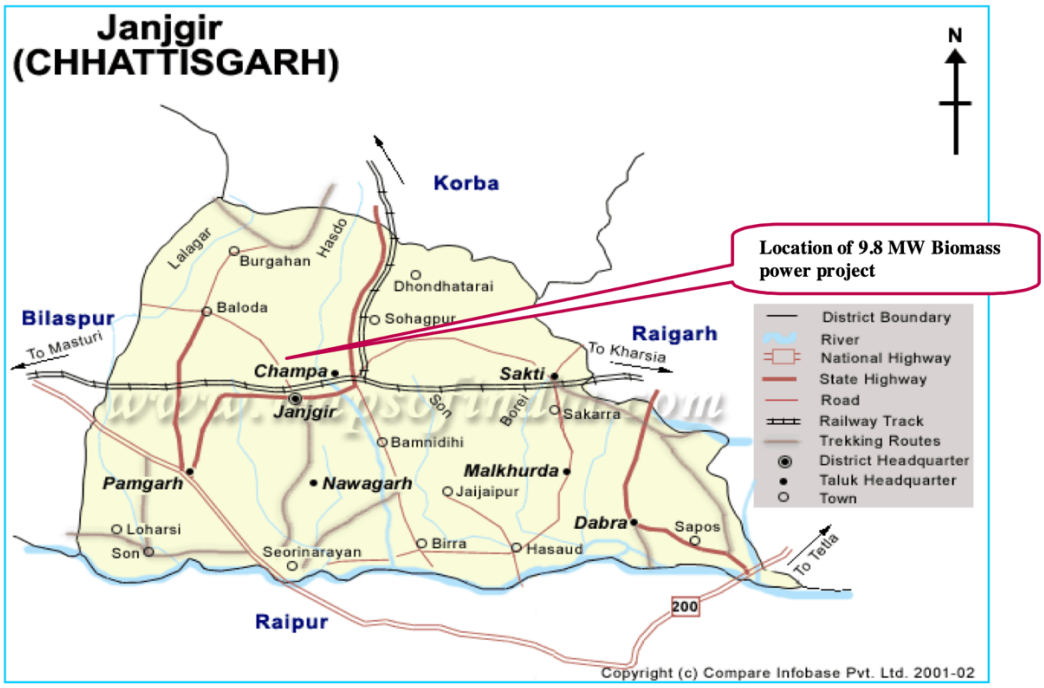
A.3. Location of project activity >>

Country: India
State: Chhattisgarh
District: Janjgir-Champa
Tehsil: Champa
Village: Mahuda

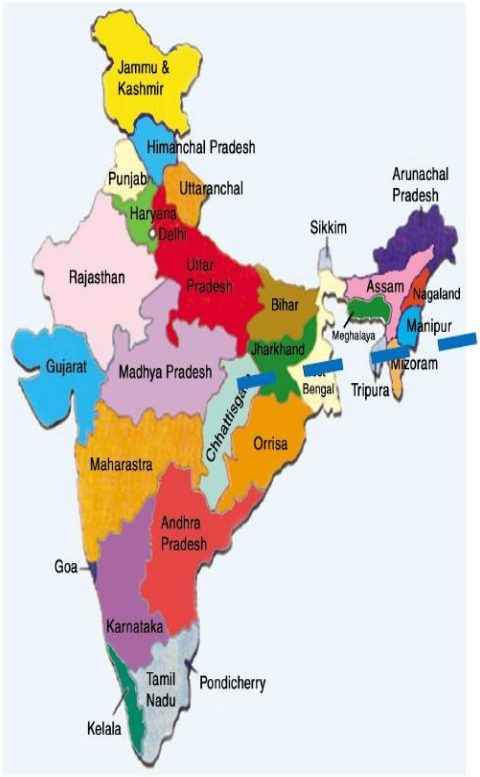
Google map & other map showing location of the project activity

