



PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT



Title : **10 MW Biomass based Power Project by Sanjog Sugars & Eco-Power Private Limited**

Version : 1.0

PCN Date : 29/01/2025

CoU Issuance Period : 28 years

Monitoring Duration : 01/01/2013 to 31/12/2040



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

BASIC INFORMATION	
Title of the project activity	10 MW Biomass based Power Project by Sanjog Sugars & Eco-Power Private Limited
Scale of the project activity	Small Scale
Completion date of the PCN	29/01/2025
Project participants	M/s. Creduce Technologies Private Limited (Aggregator) M/s Sanjog Sugars & Eco-Power Private Limited (Project Proponent)
Host Party	India
Applied methodologies and standardized baselines	Applied Baseline Methodology: AMS I.D.- “Grid-connected Renewable electricity generation”, Version 18.0 Standardized Methodology: Not Applicable.
Sectoral scopes	01- Energy Industries (renewable/non-renewable sources)
Estimated amount of total GHG emission reductions	To be estimated during verification [An ex-ante estimate is 51,803 CoUs per year]

SECTION - A - Description of project activity

A.1 General description of Carbon offset Unit (CoU) project activity

The proposed project titled under UCR is “10 MW Biomass based Power Project by Sanjog Sugars & Eco-Power Private Limited”, which generates electricity and supplies to the Unified Indian Grid system (earlier as regional (Northern, Eastern, Western, North Eastern-NEWNE) electricity grid)¹. SSEPPL has installed a 10 MW Biomass based Power Project. The project was commissioned on 07/10/2011.

Purpose of the project activity:

The project activity is a biomass-based power generation activity which incorporates installation and operation of biomass-based power generation having capacity of 10 MW. The project activity generates electricity and supplies to the Unified Indian Grid system (earlier as regional (Northern, Eastern, Western, North Eastern-NEWNE) electricity grid) This project has been promoted by M/s Sanjog Sugars & Eco-Power Private Limited.

The project activity consists of installation of one 47 TPH boiler with outlet parameters of 475° C and 66 kg/cm² (atm) pressure and one bleed cum condensing turbine of capacity 11.5 MW (normal output) with a rated output of 10 MW. The Biomass which is used for power generation in the project activity mainly includes cotton stalks and mustard husk available in the region. Other seasonally available renewable biomass residues in small quantities like paddy straw, sugar cane, groundnut husk, rice husk is utilised in force majeure conditions like change in cropping pattern. The project activity was commissioned on 07/10/2011.

As per the ex-ante estimate, the project will generate approximately 61,670 MWh per Annum of electricity per annum. The project activity generates electricity and supplies to the Unified Indian Grid system by the project proponent (PP). The project activity has been helping in greenhouse gas (GHG) emission reduction by energy industries sectoral scope of biomass base energy generation.

The estimated annual average and the total CO₂e emission reduction by the project activity is expected to be 51,803 tCO₂e, whereas actual emission reduction achieved during the first CoU period shall be submitted as a part of first monitoring and verification.

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

A.1.1 Project's Contribution to Sustainable Development

This project is a greenfield activity where grid power is the baseline. The Indian grid system has been predominantly dependent on fossil fuel-powered plants. Renewable power generation is gradually contributing to the share of clean & green power in the grid; however, the grid emission factor is still on the higher side which defines the grid as a distinct baseline.

The Government of India has stipulated the following indicators for sustainable development in the interim approval guidelines for such projects which are contributing to GHG mitigations. The Ministry

¹ At the time of registration of the project, it was nominated under regional grid, called NEWNE grid. However, currently all regional grids are unified under Indian Grid System.


of Environment, Forests & Climate Change, has stipulated economic, social, environmental, and technological well-being as the four indicators of sustainable development. It has been envisaged that the project shall contribute to sustainable development using the following ways:

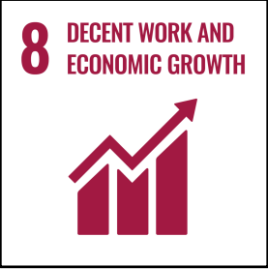

Social well-being: There has been good employment opportunities created for the local workforce during the project construction phase. The project after implementation has also continued to provide employment opportunities for the local populace in a sustained manner and the same would be continued over the project life time. The employment opportunities created will contribute towards alleviation of poverty in the surrounding area throughout the lifetime of the project activity.

