PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: 16 TPH Biomass Boiler Project by Om Shree Agro Tech Private Limited in Maharashtra, India

Version:1.0

Date:28/08/2024

First CoU Issuance Period:10 Years 00 Months

Date: 01/01/2013 to 31/12/2023 (both dates are included)

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

BASIC INFORMATION	
Title of the project activity	16 TPH Biomass Boiler Project by Om Shree Agro Tech Private Limited in Maharashtra, India
Scale of the project activity	Small Scale Project
Completion date of the PCN	28/08/2024
Project participants	Om Shree Agro Tech Private Limited
Host Party	India
Applied methodologies and standardized baselines	**CDM UNFCCC Methodology** **AMS-I.C:** Thermal energy production with or without electricity Version 22.
Sectoral scopes	01 Energy industries (Renewable/Non-Renewable Sources)
Estimated amount of total GHG emission reductions in 10 years	To be estimated during verification. An ex-ante estimate is 34,702 CoUs (34,702) tCO2eq

SECTION A. Description of project activity

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

The titled project activity "16TPH Biomass boiler project by Om Shree Agro Tech Private Limited in Maharashtra India" is a biomass-based thermal energy generation project located in Dhule District of Maharashtra, India.

The details of the Project Activity are as follows:

PP Name	Plant Capacity(TPH)	Location	Commissioning Date
Om shree Agro Tech Private Limited	6	G-32, M.I.D.C.Avdhan, Dhule District,Maharashtra state,India	June -2005
	10		January-2016

Purpose of the project activity:

The project activity involves the installation of a biomass - based boiler with a total installed capacity of 16 TPH. The project avoids use of coal as fuel in steam generation which would have been the most preferred option in absence of the project activity. The main fuel types (biomass) used are Corn cobs and groundnut shell. In the absence of this project activity, equivalent amount of energy would have been generated from coal-based boiler which would spew the comparable amount of GHG into the atmosphere. Hence, the implementation of this project activity leads to reduction in GHG emissions associated with the coal-based steam generation.

Since these biomass fuel types are considered as renewable biomass, the thermal energy generated from the project activity is considered as a clean form of energy. The project activity uses the thermal energy generated for captive consumption within the plant, thereby it reduces significant amount of carbon emissions into the atmosphere. The project activity would protect and conserve the local environment by avoiding unintended emissions from the decay and uncontrolled burning of biomass, which is a common practice in the region.

The project activity utilizes Corn cobs and groundnut shells as fuel which are considered waste by the local farmers and are disposed of by burning in the fields due to the high cost of collection and lack of economically viable options to utilize the same. This causes air pollution in the state of Maharashtra.

The Project Activity is supposed to generate an average estimated emission reduction of about 34,702 tCO2e/year. The total estimated emission reduction for the entire duration of the crediting period is 3,47,020 tCO2e.

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 activity will lead to the development of supporting infrastructure such as road network etc., in the Project Activity Location, access to which is also provided to the local population.
  - The project will create job opportunities for local residents, both temporary during construction and permanent during operation. This will boost income and improve the standard of living in the community

- **Environmental benefits:**
  - The displacement of coal with renewable biomass will lead to greenhouse gas emission reduction. The air pollution (particulate, SOx, NOx) arising due to coal firing would be reduced.
  - The land pollution due to ash generated during coal firing would be reduced. Further, the ash generated from burning of Corn cobs and Groundnut shells can be used as fertilizer in the farms. Worker health hazard from handling coal was avoided.

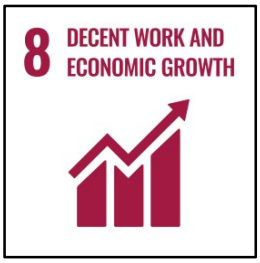
- **Economic benefits:**
  - Farmers and suppliers are encouraged to replace the practices of open combustion of biomass.
  - The biomass will be valued as a fuel which would generate economic return for locals, farmers and suppliers. In addition, the use of biomass in the boiler would reduce the government coal import bill. Additional income generation to farmers from selling of biomass (agro residues) which would have been otherwise wasted in the absence of project activity

- **Technical benefits:**

  - The project activity will promote biomass energy for steam generation, inspire other entrepreneurs, and drive R&D to develop more efficient machinery. It will also attract investors by demonstrating the viability of biomass energy projects in the region

The project activity also contributes to the following sustainable development goals (SDGs):

Table 1: Contribution to the SDGs

Goal 7 	➢ The project contributes SDG Target 7.2 "By 2030, increase substantially the share of renewable energy in the global energy mix" by the utilization of biomass as a renewable energy source.
Goal 8 	➢ Decent work and economic growth. This project activity generates additional employment for skilled and unskilled, also the project situated in remote areas 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.
	➢ Biomass based steam generation systems reduce the GHG emissions. This project is expected to reduce CO_2e emission 34,702 ton per year. This project meets the SDG 13 goal by saving fossil fuel and produce clean energy.

