



MONITORING REPORT

CARBON OFFSET UNIT (CoU) PROJECT



**Title: Renewable biomass based thermal energy generation by
Shiva Parvati Poultry Feed, Hingoli, Maharashtra**

Version 1.0

Date 12/06/2022

First CoU Issuance Period: 8 Years, 0 Months

Monitoring Period: 01/01/2014 to 31/12/2021 (both days included)

UCR PROJECT ID: 110



Monitoring Report (MR) CARBON OFFSET UNIT (CoU) PROJECT

BASIC INFORMATION

Title of the project activity	Renewable biomass based thermal energy generation by Shiva Parvati Poultry Feed, Hingoli, Maharashtra
Scale of the project activity	Small Scale
UCR PROJECT ID	110
Completion date of the MR	12/06/2022
Project participants	<u>Project Owner:</u> Shiva Parvati Poultry Feed Pvt Ltd <u>Aggregator:</u> Gram Vikas Trust, <u>UCR ID:</u> 741215693
Host Party	India
Applied methodologies and standardized baselines	CDM UNFCCC Methodology AMS-I.C.: Thermal energy production with or without electricity (Ver.21.0)
Sectoral scopes	01 Energy industries (Renewable/NonRenewable Sources)
Calculated amount of annual average GHG emission reductions	2014: 15778 tCO ₂ (15778 CoUs)
	2015: 15107 tCO ₂ (15107 CoUs)
	2016: 14429 tCO ₂ (14429 CoUs)
	2017: 14465 tCO ₂ (14465 CoUs)
	2018: 15435 tCO ₂ (15435 CoUs)
	2019: 10488 tCO ₂ (10488 CoUs)
	2020: 14823 tCO ₂ (14823 CoUs)
	2021: 15171 tCO ₂ (15171 CoUs)
Calculated total GHG emission reductions this crediting period	115696 tCO₂ (115696 CoUs)

SECTION A. Description of project activity

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

The project **Renewable biomass based thermal energy generation by Shiva Parvati Poultry Feed, Hingoli, Maharashtra** is located at C-12, MIDC, Village: Limbala Makata, Taluka: Hingoli, District: Hingoli, State: Maharashtra, Country: India.

The details of the registered project are as follows:

Purpose of the project activity:

The project activity meets the in house demand of steam of Shiva Parvati Poultry Feed Pvt Ltd (SPPFPT) poultry feed unit manufacturing facility and involves the installation of a 12TPH biomass (husk/soya husk/bagasse) based boiler that is operational for an average of 330 days a year and 15 hours a day. The primary technology for the project activity involves direct combustion of biomass in the boiler to generate thermal energy. During combustion chemical energy contained in the biomass is converted into thermal energy, which is utilized for steam/hot air generation. The boiler of 12 TPH capacity has parameters of 12.5 kg/cm² (pressure) and 180 °C (temperature). The boiler was first steam tested on **26/05/2005** which is considered as the commissioning date of the project activity.

The project activity is the thermal energy production using renewable energy sources that displaces fossil fuel use and avoids GHG emissions (CO₂). In the pre-project scenario, the process demand of steam would have been met by a coal fired boiler. The project results in reductions of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. The project results in reductions of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change.

A.2. Location of project activity >>

Country: India
Site: C-12, MIDC,
Village: Limbala Makata,
Taluka: Hingoli,
District: Hingoli,
State: Maharashtra



A.3. Technologies/measures >>

The project activity is the installation of a biomass (husk and bagasse) fired boiler for steam generation. The generated steam is utilized for meeting the process requirement. In the baseline scenario the steam was generated through a coal based boiler, to meet SPPFPT's process requirement. The project activity has replaced coal based boiler with a (husk) biomass based boiler for steam generation thus the project activity is environment friendly and leads to GHG emission reduction. Prior to implementation of the project, the steam demand of SPPFPT, would have been satisfied by fossil fuel (coal) based boilers. The installed biomass boiler generates steam to meet the demand of recipient plant and displaces the use of fossil fuel based boilers. The project technology utilizes appropriate treatment systems to ensure exhaust gas and discharged water in compliance with national environmental regulations. Many kinds of biomass fuel such as biomass briquette, sawdust, rice husk, and cashew can be used for the biomass boiler. Note that fossil fuel (i.e. furnace oil, coal, gas, etc) cannot be used for biomass fired boilers due to its specialized design of combustion chamber. The service level (e.g. temperature, pressure) of supplied steam in case of utilizing different types of renewable biomass residues is ensured by qualified boiler operators and is monitored by steam flow meter at recipient plant. The project activity will thus reduce Green house gas (GHG) emissions associated with the combustion of fuel oil in baseline boilers. The project activity claims emission reduction for the thermal energy production by renewable energy technologies (biomass boilers) that displace the use of fossil fuel based boilers. This is in line with the applied methodology AMS I.C.