Map1: Location of Chattisgarh (yellow) in India

Map2: Location of Janjgir district in Chattisgarh



Map3: Location of 9.8 MW biomass based power project in Janjgir District



A.4. Technologies/measures >>

The basic technology is Rankine Cycle route where direct combustion of biomass materials takes place through the multi-fuel fired boiler to generate high pressure and high temperature steam, which drives an reaction turbine generator set.
The plant and machinery of the project consists of one number traveling grate boiler, one number steam turbine generator set, power evacuation system and fuel handling system etc. The electricity voltage level generated by the turbo generator is stepped to the voltage that is suitable to interface with the grid electricity. Other plant equipment includes HP heater, DM water system, water cooling system/radiator cooling system, compressed air system, firefighting equipment, fuel and ash handling system, switchgear and switch yard etc. The technology of power generation through direct combustion of fuels is already established in India.
The capacity of the turbo generator is 9.8 MW, which generates electricity at 33/11 kV level for about 7920 hours in a year. It is anticipated that the plant can operate at 70% PLF during the first year and 80% PLF from second year on wards. Annual estimate of power export to the grid system during first year is 48.90 and 55.88 GWhfrom second year on wards
A key technical specification of the major equipments for the project is as given in the below table:

Boiler	
Type	Travelling Grate, Bi-drum, natural circulation
No. of boilers	1
Boiler capacity/steam flow rate	45 tons/hour
Steam pressure at super heater outlet	66 ata
Steam temperature at super heater outlet	485^0C +/- 5%
Water requirement	67 m3 / hour
Turbo-Generator Rated	
Type	Extraction cum condensing
Steam pressure at TG inlet	64 ata
Steam temperature at TG inlet	480 ^{0}C
Generator Voltage	11 KV
Frequency	50 HZ
Power Factor	0.8
RPM	1500
Condenser type	Surface condenser / Water cooled
Power Evacuation	
Grid Voltage	33 kV
CSEB Sub station	Banari, 33/11 kV
Energy Production	
Gross Power	9.8 MW

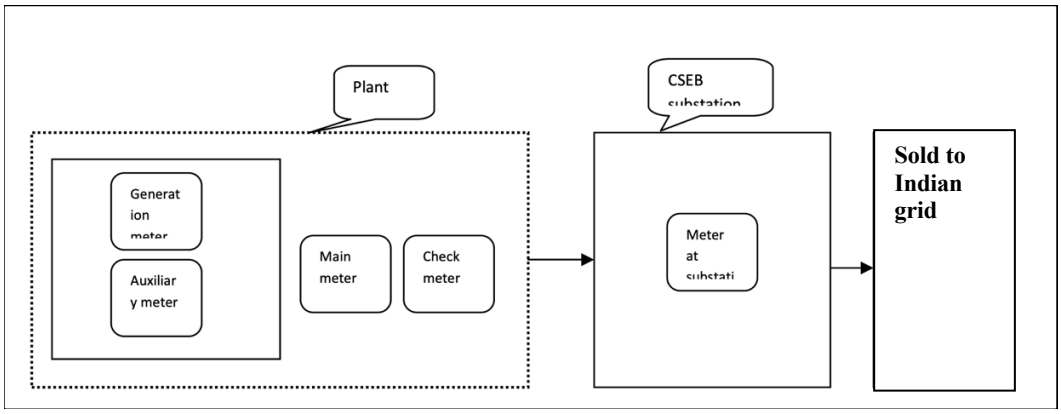
Auxiliary Consumption	0.98 MW
Net Power for Export	8.82 MW

A.5. Parties and project participants >>

Party (Host)	Participants
India	Mahendra Power Private Limited

A.6. Baseline Emissions>>

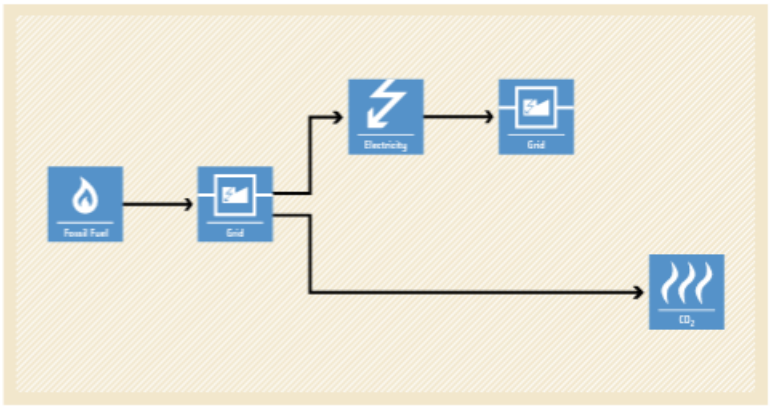
The baseline scenario identified at the PCN stage of the project activity is: Grid In the absence of the project activity, the equivalent amount of electricity would have been generated by the operation of fossil fuel-based grid-connected power plants and fed into Indian grid system, which is carbon intensive due to use of fossil fuels. Hence, baseline scenario of the project activity is the grid-based electricity system, which is also the pre-project scenario. Schematic diagram showing the baseline scenario:



