

Monitoring Report
CARBON OFFSET UNIT (CoU) PROJECT



Title: 10 MW Biomass Power Project by Indra Powergen Pvt. Ltd
Version 1.0
Date 03-02-2023

First CoU Issuance Period: 8 years, 00 months
Monitoring Period: 01/01/2015 to 31/12/2022



Universal Carbon Registry

Monitoring Report (MR)

CARBON OFFSET UNIT (CoU) PROJECT

Monitoring Report	
Title of the project activity	10 MW Biomass Power Project by Indra Powergen Pvt. Ltd
UCR Project Registration Number	UCR (ID# 292)
Version	01
Completion date of the MR	02-03-2023
Monitoring period number and duration of this monitoring period	Monitoring Period Number: 01 Duration of this monitoring Period: (first and last days included: 01/01/2015 to 31/12/2022
Project participants	M/S Indra Powergen Pvt Ltd.
Host Party	India
Applied methodologies and standardized baselines	AMS-I.D.: Grid connected renewable electricity generation ---- Version 18.0 ¹
Sectoral scopes	SELECT SCOPE 01 Energy industries (Renewable/Non-Renewable Sources)
Estimated amount of GHG emission reductions for this monitoring period in the registered PCN	2015: 41324 CoUs (41324 tCO _{2eq})
	2016: 44485 CoUs (44485 tCO _{2eq})
	2017: 41584 CoUs (41584 tCO _{2eq})
	2018: 28325 CoUs (28325 tCO _{2eq})
	2019: 31061 CoUs (31061 tCO _{2eq})
	2020: 46013 CoUs (46013 tCO _{2eq})
	2021: 49452 CoUs (49452 tCO _{2eq})
	2022: 36,763 CoUs (36763 tCO _{2eq})
Total:	319007 CoUs (319007 tCO_{2eq})

SECTION A. Description of project activity

A.1. Purpose and general description of project activity >>

a) Purpose of the project activity and the measures taken for GHG emission reductions >>

The purpose of the project is essentially to utilize the available biomass fuels in the region effectively and generation of clean power. The project activity is a 10 MW biomass based power plant implementing at Narayanpur Village, Surajpur Tehsil, Sarguja District of Chhattisgarh. The electricity generated from the project activity is exported to a grid system owned by the state owned power utility, Chhattisgarh State Electricity Board (CSEB). The project also helps to reduce ever increasing demand and supply gap of electricity in the region.

The proposed project activity generates power through sustainable mean using rice husk without causing any negative impact on the environment and export the generated electricity to the 33/110 kV Baikunthpur sub- station owned by CSEB. The whole process supports climate change mitigation as it leads to emission reduction of 319,0072 tonnes of CO₂eq over the crediting period of 08 years.

The Project was commissioned on 19/09/2009.

b) Brief description of the installed technology and equipment>>

The capacity of the proposed CDM project is only 10 MW, which is well below the qualifying capacity of 15 MW, the project activity can be regarded as a small scale.

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 a 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. Other plant equipment includes HP heater, DM water system, water cooling system/radiator cooling system, compressed air system, fire fighting 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 10 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 90%.

c) Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.)>>

UCR Project ID or Date of Authorization: UCR (ID# 292)

Start Date of Crediting Period: 01/01/2015

Project Commissioned: 19/09/2009

d) Total GHG emission reductions achieved or net anthropogenic GHG removals by sinks achieved in this monitoring period>>

The total GHG emission reductions achieved in this monitoring period is as follows:

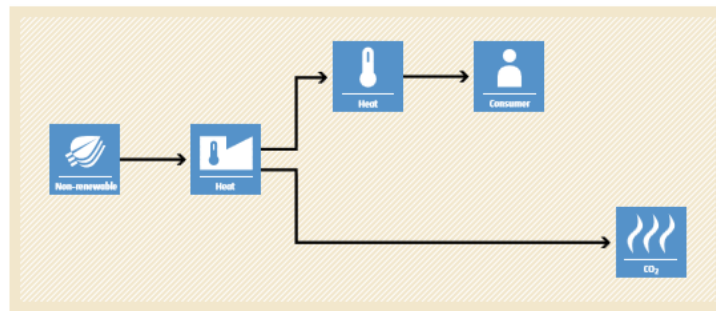
Summary of the Project Activity and ERs Generated for the Monitoring Period	
Start date of this Monitoring Period	01/01/2015
Carbon credits claimed up to	31/12/2022
Total ERs generated (tCO ₂ eq)	319,007 tCO ₂ eq
Leakage	0 tCO ₂ eq