The CO₂ emission due to the combustion of husk/bagasse is neutralized by the photosynthesis process of paddy crops. Hence, it "recycles" atmospheric carbon and does not add to the greenhouse effect. And also the husk/bagasse contains negligible quantities of nitrogen and sulphur, hence the other green house gas from the combustion of husk/bagasse 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.

No transfer of technology is involved to host country because technology is available within India from reputed manufactures.

Specification	Value
Capacity of Boiler	12 TPH
Operating Temperature	180 °C
Number of Boilers	1
Pressure	12.5 kg/cm ²
Feed Material	Husk/Bagasse
Enthalpy of Steam*	3193.73 KJ/kg
Operation days/annum	330 days/yr, 15hrs/day
Feed Water Temperature	80 °C
Boiler Rating (Thermal)	9.2 MW _{thermal}
Model	CTD 410
Efficiency of Biomass Boiler	81.00%

The 12TPH biomass boiler was manufactured and installed by Micro Dynamic Pvt Ltd, Pune, Maharashtra, India who is specialized in manufacturing boilers in India. The service level of saturated steam from biomass boilers satisfies the requirements of recipient plant as confirmation of steam user. Well trained and qualified personnel have been deployed for operation of the biomass boiler.

Confirmation of the technical specification of the project activity. The technical aspects of the project activity are:

- 1) Purchase Order dated 8/04/2004
- 2) Boiler Delivery & Parts Invoice, dated 5/9/2004, 21/09/2004, 22/09/2004, 24/09/2004
- 3) Equipment contract for erection and fabrication, dated 10/12/2004
- 4) Biomass Boiler Inspection Certificate for the project activity, dated 26/05/2005

SPPFPT was incorporated in March 2004 with the objective of manufacturing edible and non-edible oils along with poultry feed. SPPFPT operates a solvent extraction plant for soya bean seeds and sunflower cake at the project activity site. The commercial operations of this plant commenced in 2005. The raw material for the products manufactured at SPPFPT are cultivated and procured directly from farmers and from the open market. The finished products are edible oil for human consumption and de-oiled cake used as cattle and poultry feed.

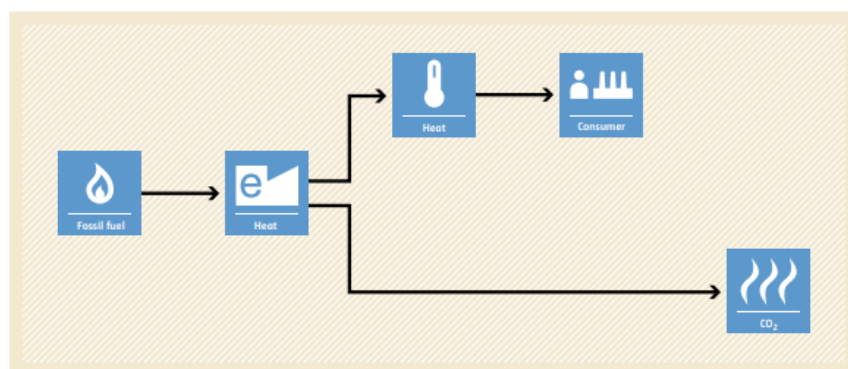
A.4. Parties and project participants >>

Party (Host)	Participants
India	<u>Project Owner:</u> Shiva Parvati Poultry Feed Pvt Ltd <u>Aggregator:</u> Gram Vikas Trust, <u>UCR ID:</u> 741215693 Email: gvtbiogas@gmail.com

