



Verification Report for

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

UCR Project ID : 110

Name of Verifier	SQAC Certification Pvt. Ltd.
Date of Issue	July 05, 2022
Project Proponent	M/s : Shiva Parvati Poultry Feed Pvt. Ltd.
UCR Project Aggregator	Gram Vikas Trust
Work carried by	Mr. Santosh Nair
Work reviewed by	Mr. Praful Shinganapurkar

Summary:

SQAC Certification Pvt. Ltd. has performed verification of the “Renewable biomass based thermal energy generation by Shiva Parvati Poultry Feed, Hingoli, Maharashtra, India” for generating thermal energy from direct combustion of biomass in the boiler, on the basis of UCR criteria. This is a single project activity of boiler of 12 TPH capacity having outlet parameters of 12.5 kg/cm² (pressure) and 180 °C (temperature). The purpose of this plant installation is combustion of chemical energy which is contained in the biomass to be converted into thermal energy, which is utilized for steam/hot air generation.

Verification for the period : : **01/01/2014 to 31/12/2021**

The GHG emission reductions were calculated on the basis of UCR Protocols which draws reference from, UCR Protocol Standard Baseline, CDM UNFCCC Methodology Category AMS-I.C.: Thermal energy production with or without electricity (Ver.21.0). Owing to the Covid pandemic, the verification was done remotely by way of video calls / verification, phone calls and submission of documents for verification through emails.

SQAC is able to certify that the emission reductions through Renewable biomass based thermal energy generation by Shiva Parvati Poultry Feed, Hingoli, Maharashtra, India (UCR ID – 110) for the period **01/01/2014 to 31/12/2021** amounts to **1,16,088 CoUs** (1,16,088 tCO₂eq)

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Detailed Verification Report:

Purpose:

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 thus forming the commissioning date of the project activity.

Scope:

The scope covers verification of emission reductions from the project - Renewable biomass based thermal energy generation by Shiva Parvati Poultry Feed, Hingoli, Maharashtra, India (UCR ID – 110)

Criteria:

Verification criteria is as per the requirements of UCR Standard.

Description of project:

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.

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. 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. 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.

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*	3.2 MJ/kg
Operation days/annum	330 days/yr, 15hrs/day
Feed Water Temperature	80 °C
Boiler Rating (Thermal)	$12 \times (3.2 - 0.418) / 3.6 = 9.2 \text{ MW}_{\text{thermal}}$
Model	CTD 410
Efficiency of Biomass Boiler	81.00%

*<https://www.spiraxsarco.com/resources-and-design-tools/steam-tables/superheated-steam-region>

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.

Level of Assurance:

The verification report is based on the information collected through interviews conducted over video calls / phone calls, supporting documents provided during the verification, Project Concept Note (PCN) / Monitoring Report (MR), submitted to SQAC. The verification opinion is assured provided the credibility of all the above.

Verification Methodology:

Review of the following documentation was done by SQAC Verifier, Mr. Santosh Nair, who is experienced in such projects.

- Project Concept Note (PCN)
- Monitoring Report (MR)
- Commissioning Report of Boiler (Biomass Boiler Inspection Certificate for the project activity, dated 26/05/2005)
- Calibration report
- Data provided upon request of all the documents of the related projects

Sampling:

Not applicable

Person interviewed:

1. Jitendra Ramniklal Khiraiya (Manager A/Cs) : M/S. Shiva Parvati Poultry Feed Pvt Ltd
2. Madanlal Govindram Saini (Works Manager) : M/S. Shiva Parvati Poultry Feed Pvt Ltd
3. Shankar Kanthewad (1st Class Boiler Attendant) : M/S. Shiva Parvati Poultry Feed Pvt Ltd
4. Saiyyad Fasiyuddin (2nd Class Boiler Attendant) : M/S. Shiva Parvati Poultry Feed Pvt Ltd

Documentation Verified:

- Project Concept Note (PCN)
- Monitoring Report (MR)
- Calibration Reports
- M/s. Shiva Parvati Poultry Feed Pvt Ltd Invoices
- Coal register
- Husk Register
- Bagasse Register
- Boiler Log book
- Breakdown Reports
- Commissioning Certificates

Applied methodologies and standardized baselines :

UCR Protocol Standard Baseline

AMS-I.C.: Thermal energy production with or without electricity (Ver.21.0)

Application of methodologies and standardized baselines**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.