Economic well-being: The project is a clean technology investment decided based on carbon revenue support, which signifies flows of clean energy investments into the host country. The project activity requires temporary and permanent, skilled and semi-skilled manpower at the project location; this will create additional employment opportunities in the region. The electricity replaced in grid will be available for nearby area which directly and indirectly improves the economy and life style of the area. In addition, success of these kind of project will provide new opportunities for industries and economic activities to be setup in the area. Apart from getting better employment opportunities, the local people will get better prices for their land, thereby resulting in overall economic development.

Technological well-being: The successful operation of project activity would lead to promotion of waste generation-based power generation and would encourage other entrepreneurs to participate in similar projects. Increased interest in waste generation projects will further push R&D efforts by technology providers to develop more efficient and better machinery in future. The project activity leads to the promotion and demonstrates the success of waste generation projects in the region which further motivate more investors to invest in waste generation projects. Hence, the project activity leads to technological well-being.

Environmental well-being: The project activity will generate power using zero emissions waste generation-based power generation facility which helps to reduce GHG emissions and specific pollutants like SO_x, NO_x, and SPM associated with the conventional thermal power generation facilities. The project utilizes waste energy for generating electricity which is a clean source of energy. Also, being a renewable resource, use of waste energy to generate electricity contributes to resource conservation. It reduces the dependence on fossil fuels and conserves natural resources which are on the verge of depletion. The impact on land, water, air and soil is negligible. Thus, the project causes no negative impact on the surrounding environment contributing to environmental well-being.

SDG Goals	Description
<p data-bbox="260 1653 347 1691">Goal 7</p> <div data-bbox="169 1713 440 1973"> <p data-bbox="188 1731 395 1794">7 AFFORDABLE AND CLEAN ENERGY</p>  </div>	<ul style="list-style-type: none"> <li data-bbox="483 1641 1453 1731">➤ The project activity will generate clean energy, which with increased shared will increase the affordability at a cheaper rate to end user. <li data-bbox="483 1749 1358 1794">➤ The project activity will utilize waste energy to generate power.

<p>Goal 8</p> 	<ul style="list-style-type: none"> ➤ Decent work and economic growth. ➤ This project activity generates additional employment for skilled and unskilled, also the project situated in remote area will provide employment opportunities to unskilled people from villages. The training on various aspect including safety, operational issues and developing skill set will also be provided to employees ➤ This project will achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value
<p>Goal 13</p> 	<ul style="list-style-type: none"> ➤ This 10 MW Biomass based Power Project meets the SDG 13 goal by saving fossil fuel and producing clean energy. ➤ This project is expected to reduce CO₂ emissions 51,803 tons per year. ➤ SDG 13 on clean energy is closely related and complementary. ➤ In a Greenfield waste generation project, electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants. Thereby the project activity reduces the dependence on fossil fuel-based generation units and as there are no associated emissions with this project it contributes to the reduction of greenhouse gases (GHG) emissions.

A.1.2 With regards to ESG credentials:

At present specific ESG credentials have not been evaluated, however, the project essentially contributes to various indicators which can be considered under ESG credentials. Some of the examples are as follows:

- **Under Environment:**

Environmental criteria may include a company's energy use, waste, pollution, natural resource conservation, and treatment of animals, etc. For the project proponent, the energy use pattern is now based on waste generation due to the project and it also contributes to GHG emission reduction and conservation of depleting energy sources associated with the project baseline. Also, the criteria can be further evaluated on the basis of any environmental risks that the company might face and how those risks are being managed by the company. Here, as the power generation will be based on waste generation, the risk of environmental concerns associated with non-renewable power generation and risk related to increasing cost of power, etc. are now mitigated. Hence, the project contributes to ESG credentials.