A.5. Baseline Emissions>>

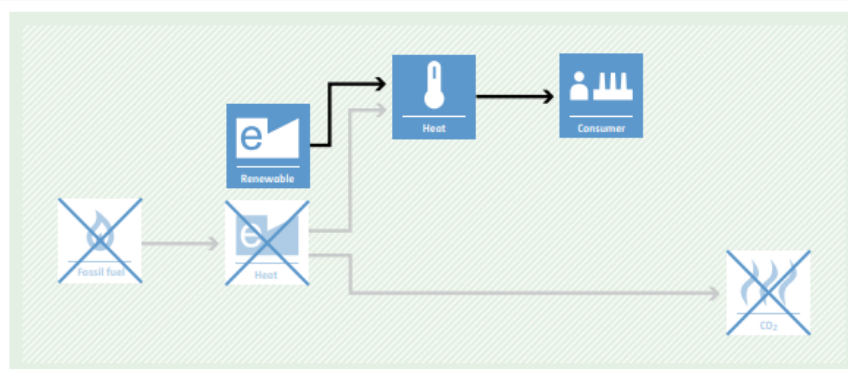
BASILINE SCENARIO

Energy generation (thermal heat and / or electricity) by more-carbon-intensive technologies based on fossil fuel. In case of retrofits or capacity addition, operation of existing renewable power units without retrofit and capacity addition.



PROJECT SCENARIO

Energy generation by installation of new renewable energy generation units, by retrofitting or replacement of existing renewable energy generation units as well as by switch from fossil fuel to biomass in modified existing facilities.



The approved baseline methodology AMS IC, has been referred from the indicative simplified baseline and monitoring methodologies for selected small-scale UNFCCC CDM project activity categories.

The applicable methodology and simplified modalities and procedures for small scale CDM project activities, states that “*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 coefficient for the fossil fuel displaced. IPCC default values for emission coefficients may be used.*”

Emission coefficient of fuel used in the baseline scenario

In absence of the project activity, the probable baseline scenario would have been steam generation using fossil fuel (coal). Thus to determine emission co-efficient SPPFPT has used emission factor for coal as per 2006 IPCC Guidelines for National Greenhouse Gas Inventories for GHG emissions which is 96.1 tCO₂ /TJ.

Emission coefficient of fuel used in the project activity

The fuel used in the project activity is the biomass residues (husk/bagasse), which is a carbon neutral fuel and therefore the emission coefficient (tC/TJ) is zero.

A.6. Debundling>>

This project is not a debundled component of a larger registered carbon offset 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.: Thermal energy production with or without electricity (Ver. 21.0)*

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 energy derived from renewable biomass and other technologies that provide thermal energy that displaces fossil fuel.

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

The project activity is thermal energy generation project using a biomass (husk/bagasse) based boiler that displaces equivalent amount of thermal energy that would have been generated by a fossil fuel based boiler. Since the project activity utilises husk/bagasse for the generation of Thermal energy by displacing fossil fuel (coal), it meets the primary applicability criteria of the methodology.

The thermal generation capacity of project activity is 9.2MW_{thermal} which is less than the threshold of 45MW_{thermal} as per the applied methodology.

The biomass used by the project plant is not stored for more than one year.

The project activity is neither a co-generation nor co-firing system, therefore this condition is not applicable in the case of SPPFPT project activity.

Biomass generated steam is used for captive use.

The project activity replaces the fossil fuel based thermal energy generation. There was no renewable energy based system prior to the project activity.

Thermal energy generation capacity are determined by taking the difference between enthalpy of total output leaving the project equipment and the total enthalpy of input entering the project equipment.

The installed biomass boiler generates steam to meet the demand of steam recipient plant and displace fully the use of fossil fuel based boilers. The project technology utilizes appropriate treatment systems to ensure exhaust gas and discharged water in compliance with national environmental regulations. Note that fossil fuel (i.e. furnace oil, coal, gas, etc) cannot be used for biomass fired boilers due to its specialized design of combustion chamber. The service level (e.g. temperature, pressure) of supplied steam in case of utilizing different types of renewable biomass residues is ensured by qualified boiler operators and is monitored by steam flow meter at recipient plant. The project activity will thus reduce Green house gas (GHG) emissions associated with the combustion of fuel oil in baseline boilers. The project activity claims emission reduction for the thermal energy production by renewable energy technologies (biomass boilers) that displace the use of fossil fuel based boilers. This is in line with the applied methodology AMS I.C requirements.

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

The biomass boiler is constructed by the project proponent within the boundary. The biomass boiler has a unique Ids (MR/13681), which is visible on the unit. Copies of all related Boiler Inspection Reports will be provided to the UCR verifier during the online verification process.