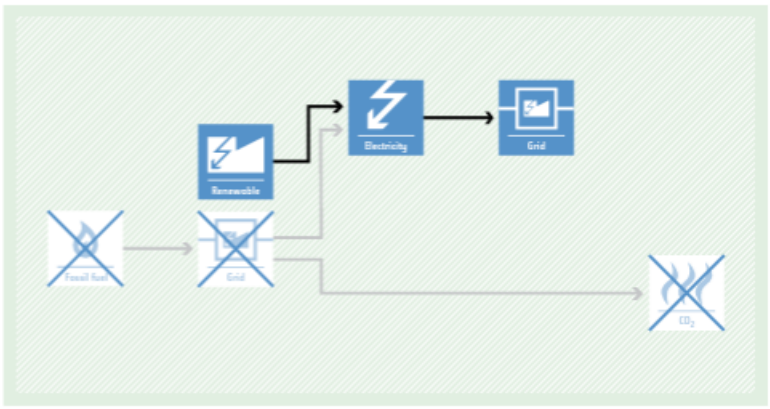
Baseline Scenario: As per the approved consolidated methodology AMS-I.D. Version 10, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following: "The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid". The project activity involves setting up of a new power plant which generates electricity from combustion of biomass which is a renewable source and to supply the produced power to the grid. In the absence of the project activity, the equivalent amount of power would have been supplied by the Unified grid, which is fed mainly by fossil fuel fired plants. Hence, the baseline for the project activity is the equivalent amount of power produced at the Indian grid.

DIAGRAM OR FLOW SHOWING BASELINE SCENARIO

BASELINE SCENARIO
Electricity provided to the grid by more-GHG-intensive means.



PROJECT SCENARIO
Electricity is generated and supplied to the grid using renewable energy technologies.



A.7. Debundling>>

This project activity is not a debundled component of a larger 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

CATEGORY: AMS. I.D. (Title: "Grid connected renewable electricity generation", version 10)

Note: PP had applied the version 10 of the methodology as the project is a CDM registered project under the CDM[2] with the version 10 of the applied methodology. The project was registered at CDM on 03/09/2007 with first crediting period of 10 years (from 03/09/2007 to 02/09/2017).

But PP has never taken any issuance during the crediting period as no verification has been done. Hence, for UCR registration the latest version of methodology i.e., version 18 is being considered for emission reduction calculation which is also the current version applied under CDM.

[2] DNV_Draft_Validation Report_Laharipower_ET070618 (unfccc.int)

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

The project activity involves generation of grid connected electricity from the renewable biomass based power generation project and is a Greenfield project activity. The project activity is having 9.8 MW installed capacity; therefore, falls in small scale project activity and eligible under small scale methodology AMS-I.D. The project status corresponding to the methodology AMS-I.D. Version 10 and applicability of methodology is discussed below:

Applicability Criterion	Project Case
1. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass: (a) Supplying electricity to a national or a Unified Indian Grid; or (b) Supplying electricity to an identified consumer facility via national/Unified Indian Grid through a contractual arrangement such as wheeling.	The project comprises of renewable biomass-based electricity generation unit which will supply electricity to a Unified Indian Grid on a contractual agreement signed with the state electricity board and thus satisfies the criteria. Hence, project activity satisfies this applicability criterion 1.a.
2. Illustration of respective situations under which each of the methodology (i.e. AMS-I.D: Grid connected renewable electricity generation", AMS-I.F: Renewable electricity generation for captive use and mini-grid" and AMS-I.A: Electricity generation by the user) applies is included in Table 2	According to the point 1 of the Table 2 in the methodology – "Project supplies electricity to a national/ Unified Indian Grid" is applicable under AMS I.D. As the project activity supplies the electricity to Unified Indian grid which is a Unified Indian Grid, the methodology AMS-I.D. is applicable
Applicability Criterion	**Project Case**
3. This methodology is applicable to project activities that: (a) Install a Greenfield plant; (b) Involve a capacity addition in (an) existing plant(s); (c) Involve a retrofit of (an) existing plant(s); (d) Involve a rehabilitation of (an) existing plant(s); or (e) Involve a replacement of (an) existing plant(s).	The Project activity involves the installation of new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity. Thus, Project activity is a Greenfield plant and satisfies this applicability condition (a).
4. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: (a) The project activity is implemented in existing reservoir, with no change in the volume of the reservoir; or (b) The project activity is implemented in existing reservoir, where the volume of the reservoir(s)	The criterion is not applicable to the project activity as the project is a biomass project.