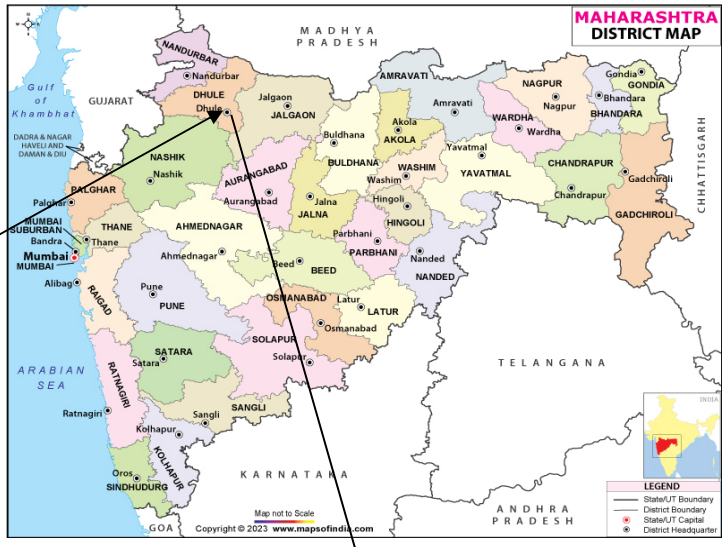
A.3. Location of project activity >>

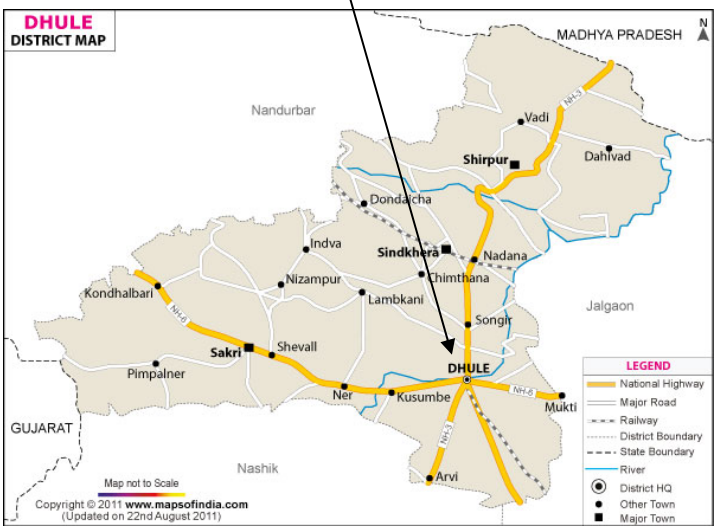
Country : India
Site :G-32 M.I.D.C
Village :Avdhan
District : Dhule
Village : Dhule
State : Maharashtra
Code :424311

The geographic co-ordinates of the project location have been given below:

Latitude : 20°51'07"N
Longitude : 74°45'20"E

The representative Location of map is included below:





A.4. Technologies/measures >>

The Ministry of Environment and forests (MoEF), Government of India, under the Environment Impact Assessment Notification has listed a set of industrial activities in Schedule of the notification which for setting up new projects or modernization /expansion will require environmental clearance and will have to conduct an Environmental Impact Assessment (EIA) study, But biomass power plants with installed capacity up to 15MW are exempted from EIA[1]

The project activity is the installation of a biomass boiler for steam generation. The generated steam is utilized to meet the process requirement. In the baseline scenario the steam would have been generated through a coal-based boiler, to meet process requirements. The project activity has replaced coal-based boiler with corn cobs and groundnut shells based boiler for steam generation thus the project activity is environment friendly and leads to GHG emission reduction.

The CO2 emission due to the combustion of is neutralized by the photosynthesis process of paddy crops. Hence, it "recycles" atmospheric carbon and does not add to the greenhouse effect. also the with corn cobs and groundnut shells contains negligible quantities of nitrogen and sulphur, hence the other greenhouse gas from the combustion of with corn cobs and groundnuts shells can be neglected. The coal being a carbon intensive fuel leads to GHG emissions hence implementation of the project activity leads to GHG emission reductions.

The purpose of the project activity is to meet the thermal energy (steam) requirement & displace GHG emissions by utilizing biomass as fuel in the boilers.

Thus, the project activity leads to GHG emission reduction due to displaced fossil fuel. The project activity uses renewable biomass for the generation of thermal energy. The alternative to usage of biomass would have been to use coal which is a non-renewable fossil fuel. This would have resulted in the generation of GHG emissions. By the use of renewable biomass, the GHG emission are prevented.