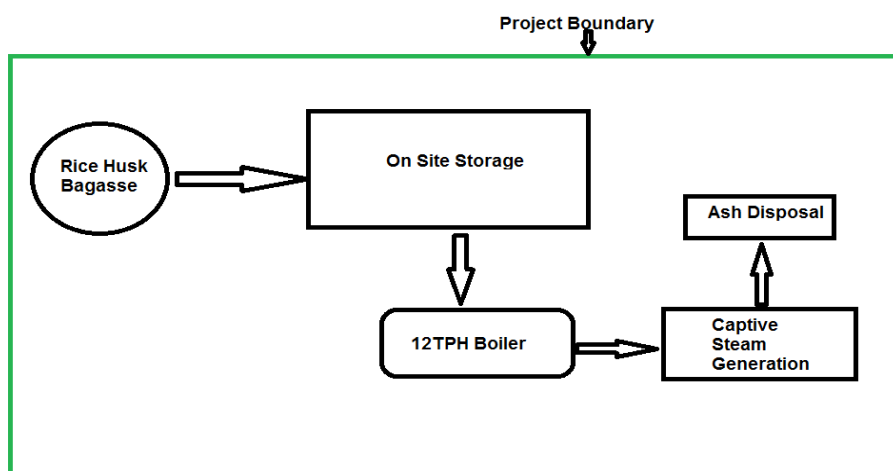
The project has never applied for carbon credits under any other GHG program or for the 2014-2021 vintage years and hence there is no double counting of the credits. The double counting avoidance agreement will be provided to the UCR verifier during the verification process.

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

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

- Site of the renewable energy generation.
- Biomass based boiler, which starts from the biomass storage to the point of steam supply
- Biomass storage facility

	Source	GHG	Included?	Justification/Explanation
Baseline	CO ₂ Emissions from fossil fuel in boilers for heat	CO ₂	Included	Major source of GHG emissions
		CH ₄	Excluded	Excluded for simplification. This is conservative
		N ₂ O	Excluded	Excluded for simplification. This is conservative
Project Activity	Emissions from Coal co-fired in the Project Activity	CO ₂	Included	Major source of GHG emissions
		CH ₄	Excluded	Excluded for simplification. This is conservative
		N ₂ O	Excluded	Excluded for simplification. This is conservative



Leakage Emissions is not applicable as the project activity does not use technology or equipment transferred from another activity.

There is no registered or an application to register another small-scale carbon project activity with the same project participants in the same project category within 1 km of the project boundary, hence the project activity is not a debundled component of a large scale project.

This is a new installation and the energy generating equipment is not transferred from another activity or the existing equipment was not transferred to another activity. So, no leakage is considered.

B.5. Establishment and description of baseline scenario >>

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

- *Renewable energy technologies that displace technologies using fossil fuels, wherein 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.*

Emission Reductions (ER_y) The emission reduction due to the project activity is calculated as the difference between the baseline emissions and the sum of the project emissions and the leakage:

$$ER_y = BE_y - (PE_y + LE_y)$$

BE_y= Baseline emissions in year y (t CO_{2e})

As mentioned in the methodology AMS I.C, for steam produced using fossil fuels the baseline emissions are calculated as follows:

$$BE_y = (HG_y * EF_{CO_2}) / \eta_{th}$$

Where:

HG_y = The net quantity of heat supplied by the project activity during the year in TJ. It is calculated as product of quantity of steam generated and net enthalpy of steam. The net enthalpy of steam is calculated as difference of enthalpy of steam and enthalpy of feedwater. The enthalpy of steam is calculated from steam pressure and steam temperature..

EF_{CO₂} = The CO₂ emission factor per unit of energy of the fuel that would have been used in the baseline plant in (tCO₂/TJ), obtained from reliable local or national data if available, otherwise, IPCC default emission factors are used.

η_{th} – The efficiency of the boiler using fossil fuel that would have been used in the absence of the project activity (Table 1 below).

PE_y = Project activity emissions. The GHG emissions due to the combustion of biomass is neutralized by the sequestration done during the growth of the biomass, thereby making it a carbon neutral fuel. Further the husk and bagasse contains negligible quantities of nitrogen

and sulphur, the other green house gas from the combustion of biomass can be considered as negligible. Therefore coal used in co-firing is the only minor source of GHG emissions within the Project Boundary.

LE_y = Leakage emissions. Leakages is to be considered if the energy generating equipment is transferred from another activity or if the existing is transferred to another activity. There is no transfer of energy generating equipment or existing equipment to another activity. Further, emissions arising during the transportation of husk and biomass to the site, is negligible since the biomass is sourced locally within a radius of less than 200 kms, hence considered as negligible.