is increased and the power density as per definitions given in the project emissions section, is greater than 4 W/m2. (c) The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m2	
5. If the new unit has both renewable and non- renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not Exceed the limit of 15 MW.	The project activity involves the installation of a turbine generator with an installed capacity of 9.8 MW based on the renewable biomass (Husk) and hence is within the 15 MW limit set by the methodology.
6. Combined heat and power (co-generation) systems are not eligible under this category	The project is not a combined heat and power plant and hence this criterion is not applicable.
7. In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	The project is a Greenfield project as there is no addition to the existing renewable power generation from the time of commissioning of the project activity and hence this criterion is not applicable.
8. In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement power plant/unit shall not exceed the limit of 15 MW.	The project is a Greenfield project as there is not any retrofit or replacement to the existing renewable power generation from the time of commissioning of the project activity and hence this criterion is not applicable.
Applicability Criterion	**Project Case**
9. In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as "AMS I. C.: Thermal energy production with or without electricity" shall be explored.	The project activity involves the installation of a turbine generator with an installed capacity of 9.8 MW based on the renewable biomass. Hence, this criterion is not applicable.

10. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply.	Project activity is not based on the biomass sourced from the dedicated plantations. Hence, this criterion is not applicable

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 is uniquely identifiable based on its location coordinates,
- Project has dedicated commissioning certificate and connection point,
- Project is associated with energy meters which are dedicated to the consumption point for project developer

PP had applied the version 10 of the methodology as the project is a CDM registered project under the CDM[3] with the version 10 of the applied methodology. The project was registered at CDM on 03/09/2007 with first crediting period of 10 years (from 03/09/2007 – 02/09/2017 (Fixed).

Note -But PP has never taken any issuance during the crediting period as no verification has been done, However PP will provide declaration letter for no double accounting signed on his letter head during the period of verification of this project activity.

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

As per applicable methodology AMS-I.D. Version 10, "The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the project power plant is connected to."
Thus, the project boundary includes the biomass-based steam generator, steam turbine generators and the Indian grid system.

Source		Gas	Included?	Justification/Explanation
Baseline	Grid connected electricity generation	**CO_2**	**Yes**	**CO2 emissions from electricity generation in fossil fuel fired power plants**
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
		Other	No	No other GHG emissions were emitted from the project
Project	Greenfield Biomass Power Project Activity	CO_2	No	No CO_2 emissions are emitted from the project
		CH_4	No	Project activity does not emit CH_4
		N_2O	No	Project activity does not emit N_2O
		Other	No	No other emissions are emitted from the project

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

This section provides details of emission displacement rates/coefficients/factors established by the

[3] https://cdm.unfccc.int/Projects/DB/DNV-CUK1182333004.68

applicable methodology selected for the project.

As per para 19 of the approved consolidated methodology AMS-I.D. Version 10, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

"The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid".

The project activity involves a new biomass-based power plant to harness energy from combustion of biomass and generate renewable energy i.e., electricity which is used for sale to national grid through PPA arrangement. In the absence of the project activity, the equivalent amount of power would have been generated by the operation of grid-connected fossil fuel-based power plants and by the addition of new fossil fuel-based generation sources into the grid, the power produced at grid from the other conventional sources which are predominantly fossil fuel based. Hence, the baseline for the project activity is the equivalent amount of power produced at the Indian grid.

A "grid emission factor" refers to a CO_2 emission factor (tCO_2/MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of **0.9 kg CO2e / kWh** for the 2014 - 2020 years as a conservative estimate for Indian projects not previously verified under any GHG program. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach.

- **Net GHG Emission Reductions and Removals**

Thus,

$\mathbf{ER_y = BE_y - PE_y - LE_y}$ Where:
ERy = Emission reductions in year y (tCO2/y)
BEy = Baseline Emissions in year y (t CO2/y)
PEy = Project emissions in year y (tCO2/y)
Ley = Leakage emissions in year y (tCO2/y)

- **Baseline Emissions**

Baseline emissions include only CO_2 emissions from electricity generation in power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants.