- **Under Social:**

Social criteria reflect on the company's business relationships, qualitative employment, working conditions with regard to its employees' health and safety, interests of other stakeholders' etc. With respect to this project, the project proponent has robust policies in place to ensure equitable employment, health & safety measures, local jobs creation etc. Also, the organizational CSR activities directly support local stakeholders to ensure social sustainability. Thus, the project contributes to ESG credentials.

- **Under Governance:**

Governance criteria relate to overall operational practices and accounting procedure of the organization. With respect to this project activity, the PP practices a good governance practice with transparency, accountability and adherence to local and national rules & regulations etc. This can be further referred from the company's annual report. The electricity generated from the project can be accurately monitored, recorded and further verified under the existing management practice of the company. Thus, the project and the proponent ensure good credentials under ESG.

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

There was no harm identified from the project and hence no mitigations measures are applicable.

Rational: as per the project owner has obtained Consolidate Consent & Authorization (CC&A) from Pollution Control Board to install and operate biomass base energy generation and adheres to the environmental compliance mentioned in CTO, hence project activity has no damage to environment.

A.3 Location of the project activity

Country	State	District	Town/Village	Pincode	Co-ordinates
India	Rajasthan	Hanumangarh	Sangaria	125101	29°45'16.86''N 74°28'00.70'' E