Technical Specifications of Major Equipment:

Parameter	Specification
Boiler capacity	16TPH
Boiler Make	Micro Dynamics
Maximum Continues Evaporation	7240 Kg/Hour
Quotation of input feed stock per day	47 MT to 50 MT/day
Pressure of Feedwater	15.5 kg cm^2 to 16 kg/cm^2
Steam Pressure	15kg/cm^2 to 16 kg/cm^2
Boiler Rating	241 sq.meter

[1] http://www.environmentwb.gov.in/pdf/EIA%20Notification,%202006.pdf.

Feedstock used	Corn cobs and Groundnut shells
Boiler Feed water Temperature	70 ^{0}c to 75 ^{0}c
Steam Temperature	201.4100 ^{0}c
Steam enthalpy	2,790.4200 kJ/Kg
Efficiency of Biomass Boiler	70%
NCV of coal	26.0000 TJ/Gg

A.5. Parties and project participants >>

Party (Host)	Participants (Project Proponent)
India	Om Shree Agro Tech Private Limited (Project Owner)

Party (Host)	Participants (Other Participant)
India	Viviid Emissions Reduction Universal Pvt. Ltd. (Carbon Management)

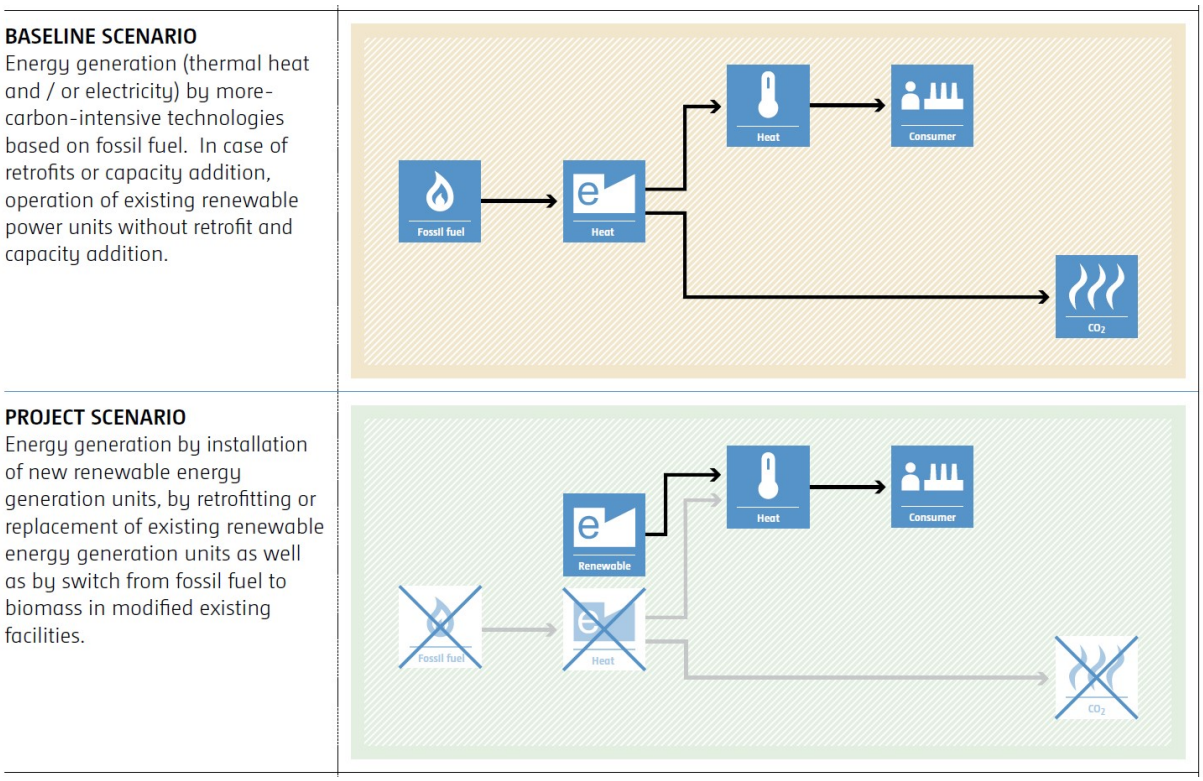
A.6. Baseline Emissions>>

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

As per paragraph 25 of the approved small-scale methodology AMS-I.C. Version 22, The baseline scenario identified at the PCN stage of the project activity is:

In the absence of the project activity, the simplified baseline is the fossil fuel consumption of the technologies that would have been used in the absence of the project activity, times an emission factor for the fossil fuel displaced.