e) Baseline Scenario>>

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

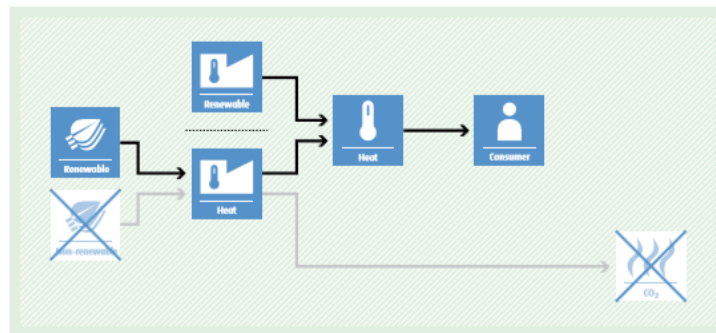
BASELINE SCENARIO

Thermal energy would be produced by more-GHG-intensive means based on the use of non-renewable biomass.



PROJECT SCENARIO

Use of renewable energy technologies for thermal energy generation, displacing non-renewable biomass use.



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 18, 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.

A.2. Location of project activity>>

Country: INDIA.

District: Sarguja

Village: Narayanpur

Tehsil: Surajpur

State: Chhattisgarh

Code: 497229

Latitude - 23.211191 (23° 12' 40.2876" N)

longitude - 82.923997 (82° 55' 26.3892" E)



Map 1: Location of Chattisgarh state (yellow) in India



Map 2: Location of Sarguja in Chhattisgarh State



A.3. Parties and project participants >>

Party (Host)	Participants
India	M/s Indra Powergen Pvt. Ltd.

A.4. 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 18)

A.5. Crediting period of project activity >>

First Monitoring Period:

8 years, 0 months including the end date

01/01/2015 to 31/12/2022 (inclusive of both dates)

Crediting period of the project activity is from 01/01/2015 to 31/12/2022

A.6. Contact information of responsible persons/entities >>

Contact person: Mr. TejasBaid

Mobile: +91 7898378818

Email: <mailto:tejas.baid@blueearth.eco>

Address: 504, 3rd Floor, Rajeev Gandhi Complex, Bal Ashram Compound, Kuchery Chowk, Raipur (C.G.), India

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity >>

a) Provide information on the implementation status of the project activity during this monitoring period in accordance with UCR PCN>>

The project 10 MW Biomass Power Project by Indra Powergen Private Limited is located in Village – Narayanpur, Tehsil – Surajpur, District – Sarguja, State - Chhattisgarh, Country – India

The details of the registered project are as follows:

Purpose of the project activity:

The purpose of the project is essentially to utilize the available biomass fuels in the region effectively and generation of clean power. The project activity is a 10 MW biomass based power plant implementing at Narayanpur Village, Surajpur Tehsil, Sarguja District of Chhattisgarh. The electricity generated from the project activity will be exported to a grid system owned by the state owned power utility, Chhattisgarh State Electricity Board (CSEB). The project will also help to reduce ever increasing demand and supply gap of electricity in the region.

The proposed project activity will generate power through sustainable means using rice husk without causing any negative impact on the environment and export the generated electricity to the 33/110 kV Baikunthpur sub- station owned by CSEB. The whole process supports climate change mitigation as it leads to emission reduction of 397,746 tonnes of CO₂eq. over the crediting period of 10 years.

The Project was commissioned on 19/09/2009.

b) For the description of the installed technology(ies), technical process and equipment, include diagrams, where appropriate>>

The capacity of the proposed CDM project is only 10 MW, which is well below the qualifying capacity of 15 MW, the project activity can be regarded as a small scale.

Technology

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 a reaction turbine generator set.

Equipments

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. Other plant equipment includes HP heater,

DM water system, water cooling system/radiator cooling system, compressed air system, fire fighting 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.

Power Generation

The capacity of the turbo generator is 10 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 90 %. Annual estimate of power export to the grid system during first year is

Specification	Value
Boiler	Bi-drum, natural circulation 45 T/hr
Power evacuation	Grid Voltage - 33 KV
Energy production	Gross power – 10 MW Net power for export -8.5 MW

B.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.

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 (CRVPL)
- 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.

B.3. Baseline Emissions>>

This section provides details of emission displacement rates/coefficients/factors established by the applicable methodology selected for the project.

As per para 19 of the approved consolidated methodology AMS-I.D. Version 18, 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 CO₂ emission factor (tCO₂/MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of **0.9 tCO₂/MWh** 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.