The representative location map is shown below

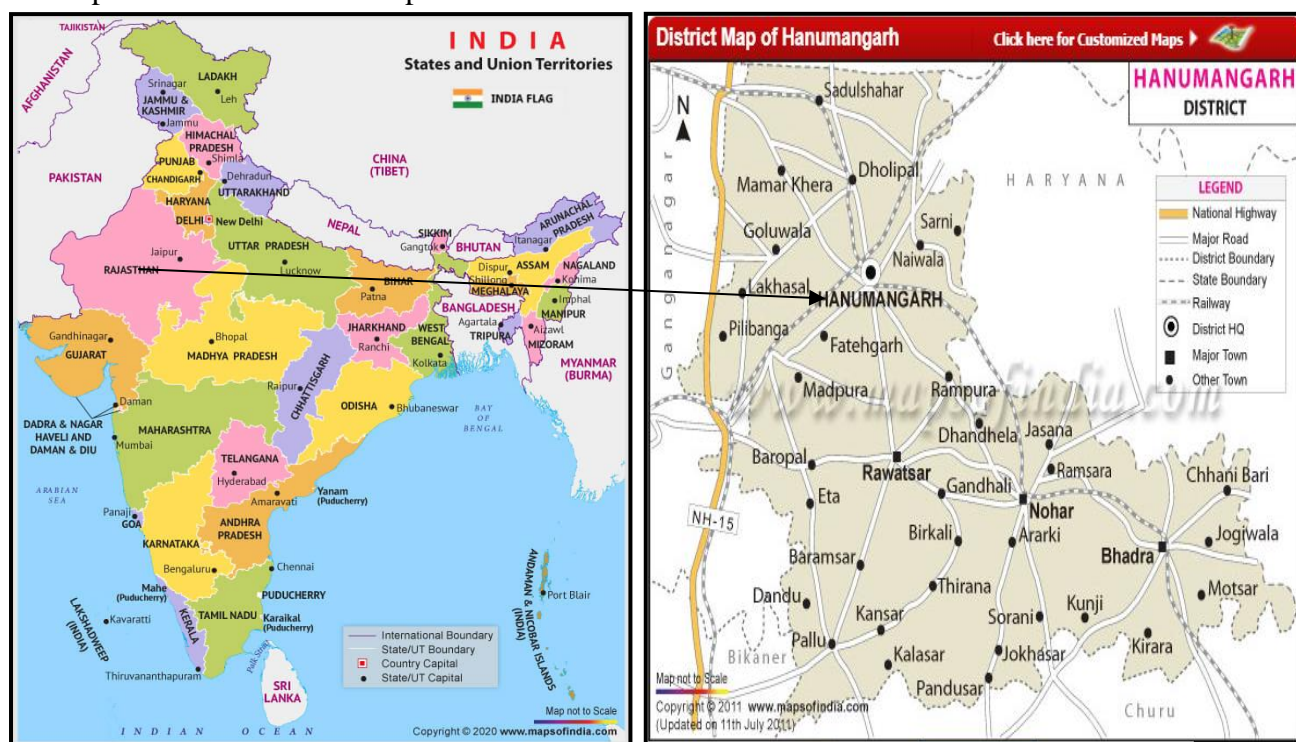


Figure-1- Location of the project activity (courtesy: google images and www.mapofindia.com)

A.4 Technologies/measures

The technical specifications of all the equipment are as follows:

Technical specification of Travelling grate boiler:

Description	Specifications
Make	ISGEC JOHN THOMPSON
Type	Natural circulation, vertical bi-drum, semi-outdoor installation
Maximum continuous rating	47TPH
Grate	Travelling grate water tube
Steam pressure at superheater outlet	66 kg/cm ²
Steam temperature at superheater outlet	475± 5°C
Feed water temperature at economizer inlet	130 °C
Registered No. and Manufacture year	RJ-1765, 2008

Technical parameters of Turbogenerator:

Description	Specifications
Make	Triveni Engineering & Industries Limited
Type	Multistage, Horizontal axle blade design, Impulse type bleed cum condensing steam turbine
Rated capacity of turbine	10000 kW
Steam pressure of turbine inlet	64 kg/cm ²
Steam temperature at turbine inlet	475°C
Condenser pressure	0.1 kg/cm ²
Cooling water temperature at inlet to condenser	32°C

Technical specification of Air-cooled condenser:

Description	Specifications
Make	GEI Industrial Systems Ltd.
Turbine exhaust steam flow rate	41.7 tons/hr
Turbine back pressure	0.18 bar
Turbine exhaust steam enthalpy	576.93 kcal/kg
ACC design ambient temperature	42 °C

Technical specification of Electrostatic precipitator:

Description	Specification
Make	Thermax Ltd.
Gas Flow	124200 Am ³ /hr
Gas temperature	160°C
Dust concentration at ESP inlet	10 gm/Nm ³
Clean gas burden at ESP outlet with all fields	50 mg/Nm ³

Technical specification of AC generator:

Description	Specifications
Make	TDPS
Output	15000 kVA
Standard	IS 4722
Voltage (AC)	11000 V
Current (AC)	767 A
Frequency	50 Hz

The plant has been successfully commissioned on 07/10/2011. The plant has been in operation continuously since commissioning. However, during the current monitoring period i.e. 01/01/2013 to 31/12/2040.

A.5 Parties and project participants

Party (Host)	Participants
India	<p>Creduce Technologies Private Limited (Aggregator) Contact person : Shailendra Singh Rao Mobile : +91 9016850742, 9601378723 Address : 2-O-13,14 Housing Board Colony, Banswara, Rajasthan -327001, India</p> <p>M/s Sanjog Sugars & Eco-Power Private Limited (Project Owner) Address: Plot no. SP1, Phase II, Industrial Area, Sanagria, Hanumangarh, Rajasthan, 335063</p>