The Schematic diagram below shows the baseline scenario and project scenario



A.7. Debundling>>

This project is not a de-bundled 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.C (Titled: "Thermal energy production with or without electricity Version 22)

https://cdm.unfccc.int/UserManagement/FileStorage/6GZLF8KSJVXAT3WPR05D71EMO9HUNB

"TOOL03: Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"

https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v3.0.pdf

TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation Version 03

https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v3.0.pdf

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

Applicability criteria	Applicability Status
1.This methodology comprises renewable energy technologies that supply users i.e. residential, industrial or commercial facilities with thermal energy that displaces fossil fuel use. These units include technologies such as solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass and other technologies that provide thermal energy that displaces fossil fuel	The project activity is biomass plant project with boiler installed capacity of 16TPH. The project activity involves switching of fuel from fossil fuel (coal) to biomass , therefore project is in line with the given criteria
2. Biomass-based cogeneration and trigeneration systems are included in this category	Project activity doesn't involve the simultaneous generation of thermal energy & electrical energy, hence said criteria is not applicable.
3. Emission reductions from a biomass cogeneration or trigeneration system can accrue from one of the following activities: (a) Electricity supply to a grid; b) Electricity and/or thermal energy production for on-site consumption or for consumption by other facilities; c) Combination of (a) and (b).	The project activity is a biomass based thermal energy system and emission reductions accrue due to thermal energy production for on-site consumption. Therefore, this said criteria is not applicable.
4. Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category.	It is a Greenfield project and not the extension of an existing renewable energy facility.

5. In the case of new facilities (Greenfield projects) and project activities involving capacity additions the relevant requirements related to determination of baseline scenario provided in the "General guidelines for SSC CDM methodologies" for Type-II and Type-III Greenfield/capacity expansion project activities also apply.	The project activity is a Greenfield project .Therefore criteria is applicable.
6. The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW thermal1 (see paragraph 9 for the applicable limits for cogeneration and trigeneration project activities).	This project will generate only thermal energy and no power will be generated. Considering installed steam generation capacity of 16 TPH , the total installed thermal energy output of Corn cobs and Groundnut shells husk-based biomass project is less than 45 MW thermal. Therefore, this applicability criterion has been met.
7. For co-fired systems, the total installed thermal energy generation capacity of the project equipment, when using both fossil and renewable fuel, shall not exceed 45 MW thermal.	The project activity is not a co-fired system but solely designed as a Biomass based fired boiler. Therefore, this criterion is not applicable.
8. The following capacity limits apply for biomass cogeneration and trigeneration units: (a) If the emission reductions of the project activity are on account of thermal and electrical energy production, the total installed thermal and electrical energy generation capacity of the project equipment shall not exceed 45 MW thermal. For the purpose of calculating the capacity limit the conversion factor of 1:3 shall be used for converting electrical energy to thermal energy (i.e., for renewable energy project activities, the installed capacity of 15 MW(e) is equivalent to 45 MW thermal output of the equipment or the plant); (b) If the emission reductions of the project activity are solely on account of thermal energy production (i.e., no emission reductions accrue from the electricity component), the total installed thermal energy production capacity of the project equipment shall not exceed 45 MW thermal; (c) If the emission reductions of the project activity are solely on account of electrical energy production (i.e. no emission reductions accrue from the thermal energy component), the total installed electrical energy generation capacity of the project equipment shall not exceed 15 MW	Not applicable since the system solely runs through the combustion of biomass and no other fossil fuels are used.
9.. If solid biomass fuel (e.g., briquette) is used, it shall be demonstrated that it has been produced using solely renewable biomass and all project or leakage emissions associated with its production shall be taken into account in the emissions reduction	The project activity used corn cubs and Groundnuts shell and no solid briquette is used. Therefore, this criterion is not applicable.

calculation.	
10. The capacity limits specified in paragraphs 7 to 9 above apply to both new facilities and retrofit projects. In the case of project activities that involve the addition of renewable energy units at an existing renewable energy facility, the total capacity of the units added by the project shall comply with capacity limits specified in the paragraphs 7 to 9, and shall be physically distinct from the existing units.	The project activity meets the capacity limits specified in paragraphs 7 to 9 of the applied Methodology AMS I.C. It may also be noted that the project activity does not involve addition of renewable energy units at an existing renewable energy facility. Therefore, this criterion is not applicable.
11. Where the project participant is not the producer of the processed solid biomass fuel, the project participant and the producer are bound by a contract that shall enable the project participant to monitor the source of the renewable biomass to account for any emissions associated with solid biomass fuel production. Such a contract shall also ensure that there is no double-counting of emission reductions	The project activity does not use any solid biomass fuel. Also, the project owner is not the producer of the processed solid biomass fuel. The project owner procures the Corn from local farmers. There is no double-counting of emission reduction. Therefore, the criterion has been met.
12. If electricity and/or thermal energy produced by the project activity is delivered to a third party i.e., another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered into that ensures there is no double-counting of emission reductions	The project activity does not produce thermal energy for third party or another facility. The project activity generates thermal energy for captive consumption. Therefore, this criterion is not applicable.
13. If the project activity recovers and utilizes biogas for producing electricity and/or thermal energy and applies this methodology on a standalone basis i.e. without using a Type III component of a SSC methodology, any incremental emissions occurring due to the implementation of the project activity (e.g. physical leakage of the anaerobic digester, emissions due to inefficiency of the flaring), shall be taken into account either as project or leakage emissions as per relevant procedures in the tool "Emissions from solid waste disposal sites" and/or "Project emissions from flaring". In the event that the biomass fuel (solid/liquid/gas) is sourced from an existing CDM project, then the emissions associated with the production of the fuel shall be accounted with that project.	The project activity does not recover and utilizes biogas for producing electricity and/or thermal energy. Therefore, this criterion is not applicable.
14. If project equipment contains refrigerants, then the refrigerant used in the project case shall have no ozone depleting potential (ODP)	The project equipment does not contain refrigerants. Therefore ,this criteria is not applicable not applicable
15. Charcoal based biomass energy generation project activities are eligible to apply the methodology only if the charcoal is produced from renewable biomass sources, provided: (a) Charcoal is produced in kilns equipped with methane recovery	The project activity does not use charcoal-based biomass for steam generation. Therefore, this criterion is not applicable.