Applicability of methodologies and standardized baselines

The project status is corresponding to the methodology AMS-I.C.: Thermal energy production with or without electricity (Ver.21.0) and applicability of methodology is discussed below:

- The project activity is thermal energy generation project using a biomass (rice 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 rice 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.

Applicability of double counting emission reductions

The project is not registered with any other voluntary market (National or International). Agreement for Double Counting Avoidance from Proponent has been provided duly signed on 17.06.2022

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 emission
		CH ₄	Excluded	Excluded for simplification. This is conservative.
		N ₂ O	Excluded	Excluded for simplification. This is conservative.
Project Activity	Emissions from Biomass Project Activity	CO ₂	Excluded	Excluded for simplification. This is conservative.
		CH ₄	Excluded	Excluded for simplification. This is conservative.
		N ₂ O	Excluded	Excluded for simplification. This is conservative.

Establishment and description of baseline scenario (UCR Protocol)

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_{CO_2} = The CO_2 emission factor per unit of energy of the fuel that would have been used in the baseline plant in (tCO_2/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

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 rice 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 rice husk and bagasse to the site, is negligible since the biomass is sourced locally within a radius of less than 200 kms, hence considered as negligible.

Enthalpy of Steam	=	3201 Kj/kg (at 12.5 kg/cm ² and 180 °C)
Yearly Steam Production	=	50,490 T
Enthalpy of Feed Water 90 °C	=	822.07 Kj/kg
EF_{CO_2}	=	96.1 tCO_2/TJ IPCC 2006 guidelines for National Greenhouse Gas inventories for stationary combustion

$$\text{Yearly Steam Production} = 330 * 15 * 12 * 0.85 = 50,490 \text{ T}$$

$$\text{Extracted Steam} = 12 * (3201 - 822.07 / 4.186) * 330 * 15 * 4.186 / 10^6$$

$$HG_y = 141.308 \text{ TJ}$$

$$BE_y = (141.308 * 96.1) / 0.85 \text{ tCO}_2 = 15976 \text{ tCO}_2$$

Default baseline efficiency values for new coal fired boiler as per AMS IC Methodology is 85 %

Project Emissions

Year		2014	2015	2016	2017	2018	2019	2020	2021
Coal procured / Consumed	MT	105.19	579.935	1059.43	1033.45	347.435	3846.355	780.36	534.475
Project Emissions	tCO ₂	149	820	1498	1462	492	5439	1104	756
For the period 2014 - 2021	tCO ₂	11720							

Emission Reductions (ER_y) for the period 2014 – 2021

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

Year	Emission Reductions (tCO _{2eq})	Project Emissions (tCO ₂)	Emission Reductions
2014	15976	149	15827
2015	15976	820	15156
2016	15976	1498	14478
2017	15976	1462	14514
2018	15976	492	15484
2019	15976	5439	10537
2020	15976	1104	14872
2021	15976	756	15220
Total Emission Reductions		1,16,088	

Issuance Period: 08 years – 2014 – 2021

Total emission reductions (ER_y) = 1,16,088 CoUs (1,16,088 tCO_{2eq})

Conclusions:

Based on the audit conducted on the basis of UCR Protocol, which draws reference from UCR Protocol Standard Baseline, AMS-I.C.: Thermal energy production with or without electricity (Ver.21.0), the documents submitted during the verification including the Data, Project Concept Note (PCN) / Monitoring Report (MR), SQAC is able to certify that the emission reductions from the project - Renewable biomass based thermal energy generation by Shiva Parvati Poultry Feed, Hingoli, Maharashtra (UCR ID – 110) for the period **01/01/2014 to 31/12/2021** amounts to **1,16,088 CoUs (1,16,088 tCO₂eq)**