The baseline emissions are to be calculated as follows:

$$BEy = EG\mathbf{BL},y \times EFgrid,y$$

Where-

BE_y	=	Baseline emissions in year y (t CO_2)
$EG_{BL,y}$	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of this project activity in year y (MWh)
$EFgrid,y$	=	UCR recommended emission factor of 0.887 kg CO2e / kWh has been considered. (Reference: General Project Eligibility Criteria and Guidance, UCR Standard, page 4)

Project Emissions

As per paragraph 39 of AMS-I.D, version 10, for most renewable energy project activities emission is zero.

As per applied methodology only emission associated with the fossil fuel combustion, emission from use of alternate fuel during unavailability of biomass, would be accounted for the project emission on actuals. Therefore, following project emission type has been considered for the project activity:

Coal or lignite consumption:

The project activity will be using fossil fuel like coal and lignite as alternate fuel to meet the emergency requirements of the powerhouse; hence emissions due to usage of fossil fuel will be accounted as project emissions. As per the latest guidelines of Government of India, 15% of conventional fossil fuel can be used in case of any emergency.

CO2 emissions from fossil fuel combustion in the project activity are calculated based on the quantity of fuels combusted and the CO2 emission factor of those fuels, as follows:

$$\mathbf{PE_{FC,y} = \Sigma\, FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i}}$$

Where:

$PE_{FC,y}$ = Project Emission due to alternate fossil fuel consumed during monitoring period
$FC_{i,y}$ = Quantity of fuel type 'i' consumed in liters (lit) or tones (t)
$NCV_{i,y}$ = Net Calorific Value of type of fuel used
$EF_{CO2,i}$ = IPCC 2006 Emission factor for type of fuel used
i = fuel types combusted during the monitoring period

Hence, $PE_y = PE_{FC,y}$

Leakage

As per the para 23 of the tool "Leakage in biomass small-scale project activities" version 04, under "Competing uses for the biomass" category – "The project participant shall evaluate ex-ante if there is a surplus of the biomass in the region of the project activity, which is not utilized. If it is demonstrated (e.g., using published literature, official reports, surveys etc.) at the beginning of each crediting period that the quantity of available biomass in the region (e.g., 50 km radius), is at least 25% larger than the quantity of biomass that is utilized including the project activity, then this source of leakage can be neglected otherwise this leakage shall be estimated and deducted from the emission reductions".

In order to assess the availability of biomass in the project region, a biomass availability survey has been conducted by a credible third-party agent. Based on the biomass availability survey report it has been confirmed that there is sufficient biomass available in the region less than 50 km surrounding the site of the project activity. It confirms that there is no such leakage anticipated.

Hence, LEy = 0

The actual emission reduction achieved during the first CoU period shall be submitted as a part of first monitoring and verification. However, for the purpose of an ex-ante estimation, following calculation has been submitted:

Estimated annual baseline emission reductions (BEy)

Ex-ante calculation of emission reductions is equal to ex-ante calculation of baseline emissions as project emissions and leakage are nil.
Baseline emission factor (Combined Margin) ($\mathbf{EF_{grid, CM, y}}$ / $\mathbf{EF_{grid, CO2,y}}$) = 0.887 kg CO2e / kWh
Annual Net electricity generation = 9.8 MW (project capacity) × 80% (PLF) × 8760 (operating hours)
= 61810.56MWh

Combined CO_2 emission factor of the INDIAN Grid = 0.9 kg CO2e / kWh

Baseline emissions from the project activity = (net electricity from the project activity* emission factor of the INDIAN grid)

Baseline emissions from the project activity = (net electricity from the project activity* emission factor of the INDIAN grid)
= (61810.56 * 0.9)
= 55629.50 t CO2/yr
Emission Reductions from the project activity = 55629.50tCO2/yr

Hence, the total emission reductions after rounding off the above result, is 55629.50tons of CO2 annually and 556,295tons of CO2 for the entire duration of the crediting period.

B.6. Prior History>>

The project activity is a small-scale biomass fired project following are the key details under the prior history of the project:

PP had applied the version 10 of the methodology as the project is a CDM registered project under the CDM[4] with the version 10 of the applied methodology. The project proponent had earlier applied for carbon credits under the CDM mechanism in 2007, however, the project is neither a currently registered CDM activity nor has been issued credits for the period 03/09/2007 to 02/09/2017 under any GHG program (from 01/03/2017 to 28/02/2027).

Note -But PP has never taken any issuance during the crediting period as no verification has been done for the requested period in UCR, However PP will provide declaration letter for no double accounting signed on his letter head during the period of verification of this project activity.