and destruction facility; or (b) If charcoal is produced in kilns not equipped with a methane recovery and destruction facility, methane emissions from the production of charcoal shall be considered. These emissions shall be calculated as per the procedures defined in the approved methodology "AMS-III.K.: Avoidance of methane release from charcoal production by shifting from traditional open-ended methods to mechanized charcoaling process". Alternatively, conservative emission factor values from peer reviewed literature or from a registered CDM project activity can be used, provided that it can be demonstrated	
16.In the case the project activities utilize biomass, the "TOOL16: Project and leakage emissions from biomass" shall be applied to determine the relevant project emissions from the cultivation of biomass and the utilization of biomass or biomass residues.	Not applicable as the biomass used as fuel does not come from the dedicated plantation. The fuel fired is surplus agro-residues. Also, there is no concern related to the availability and accessibility of the biomass fuel. This can be verified from the operational status of the project since commissioning which shows that there is continuous supply of biomass into the project boilers.

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

1)The biomass boilers are unique and constructed by the PP within the project boundary. Each biomass boiler has a unique ID, which is visible on the unit.

2)Project is uniquely Identifiable Based on its location coordinates,

3)The Monitoring Report has the details and will be provided to the UCR verifier during the verification process. The PP is not registered under any GHG mechanism for the current UCR monitoring and crediting period. Hence there is no double counting of the credits anticipated for the current project activity

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

As per Paragraph 24 of applied baseline and monitoring methodology AMS I.C. Version – 22.0, the spatial extent of the project boundary encompasses:

(a) All plants generating electricity and/or thermal energy located at the project site, whether fired with biomass, fossil fuels or a combination of both;

(b) All power plants connected physically to the electricity system (grid) that the project plant is connected to;

(c) Industrial, commercial or residential facility, or facilities, consuming energy generated by

the system and the processes or equipment affected by the project activity;

(d) The processing plant of biomass residues, for project activities using solid biomass fuel (e.g., briquette), unless all associated emissions are accounted for as leakage emissions or are part of an independently registered CDM project;

(e) The geographic boundaries of the dedicated plantations if the feedstock is biomass produced in dedicated plantations;

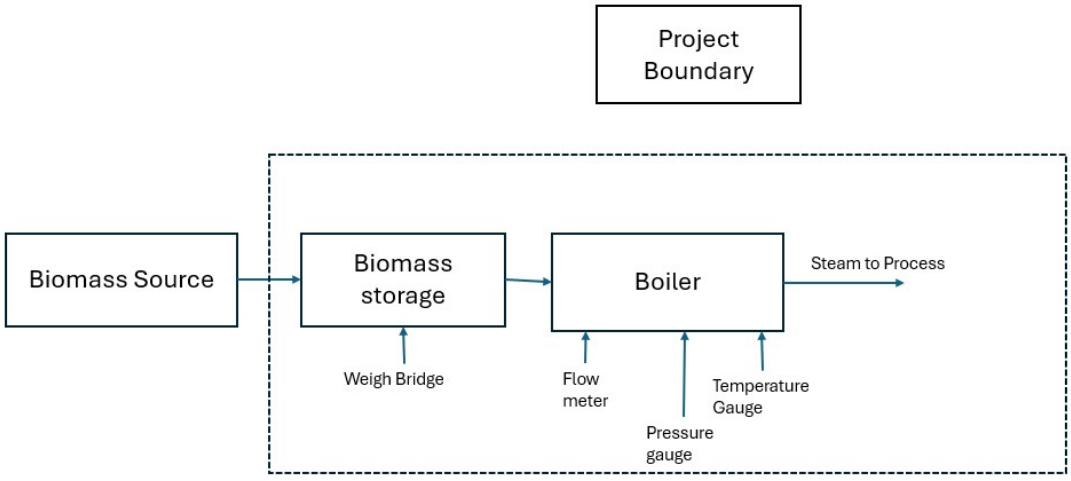
(f) The transportation itineraries, if the biomass is transported over distances greater than 200 kilometres, unless all associated emissions are accounted for as leakage emissions;