Estimated Emission Reductions: $ER_y = BE_y - PE_y - LE_y$

ER_y = Emission reductions in year y (tCO₂/y)

BE_y = Baseline Emissions in year y (t CO₂/y)

PE_y = Project emissions in year y (tCO₂/y)

LE_y = Leakage emissions in year y (tCO₂/y)

□ Baseline Emissions

Baseline emissions include only CO₂ 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:

$$BE_y = EG_{BL,y} \times EF_{grid,y}$$

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)
$EF_{grid,y}$	=	UCR recommended emission factor of 0.9 tCO ₂ /MWh has been considered. (Reference: General Project Eligibility Criteria and Guidance, UCR Standard, page 4)

B.4. Debundling>>

This project is not a de-bundled component of a larger project activity.

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

SECTION C. Application of methodologies and standardized baselines

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

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

PROJECT TYPE: I - Renewable Energy Projects

CATEGORY- AMS-I.D.: Grid connected renewable electricity generation --- Version 18

C.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 10 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 18 and applicability of methodology is discussed below:

Applicability Criterion	Project Case
-------------------------	--------------

<p>This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass:</p> <p>a. Supplying electricity to a national or a Unified Indian Grid; or</p> <p>a. Supplying electricity to an identified consumer facility via national/Unified Indian Grid through a contractual arrangement such as wheeling.</p>	<p>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.</p>
<p>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</p>	<p>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</p>
Applicability Criterion	Project Case
<p>3. This methodology is applicable to project activities that:</p> <p>a. Install a Greenfield plant;</p> <p>a. Involve a capacity addition in (an) existing plant(s);</p> <p>a. Involve a retrofit of (an) existing plant(s);</p> <p>a. Involve a rehabilitation of (an) existing plant(s); or</p> <p>a. Involve a replacement of (an) existing plant(s).</p>	<p>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).</p>
<p>4. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:</p> <p>a. The project activity is implemented in existing reservoir, with no change in the volume of the reservoir; or</p> <p>a. The project activity is implemented in existing reservoir, where the volume of the reservoir(s) is increased and the power density as per definitions given in the project emissions section, is greater than 4 W/m².</p> <p>a. 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</p>	<p>The criterion is not applicable to the project activity as the project is a biomass project.</p>
<p>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.</p>	<p>The project activity involves the installation of a turbine generator with an installed capacity of 10 MW based on the renewable biomass (Rice Husk) and hence is within the 15 MW limit set by the methodology.</p>

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 14 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

C.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

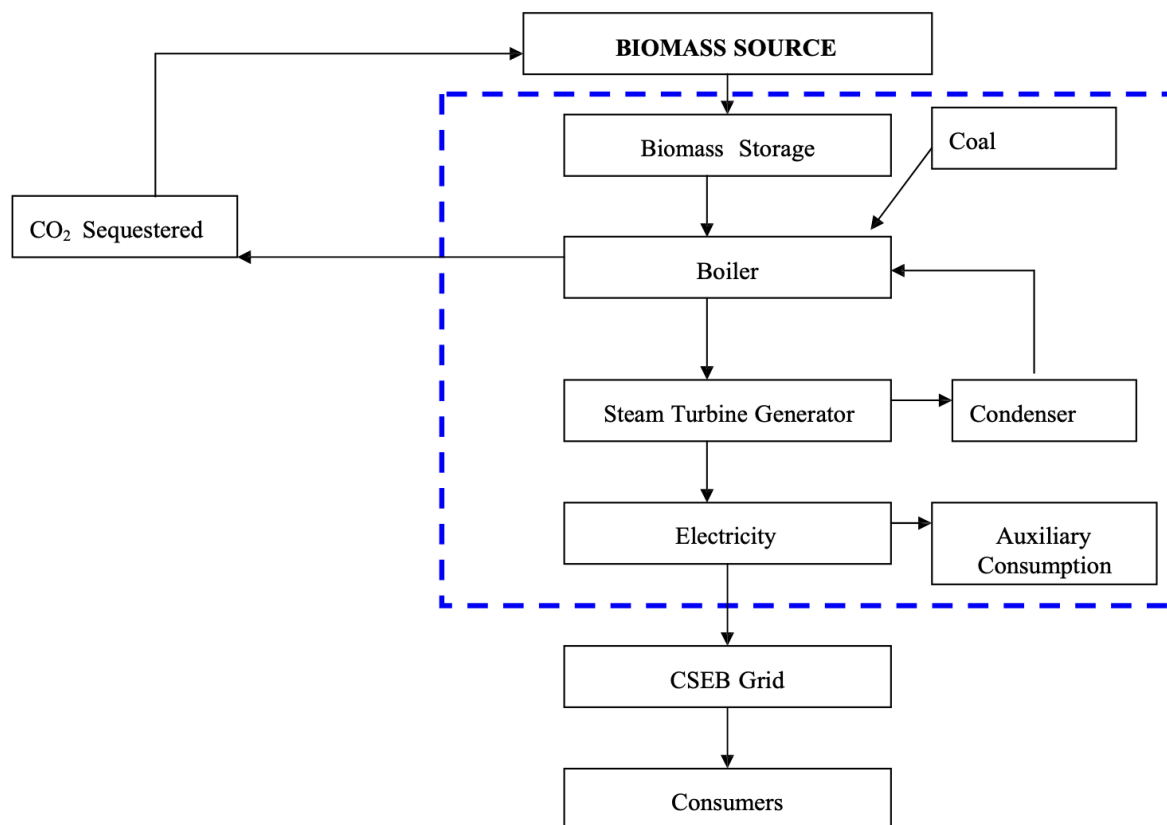
The project activity has not been registered under any other GHG mechanism and PP has never taken any issuance during the UCR crediting period, However PP will provide declaration letter for no double accounting signed on his letter head during the period of verification of this project activity.