A.6 Baseline Emissions

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

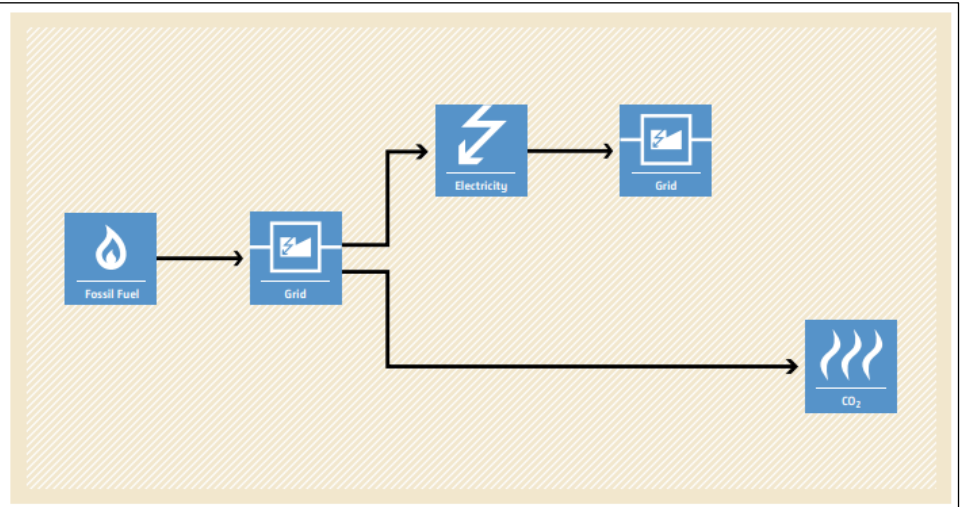
AMS I.D.- “Grid-connected Renewable electricity generation”, Version 18.0

Schematic diagram showing the baseline scenario:

Baseline Scenario:

BASELINE SCENARIO

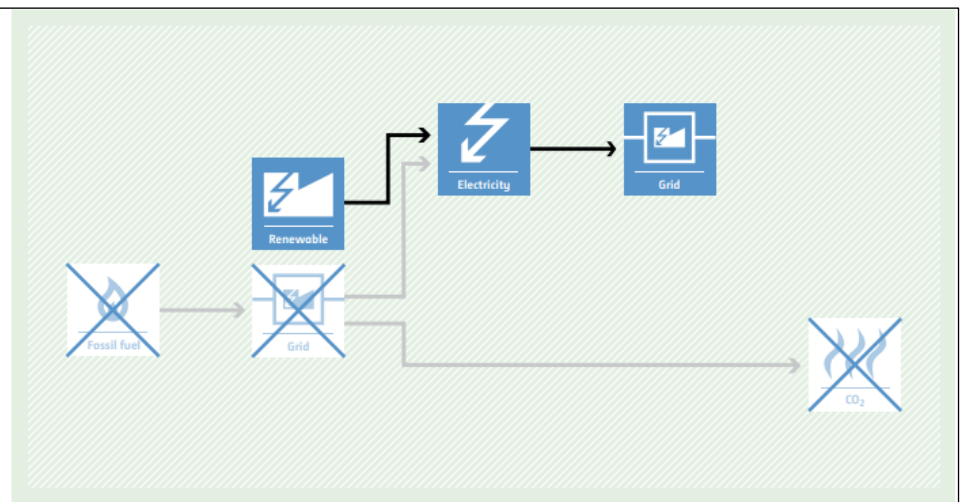
Electricity provided to the grid by more-GHG-intensive means.