Coal Consumed within the Project Boundary (Year/MT)

2014	2015	2016	2017	2018	2019	2020	2021
105.19	579.935	1059.43	1033.45	347.435	3846.355	780.36	534.475

PE_y = Project Emissions

Project Emissions Conservative	Year	2014	2015	2016	2017	2018	2019	2020	2021
	tCO ₂	149	820	1498	1462	492	5439	1104	756

(Table 1) Default baseline efficiency values for different technologies as per AMS IC Methodology

Technology of the energy generation system	Default efficiency
New natural gas fired boiler (w/o condenser)	92%
New oil fired boiler	90%
Old natural gas fired boiler (w/o condenser)	87%
New coal fired boiler	85%
Old oil fired boiler	85%
Old coal fired boiler	80.00%

Year	2014	2015	2016	2017	2018	2019	2020	2021
Baseline Emission Reductions (tCO ₂)	15927	15927	15927	15927	15927	15927	15927	15927
Project Emissions (tCO ₂)	149	820	1498	1462	492	5439	1104	756
Emission Reductions (tCO ₂)	15778	15107	14429	14465	15435	10488	14823	15171
Total (tCO ₂)	115696							

B.6. Prior History>>

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

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

There is no change in the start date of crediting period (01/01/2014).

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

There are no permanent changes from registered PCN monitoring plan and applied methodology

B.9. Monitoring period number and duration>>

First Issuance Period: 8 years, 0 months

Crediting Period: 01/01/2014 to 31/12/2021

Monitoring Period: 01/01/2014 to 31/12/2021

B.8. Monitoring plan>>

The monitoring and recording of the required parameters is carried out by trained personnel who are managed by the Project Managers. All measurements use calibrated measurement equipment that are maintained regularly and checked for its functioning which will meet the minimum requirement of the methodology. All indicators of importance for controlling and reporting of projects performance have been incorporated in the monitoring protocol and work instructions available in the control room at the site. Data parameters and log books and invoices of biomass receipts will be provided during the verification of the project activity.

Data/Parameter	<u>26/05/2005</u>
Data unit	<u>Date</u>
Description	Actual date of commissioning of the project activity based on boiler testing report
Source of data Value(s) applied	Boiler test report As and when commissioned
Measurement methods and procedures	The construction processes are maintained from its initiation to completion dates for the biogas unit. Thus the start date of each of the unit installed is recorded in the monitoring report.
Monitoring frequency	As and when commissioned and fixed and recorded in the monitoring report
Purpose of data	To showcase qualifying as per UCR CoU Standard

Data/Parameter	Q_{biomass}
Data unit	Average of MT
Description	The quantity of husk and bagasse used to generate steam in the boiler
Source of data Value(s) applied	Plant records and log books receipts of incoming quantity
Measurement methods and procedures	Monitoring: The quantity of biomass fed into the boiler is controlled. Data type: Measured Responsibility: Boiler Operator /Plant incharge
Monitoring frequency	Daily
QA/QC	The amount of biomass used can be cross checked by the purchase orders and stock inventory for husk and biomass as provided.

Husk (Biomass) Quantity

Year	2014	2015	2016	2017	2018	2019	2020	2021
Qty (MT)	609.46	730.695	2181.485	5827.08	2480.055	951.06	1918.845	3086.605

Bagasse Quantity Purchased

Year	2014	2015	2016	2017	2018	2019	2020	2021
MT	1994.33	796.55	485.22	NA	NA	NA	233.22	230.005

Data/Parameter	S_p
Data unit	12.5 Kg/cm ² boiler
Description	Pressure of the steam at the outlet of the biomass boiler
Source	The steam pressure is measured using pressure gauge. This parameter is used to calculate the Net Enthalpy of steam.
Measurement methods and procedures	Monitoring: Log book Data type: Monitored
Monitoring frequency	Daily/Hourly
QA/QC	The parameter is monitored and logged in log sheets. Based on the logged data, a report consisting of the parameter are prepared by Shift in charge in hard copy and are forwarded to manager on monthly basis. The data used is reviewed by conducting an inter department review meeting once in 6 months.

Data/Parameter	T _{feedwater}
Data unit	80°C
Description	The temperature of feed water
Source of data Value(s) applied	Plant Log Sheets
Measurement methods and procedures	Feed water temperature is measured in the plant premises by using temperature gauge. This parameter is used to calculate the Net Enthalpy of steam. Monitoring: Log book Data type: Monitored
Monitoring frequency	Daily
QA/QC	The parameter is monitored and logged in log sheets. Based on the logged data, a report consisting of the parameter are prepared by Shift in charge in hard copy and are forwarded to manager on monthly basis. The data used is reviewed by conducting an inter department review meeting once in 6 months.