(g) The site of the anaerobic digester in the case of project activity that recovers and utilizes biogas for producing electricity and/or thermal energy and applies this methodology on a standalone basis, i.e., without using a Type III component of an SSC methodology

The project boundary includes the physical, geographical site(s) of:

- biomass-based boiler generating thermal energy located at the project site
- Site of the renewable energy generation
- Biomass storage facility

The project boundary is depicted in the following diagram



Source		GHG	Included?	Justification/Explanation
Baseline	CO2 emissions from Coal-based boiler	CO_2	Yes	Major source of emission
		CH_4	No	Minor source of emission
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small
Project Activity	Emissions from on-site electricity use in the project activity	CO_2	Yes	Main Emission Source
		CH_4	No	Excluded for simplification. This emission source is assumed to be very small
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small

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

The following alternatives are available to that of project activity for the project owner to meet the captive requirement of steam in its manufacturing facility:

Alternative – 1: The project activity which generates steam from 'Fossil fuel-Natural Gas based steam generation
Alternative – 2: The project activity which generates steam from 'Fossil fuel-FO/Diesel based steam generation
Alternative – 3: The project activity which generates steam from 'Fossil fuel-Coal based steam generation

All the alternatives 1, 2, 3 are in compliance with the Regulations. Therefore, the following three alternatives were considered to have output similar to that of project activity and were in compliance with the local regulations.

Alternative 1: The supply chain system of natural gas is not adequate or reliable enough in the state of Maharashtra, to opt for natural gas operated boiler for industrial captive steam requirement. Therefore, the Alternative 1: Fossil fuel-NG based steam generation' was eliminated due to non-

availability of NG for longer durations and without any planned communication. In absence of NG availability, the boiler becomes non-operational and with no process steam available the plant has to take forced shut-down leading to production losses. In light of the above, this alternative has been excluded.
Alternative 2: The Fossil fuel based steam Generation is eliminated due the high cost of the fuel, it is not economically attractive. Hence Alternative 3: Coal is easily accessible at the project site and it may be concluded that the least cost option and therefore the most economically attractive alternative scenario is Alternative 3

Therefore, in the absence of the project activity, an equivalent amount of steam that is consumed for the production process would have been generated by a fossil fuel-coal based Boiler as per Alternative 3

As per paragraph 25 of the methodology, AMS I.C. Version 22.0, for renewable energy technologies that displace technologies using fossil fuels, the simplified baseline is the fuel consumption of the technologies that would have been used in the absence of the project activity, times an emission factor for the fossil fuel displaced.

As per paragraph 34 of the applied methodology, AMS I.C. Version 22.0:

For thermal energy produced using fossil fuels and/or grid electricity the baseline emissions are calculated as follows:

$$BE_{thermal,Co2,y} = \left(\frac{EG_{thermal,y}}{\eta_{BL,thermal}}\right) \times EF_{FF,CO2}$$

Where:

$BE_{thermal,CO2,y}$	=	Baseline emissions from thermal energy displaced by the project activity during the year y (t CO_2)
$EG_{thermal,y}$	=	Net quantity of thermal energy supplied by the project activity during the year y (TJ)
$EF_{FF,CO2}$	=	CO_2 emission factor of the fossil fuel that would have been used in the baseline plant obtained from reliable local or national data if available, alternatively, IPCC default emission factors can be used (t CO_2/TJ)
$\eta_{BL,thermal}$	=	Efficiency of the plant using fossil fuel that would have been used in the absence of the project activity

The default baseline efficiency is taken as 85% (new coal fired boiler) from appendix page 38, AMS-I.C small scale methodology.

Parameter	Value	Unit	Data Source
Boiler Capacity	16	TPH	Project Information Note
Operating days	320	days	

Operating hours per day	24	hours	Hours in a day
Annual operation	7,680	hours	Calculated
Annual steam generation	86,016	T/yr	Calculated
Steam Pressure	15	kg/cm^2	
Boiler Feed water Temperature	70	°C	
Steam Temperature	201.4100	°C	https://www.tlv.com/global/TI/calculator/steam-table-pressure.html
Steam enthalpy	2,790.4200	kJ/Kg	https://www.tlv.com/global/TI/calculator/steam-table-pressure.html
Boiler Feed water enthalpy	292.5540	kJ/Kg	https://www.spiraxsarco.com/resources-and-design-tools/steam-tables/saturated-water-line
Net Enthalpy of Steam	2,497.8660	KJ/Kg	Calculated
Total thermal energy per year	306.9378	TJ/yr	Calculated
$\varepsilon_{boiler,\ thermal}$	Percentage	85.00	Default value as per methodology
$EF_{fuel,b}$	TCO_2/TJ	96.1	Baseline Fuel- Bitiminous Coal Volume 2 ,Table-2.2:DEFAULT EMISSION FACTORS FOR STATIONARY COMBUSTION IN THE ENERGY INDUSTRIES;Page 23;http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf
Baseline Emission$_{Thermal}$	**tCO_2/yr**	34,702	**Calculated**