Project Scenario:

PROJECT SCENARIO

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



A.7 De-bundling

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

SECTION - B - Application of methodologies and standardized baselines

B.1 Reference to methodologies and standardized baselines

Sectoral scope : 01- Energy Industries (renewable/non-renewable sources)

Type : I: Renewable energy project

Category : AMS I.D.- Grid connected renewable electricity generation, Version 18.0

B.2 Applicability of methodologies and standardized baselines

Applicability as per AMS-I. D version 18.0	Project Case
<p>1. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal sand renewable biomass:</p> <p>a. Supplying electricity to a national or a regional grid; or</p> <p>b. Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.</p>	<p>The project activity is a renewable energy project i.e., a biomass-based power project which falls under applicability criteria option 1 b) the project owner has done a power purchase agreement with RVPN to supply the electricity generated by power plant.</p>
<p>1. This methodology is applicable to project activities that:</p> <p>a. Install a greenfield plant;</p> <p>b. Involve a capacity addition in (an) existing plant(s);</p> <p>c. Involve a retrofit of (an) existing plant(s);</p> <p>d. Involve a rehabilitation of (an) existing plant(s)/ unit(s); or</p> <p>e. Involve a replacement of (an) existing plant(s).</p>	<p>The option (a) of applicability criteria 2 is applicable as project is a greenfield plant/unit. Hence the project activity meets the given applicability criterion.</p>
<p>2. 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 an existing reservoir with no change in the volume of reservoir;</p> <p>b. The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the project emissions section, is greater than 4 W/m².</p> <p>c. The project activity results in new reservoirs and the power density of the power plant, as per</p>	<p>The project activity involves the installation of 47 TPH Thermal boiler having turbine capacity of 10 MW; hence, this criterion is not applicable.</p>

definitions given in the project emissions section, is greater than 4 W/m ²	
3. 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 47 TPH Thermal boiler having turbine capacity of 10 MW; hence, this criterion is not applicable.
4. Combined heat and power (co-generation) systems are not eligible under this category.	The project is not cogeneration system; hence this criterion is not applicable.
5. 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.	There is no capacity addition, thus the criterion is not applicable to this project activity
6. In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.	The project activity involves the installation of 47 TPH Thermal boiler having turbine capacity of 10 MW; hence, this criterion is not applicable.
7. 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 47 TPH Thermal boiler having turbine capacity of 10 MW; hence, this criterion is not applicable.
8. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool “Project emissions from cultivation of biomass” shall apply.	The project activity does not involve biomass sourced from dedicated plantations.

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 a dedicated commissioning certificate and connection point,
- Project is associated with energy meters which are dedicated to the consumption point for the project developer.

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

As per applicable methodology AMS I.D.- “Grid-connected Renewable electricity generation”, Version 18.0 “The spatial extent of the project boundary encompasses the biomass feedstock collection and handling systems, the biomass combustion or conversion unit (e.g., boiler or gasifier), energy conversion equipment such as the steam turbine and generator, auxiliary systems, heat recovery units, power transmission and synchronization systems, steam flow piping, flue gas ducts, and other related infrastructure, as well as the end-user facilities where the generated electricity will be consumed.”

Thus, the project boundary includes the waste heat recovery power plant and the Indian grid system.

Source		Gas	Included?	Justification/Explanation
Baseline	Grid connected electricity generation	CO ₂	Yes	Main emission source
		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 waste heat recovery power generation 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

B.5 Establishment and description of the baseline scenario

As per the approved consolidated methodology AMS I.D.- Grid connected renewable electricity generation, Version 18.0, if the project activity is the installation of biomass base energy generation project, 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 biomass base energy generation project and to use for sell to grid purpose. In the absence of the project activity, the equivalent amount of power would have been supplied

by the Indian 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 "grid emission factor" refers to a CO₂ emission factor (tCO₂/MWh) that 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 2013 - 2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Also, for the vintage 2021-2022, the combined margin emission factor calculated from the CEA database in India results in higher emissions than the default value. Hence, the same emission factor has been considered to calculate the emission reduction under a conservative approach.

B.5.1 Net GHG Emission Reductions and Removals

$$\text{Thus, } ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y = Emission reductions in year y (tCO_{2e}/y)

BE_y = Baseline Emissions in year y (tCO_{2e}/y)

PE_y = Project emissions in year y (tCO_{2e}/y)

LE_y = Leakage emissions in year y (tCO_{2e}/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:

$BE_{elec,y}$ = Baseline emissions due to displacement of electricity during the year y in tons of CO₂

$EG_{i,j,y}$ = The quantity of electricity supplied to the recipient j by generator, that in the absence of the project activity would have been sourced from i^{th} source (i can be either grid or identified existing source) during the year y in MWh.