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

As per applicable methodology AMS-I.D. Version 18, “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.”

The project boundary encompasses the physical and geographical site of the renewable generation source, which is considered from the point of fuel supply to the point of power export to the grid where the project proponent has a full control, as per the guidelines mentioned in Type I.D of Annex B of the simplified modalities and procedures for small-scale CDM project activities. Hence, project boundary is considered within these terminal points.

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 ₂ O	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 ₂ O	No	Project activity does not emit N ₂ O
		Other	No	No other emissions are emitted from the project

C.5. Establishment and description of baseline scenario (UCR Protocol) >>

This section provides details of emission displacement rates/coefficients/factors established by the applicable methodology selected for the project.

As per para 19 of the approved consolidated methodology AMS-I.D. Version 18, 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 CO₂ emission factor (tCO₂/MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of **0.9 tCO₂/MWh** 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.

Estimated Emission Reductions: $ER_y = BE_y - PE_y - LE_y$

ER_y = Emission reductions in year y (tCO₂/y)

BE_y = Baseline Emissions in year y (t CO₂/y)

PE_y = Project emissions in year y (tCO₂/y)

LE_y = Leakage emissions in year y (tCO₂/y)

□ **Baseline Emissions**

Baseline emissions include only CO₂ 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:

$$BE_y = EGBL_y \times EF_{grid,y}$$

Where-

BE_y	=	Baseline emissions in year y (t CO ₂)
$EGBL_y$	=	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)
$EF_{grid,y}$	=	UCR recommended emission factor of 0.9 tCO ₂ /MWh 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 18, 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:

$$PE_{FC,y} = \sum FC_{i,y} \times NCV_{i,y} \times EF_{CO_2,i}$$

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

$EF_{CO_2,i}$ = 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, $LE_y = 0$

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 (BE_y)

Ex-ante calculation of emission reductions is equal to ex-ante calculation of baseline emissions as project emissions and leakage are nil.

Combined CO₂ emission factor of the INDIAN Grid = 0.9 t CO₂/MWh

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)

= (354457.33 * 0.9)

= 319,007 tCO₂/yr

Emission Reductions from the project activity = 319,007 tCO₂/yr.

C.6. Prior History>>

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

C.7. Monitoring period number and duration>>

First Monitoring Period:

08 years, 00 months

01/01/2015 to 31/12/2022 (inclusive of both dates)

Crediting Period of the project activity is from 01/01/2015 to 31/12/2024 (inclusive of both dates)

C.8. Changes to start date of crediting period >>

There is change in the start date of crediting period.

Crediting period start from 01/01/2015

C.9. Permanent changes from PCN monitoring plan, applied methodology or applied standardized baseline >>

Not Applicable

C.10. 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 CO ₂ e / 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/UCRC-oUStandardAug2022updatedVer6_090822220127104470.pdf
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 _{ky}
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)
Measurement methods and procedures	IPCC Default Value is considered. <i>OR</i> Monitoring equipment – Bomb Calorimeter Water equivalent = $H \times M \times (CV_t + CV_w) / T$ 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 CO _{2,i}
Data unit	tCO _{2,e} /TJ
Description	CO ₂ 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:	E _{Gen}		
Data unit:	MWH		
Description:	Net electricity generated at generating point by 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		
	Make	Sr. No	Accuracy
	secure	CSE40045	0.2S
	secure	CSE52287	0.2S
	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.		

Monitoring frequency:	Continuously/monthly
Value Applied :	319,0078 MWh
QA/QC procedures:	<p>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.</p> <p>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</p>
Any comment:	All the data will be archived till a period of two years from the end of the crediting period.