Project Emission*:*

Project emissions shall be calculated using the following equation:
$PEy = PEFF,y + PEEc,y + PEGeo,y + PEref,y + PEBiomass,$

PE_y	=	Project emissions from the project activity during the year y (t CO_2)
PE_{FF},y	=	Project emissions from fossil fuel consumption during the year *y* (t CO_2)
PE_{Ec},y	=	Project emissions from electricity consumption during the year *y* (t CO_2)
$PEGeo,y$	=	Project emissions from a geothermal project activity in year *y* (t CO_2)
$PEref,y$	=	Project emissions from use of refrigerant in project activity in year *y* (t CO_2)
$PEBiomass,y$	=	Project emissions associated with biomass and biomass residues in year *y* (t CO_2e)

As project is using biomass and does not include refrigeration and geo-thermal activity, its project emission is considered as zero.

a) Emissions from fuel combustion

As per paragraph 67 of the applied methodology, Tool 03: "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" should be used to calculate the

emissions. The project activity does involve on-site consumption of fossil fuels. Therefore, emissions from fossil fuel usage will be calculated during its the time of monitoring.

b) Emissions from electricity consumption

As per paragraph 69 of the applied methodology, Tool 05: "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" should be used to calculate the emissions due to electricity consumption. However, there shall be no electricity consumption at the plant site as there is usage of 100% biomass to generate steam and to maintain conservativeness the emission reductions associated to auxiliary consumption has not been considered now. Its project emission will be estimated at the time of monitoring if required.

c) Emissions associated with biomass and biomass residues

Project emissions resulting from cultivation of biomass in a dedicated plantation in year y ($PE_{BC,y}$) Project emissions resulting from transportation of biomass in year y ($PE_{BT,y}$)
Project emissions resulting from transportation of biomass residues in year y ($PE_{BRT,y}$)
Project emissions resulting from processing of biomass in year y ($PE_{BP,y}$)
Project emissions resulting from processing of biomass residues in year y ($PE_{BRP,y}$)

The biomass is not sourced from dedicated plantation and the transportation is within 200 km, hence, the emission associated with biomass = 0

Leakage Emission:

The energy generating equipment currently being utilised is not transferred from outside the boundary to the project activity, and hence, leakage emission from this activity is considered as zero.

Emission Reduction:

Emission reductions are calculated as follows:

$ER_y = BE_y – PE_y – LE_y$

Where:

ER_y : Emission reductions in year y (tCO_2e/year)
BE_y: Baseline emission in year y (tCO_2e/year)
PE_y: Project emission in year y (tCO_2e/year)
LE_y : Leakage Emission in the year y (tCO_2/year)

ER_y = 34,702 – 0 – 0

= 34,702 tCO_2e

Thus, as per the ex-ante calculations the project will displace steam generation from coal consumption leading to an emission reduction of 34,702 tCO_2e equivalent every year. In the

absence of the proposed project activity, the steam demand would have been supplied to the processing plants by the coal-based boiler.

Estimated Annual or Total baseline emission reductions (BEy) = 34,702 CoUs

Other adjustments as may be applied:

As per UCR guidelines, for microscale and small-scale project activities, apply a default emission factor of 0.0142 tCO2/tonne of biomass or biomass residue or biomass-based briquettes, to determine the final amount of emission reductions that can be claimed per vintage.

Hence, net final ER values to be claimed per vintage will be as follows:

Net BE_y = BE_y – (BE_y X 0.0142) tCO2e

Project emission will be calculated during the verification of the project

B.6. Prior History>>

The project activity is a Biomass based Steam generation plant and this project was never applied under any other GHG mechanism prior to this registration with UCR. Also, the capacity or the total project as a whole has not been applied for any other environmental crediting or certification mechanism. Hence project will not cause double accounting of carbon credits (i.e., COUs).

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

This is the first submission of the project at UCR.
The project is currently submitted for Registration/Approval with start date of crediting period in line with the UCR guidelines. Hence, there is no change in the start date of crediting period.

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

There are no permanent changes from the applied methodology.
The project is currently applied under UCR for Registration/Approval, hence this is the initial PCN and Monitoring plan.