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

There is no change in the start date of crediting period, the project is applied under UCR with its first crediting period starting from 01/03/2017.

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

Not Applicable

B.9. Monitoring period number and duration>>

[4] https://cdm.unfccc.int/Projects/DB/DNV-CUK1182333004.68/view

First Monitoring Period:
5 years, 10 months including the end date
01/03/2017 to 31/12/2022 (inclusive of both dates)

Crediting period of the project activity is from 01/03/2017 to 28/02/2027.

B.8. Monitoring plan>>

Data and Parameters available at validation (ex-ante values):

Data / Parameter	UCR recommended emission factor
Data unit	tCO_2 /MWh
Description	A "grid emission factor" refers to a CO_2 emission factor (tCO_2/MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of e 0.887 kg CO2e / kWh for the 2014 - 2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach.
Source of data	https://a23e347601d72166dcd6-16da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com//Documents/UCRCoUStandardAug2022updatedVer6_090822220127104470.pdf[5]
Value applied	0.9
Measurement methods and procedures	-
Monitoring frequency	Ex-ante fixed parameter
Purpose of Data	For the calculation of Emission Factor of the grid
Additional Comment	The combined margin emission factor as per CEA database (current version 16, Year 2021) results into higher emission factor. Hence for 2021 vintage UCR default emission factor remains conservative.

Data / Parameter	$NCV_{k,y}$
Data unit	GJ/mass or volume unit
Description	Net calorific value of biomass type k
Source of data	Laboratory record (Archived on paper)
Value applied	- (an average value is given for representation)

[5] https://a23e347601d72166dcd6-16da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com//Documents/UCRCoUStandardAug2022updatedVer6_090822220127104470.pdf

Measurement methods and procedures	IPCC Default Value is considered. *OR* Monitoring equipment – Bomb Calorimeter Water equivalent = H □ M □ (CV_t + CV_w) / T Where:

	H = Calorific value of Benzoic acid in cal/gm M = Mass of sample in gm CV_t = calorific value of thread (per cm = 2.1 cal) CV_w = calorific value of ignition wire (per cm = 2.331 cal) T = final rise in temperature
Purpose of Data	Calculation of baseline emission
Comments	The data will be archived electronically, and the archived data will be kept for 2 years beyond the Crediting Period

Data / Parameter	$EF_{CO2,i}$
Data unit	tCO_2e/TJ
Description	CO2 emission factor of fossil fuel type i
Source of data	IPCC default value
Value applied	74.8
Measurement methods and procedures	The project proponent chooses default value option i.e., IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories and is fixed Ex-ante. This is in accordance to the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion", latest version applied.
Purpose of Data	Calculation of project emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data and Parameters to be monitored (ex-post monitoring values):

Note: For the purpose of baseline ER accounting only one ex-post parameter is relevant, i.e. Net Electricity supplied to the Grid by the project activity ($EG_{BL,y}$). However, in line with the registered CDM monitoring plan, few other monitoring parameters are also included. Hence, at the time of baseline emission reduction calculation only the $EG_{BL,y}$ will be used; whereas other parameters may be considered only for reporting purposes.

Main Monitoring Parameter for calculation:

Data / Parameter	$EG_{BL,y}$
Data unit	MWh / year
Description	Net electricity supplied to the grid by the project activity
Source of data	Monthly Meter Reading Performa by CSEB
Measurement procedures (if any):	Monitoring equipment – MAIN Energy Meter Accuracy class - 0.2s Calibration frequency- once in five years Monitoring equipment – CHECK Energy Meter Accuracy class - 0.2s Calibration frequency- once in five years Measured readings of the energy meter installed at the plant switchyard outgoing feeder grid interconnection point. This will be recorded every month by Monthly Meter Reading by CSEB. This record will be archived and stored.
Measurement Frequency:	Monthly
Value applied:	61810.56/ yrs (Annualized average value has been considered here for an ex-ante estimation only, whereas this is an-ex post parameter hence actual value shall be applied during monitoring and verification)
QA/QC procedures applied:	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: The meter reading is cross checked with the sales receipts of electricity. The meters installed are owned by the state utility and the meter is tri-vector type of meter which can measure both export and import.
Purpose of data:	The Data/Parameter is required to calculate the baseline emission.
Any comment:	All the data will be archived till a period of two years from the end of The crediting period.