$EF_{Elec,i,j,y}$ = The CO₂ emission factor for the electricity source i (grid or identified existing source), displaced due to the project activity, during the year y in tons CO₂/MWh.

• **Project Emissions**

As per para 39, page no. 12 of AMS-I.D., version 18.0, for most renewable energy project activities, **PE_y = 0**.

In case of our project activity, the project will be equipped with 1*250 kVA diesel generator set for emergency purposes. The quantity of diesel used in the plant will be monitored and the emissions due to the same would be considered as project emissions. However, for ex-ante purpose, the same is being considered as Zero. However, during the annual verification, the emissions would be calculated using the formula given below and deducted from the overall emission reductions. The following equation as per "Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion"

- **Leakage Emission**

No leakage is applicable under this methodology.

Hence, LE = 0

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

Hence Net GHG emission reduction,

= Baseline Emission – Project Emission – Leakage Emission

= 51,803-0-0 = 51,803 tCO_{2e}/year (i.e., 51,803 CoUs/year)

B.6 Prior History

The project activity is a biomass-based energy generation project, which was registered under the CDM (Clean Development Mechanism) for the crediting period from 13 Feb 2012 to 12 Feb 2022. However, no carbon credits (CERs) were issued during this period. The project has not been registered under any other GHG program or applied for any other environmental crediting or certification mechanism. Therefore, this project will not result in double accounting of carbon credits (i.e., CoUs).

This is a CDM Registered Project with CDM ID 5723.

The project registration details are as follows:

CDM Registration Date: 13 Feb 2012

Monitoring Period under CDM verification: 13 Feb 2012 - 31 Dec 2020

Current Status of Verification: On hold, verified but did not proceed for issuance. See the note below for more details.

Project Link: <https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1327658707.14/view>

Note: PP has developed the project under CDM and also successfully verified the Carbon Credits till 31/12/2020. However, due to the uncertainty of CDM mechanism under Article 6 of Paris Agreement PP did not proceed with submission of Request For Issuance at UNFCCC. Hence, the verified credits under CDM have never been issued, hence never utilized.

B.7 Changes to the start date of crediting

The crediting period under UCR has been considered from the date of the commissioning of the project. 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

Not applicable.

B.9 Monitoring period number and duration

Total Monitoring Period: 28 years

Date: 01/01/2013 to 31/12/2040 (inclusive of both dates).

B.10 Monitoring Plan

Data and Parameters available (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 0.9 tCO ₂ /MWh for the 2013 - 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://cea.nic.in/wp-content/uploads/2021/03/User_Guide_Version_20.0.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 the CEA database (current version 20, December 2024) results into a higher emission factor. Hence for 2022 vintage UCR default emission factor remains conservative.

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

Data / Parameter	EG _{i,j,y}
Data unit	MWh
Description	Quantity of electricity supplied to the recipient <i>j</i> by the generator, which in the absence of the project activity would have sourced from <i>i</i> th source (<i>i</i> can be either grid or identified source) during the year <i>y</i>
Source of data	Recipient facility(ies) and generation plant measurement records
Measurement procedures (if any):	<p>Data Type: Measured</p> <p>Monitoring equipment: Energy Meters are used for monitoring</p> <p>Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually</p> <p>Archiving Policy: Paper & Electronic</p> <p>Calibration frequency: 5 years (as per CEA provision)</p>
Measurement	Monthly

Frequency:	
Value applied:	
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.
Purpose of data:	The Data/Parameter is required to calculate the baseline emission.
Any comment:	Data will be archived electronically for a period of 36 months beyond the end of crediting period.