B.9. Monitoring period number and duration>>

First Issuance Period :10 years, 00 months
Date range : 01/01/2013 to 31/12/2023

B.8. Monitoring plan>>

Ex-ante Fixed Parameters:

Data / Parameter:	$EF_{FF,CO2}$
Data unit:	tCO2/TJ

Description:	The CO2 emission factor per unit of energy of coal that would have been used in the baseline plant in absence of the project activity.
Source of data	IPCC 2006, guidelines for national greenhouse gas inventories, table 2.3, page 18.
Value Applied	27.2
Measurement procedures (if any):	NA
Monitoring frequency:	NA
QA/QC procedure	NA
Any comment:	For calculation of baseline emission

Data/Parameter	**$EF_{grid, y}$**
Data unit	tCO_2 / MWh
Description	A "grid emission factor" refers to a CO_2 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 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 Value(s) applied	0.9 (UCR recommendation value) https://a23e347601d72166dcd6-16da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com//Documents/UCRCoUStandardAug2022updatedVer6_090822220127104470.pdf
Measurement methods and procedures	-
Monitoring frequency	Ex-ante fixed parameter
Purpose of data	For the calculation of Project Emission due to electricity consumption.

Data / Parameter:	***NCV***
Data unit:	TJ/kg
Description:	Net calorific value of Coal
Source of data	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

Value applied	96.1
Measurement procedures (if any):	NA
Monitoring frequency:	NA
QA/QC procedure	NA
Any comment:	NA

Ex-post monitoring parameters:

Data / Parameter:	**Q_{steam}**
Data unit:	Ton per annum
Description:	Quantity of steam
Source of data	Plant records
Measurement procedures (if any):	Steam flow meter (totalizer)
Monitoring frequency:	Daily
Value Applied:	To be determined during monitoring (ex-post)
QA/QC procedure	Calibration shall be as per the relevant paragraphs of "General guidelines for SSC CDM methodologies"
Any comment:	If applicable, measurement results shall be cross checked with records for sold/purchased thermal energy (e.g. invoices/receipts)

Data / Parameter:	$EG_{thermal,y}$
Data unit:	TJ per annum
Description:	Net quantity of thermal energy supplied by the project activity during the year *y*
Source of data	Plant records
Measurement procedures (if any):	Heat generation is determined as the difference of the enthalpy of the steam or hot fluid and/or gases generated by the heat generation equipment and the sum of the enthalpies. The enthalpies are calculated based on pressure, temperature and thermal properties of fluid.
Monitoring frequency:	Daily

Value Applied:	306.94 (ex-ante)
QA/QC procedure	-
Any comment:	Metering the energy produced by a sample of the systems where the simplified baseline is based on the energy produced multiplied by an emission coefficient

Data / Parameter:	**$B_{Biomass,y}$**
Data unit:	Mass (ton)
Description:	Net quantity of biomass consumed in year *y*
Source of data	Plant records
Measurement procedures (if any):	Weighing scale
Monitoring frequency:	Daily
Value Applied:	To be determined during monitoring (ex-post)
QA/QC procedure	It will be cross checked with invoice receipt of biomass purchase at ex-post calculation.
Any comment:	As the emission reductions are calculated based on energy output, it would help in cross verification of thermal energy generation and the available efficiency of the boiler.

Other Parameters for reporting:

Apart from the ex-ante and ex-post parameters, there are few other parameters in the applied methodology which are important for reporting purposes, however not directly used for calculation. Depending on the plant practices and availability of such records, these following parameters shall be reported during the verifications:

Data / Parameter:	**MC**
Data unit:	%

Description:	Moisture content of the biomass (wet basis)
Source of data	Plant records
Measurement procedures (if any):	Not required as the emission reduction is not calculated using the biomass energy input
Value applied	NA
Monitoring frequency:	Continuous Monitoring
QA/QC procedure	NA
Any comment:	NA

Data / Parameter:	***Twi, Tso, Tthi, Ttho***
Data unit:	°C
Description:	T_{wi} = Water inlet temperature T_{so} = Steam outlet temperature
Source of data	Plant records
Measurement procedures (if any):	-
Value Applied	T_{wi} =70, T_{so} = 201.4
Monitoring frequency:	Continuous monitoring
QA/QC procedure	-
Any comment:	-

Data / Parameter:	***P***
Data unit:	kg/cm^2
Description:	Pressure
Source of data	Plant records
Value applied	10.54
Measurement procedures (if any):	Measured using calibrated meters
Monitoring frequency:	Continuous monitoring
QA/QC procedure	

Any comment:	-

Data/Parameter	**$FC_{i,j,y}$**
Unit	Mass or volume unit per year
Description	Quantity of fossil fuel type i combusted in the project activity during year y.
Source of data	Log books for the consumption of any fossil fuel at the project site.
Value applied	0 (assumed value for ex-ante calculation of emission reductions).
Measurement procedures (if any):	-
Monitoring frequency:	This parameter is measured value. The monitoring will be based on consumption of DG.
QA/QC procedure	NA
Any comment:	For the purpose of project emission calculation

Data/Parameter	**$EG_{n,t}$**
Data unit	MWh
Description	Net electricity supplied by the grid to the project activity
Source of data Value(s) applied	Logbook
Measurement methods and procedures	-
Monitoring frequency	Monthly
Value applied	0 (assumed value for ex-ante calculation of emission reductions).
QA/QC procedures	NA
Purpose of data	For Project emission calculation