PROJECT CONCEPT NOTE
CARBON OFFSET UNIT (CoU) PROJECT

Title: Alchem Biomass to Energy Project-Neemrana Rajasthan

Version 3.0

Date 11/07/2023 (6-03-2024)*

*As per mail received from UCR default emission reduction applied.

First CoU Issuance Period: 9 years, 0 months

Date: 01/01/2013 to 31/12/2022

Project Concept Note (PCN)

CARBON OFFSET UNIT (CoU) PROJECT

BASIC INFORMATION	
Title of the project activity	**Alchem Biomass to Energy Project-Neemrana Rajasthan**
Scale of the project activity	Small Scale
Completion date of the PCN	11/09/23 (6-03-2024)* *As per mail received from UCR default emission reduction applied.
Project participants	Alchem International Private Limited SP-2-5, RIICO Industrial Area, Neemrana, Rajasthan
Host Party	India
Applied methodologies and standardized baselines	AMS.I.C. Thermal energy production with or without electricity version 22.
Sectoral scopes	01 Energy industries (Renewable/NonRenewable Sources)
Estimated amount of total GHG emission reductions over the crediting period	CoUs (107406 tCO_{2eq})

SECTION A. Description of project activity

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

The project "Alchem Biomass to Energy Project-Neemrana Rajasthan" is located SP-2-5, RIICO Industrial Area, Neemrana, Rajasthan India.

The project results in emission reductions of CO_2 that are real and measureable giving long-term benefits and contributing to the mitigation initiatives. Emission reductions attributable to the project are included in the *UCR Positive List of Project Types* deemed to be additional and also meet the "*Do No Net Harm to Society and Environment*" criteria under the ***UCR CoU Standard***.

The details of the project are as follows:

Purpose of the project activity:

The Alchem Biomass to Energy Project –Neemrana Rajasthan is located at SP-2-5, RIICO Industrial Area, Neemrana, Rajasthan India.

The purpose of the project activity is the set up of Boiler of 8TPH capacitiy to generate steam using biomass (rice husk) as fuel. Summary of Boiler and specification as under

Boiler Capacity (rating)	Commissioning	Average working hour/day	Average working per year	Steam Properties P (HP average) & T	Husk:Steam
8TPH	January 2009	20	300 days	P-8Bar, T-170^{0}C	1:4
8TPH	December 2016	Stand by	Stand by	P-8Bar, T-170^{0}C	1:4

Alchem International Pvt. Ltd. is involved in producing and providing plant derived active ingredients to the pharmaceutical, cosmetic and nutraceutical industries across 35 countries globally. Alchem is an Export Oriented Company with sales in over 35 countries. Around 90 % of its production is exported out of India. Alchem's phytoceuticals and epique divisions are dynamic, Innovative and fast growing providers of healthcare and cosmetic finished products to the Indian market with an eye on expanding business in the international market. The core values of the company include **Adaptability, Integrity, Decisiveness and Excellence**. These four core values are the key drivers to the company's growth.

As a part of manufacturing process Alchem requires steam in the manufacturing process. 100% of this steam is generated from biomass (rice husk). Alternately this fuel could have been generated from any other solid fuel (coal). In addition to replacing fossil fuel with renewable fuels, the project proponent has also installed bag filters to reduce ash emissions from the chimneys, over and above the standards prescribed by the state pollution control board.

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 uses renewable fuels in boilers for steam generation & heating. The project activity has resulted in improved working conditions inside the plant premises as well as improving the local environment for people living in close proximity. The project activity has also resulted in generating additional business opportunities for local equipment & biomass suppliers.

Environmental benefits:

The project uses renewable fuels in place of non-renewable fuels. Renewable fuels cause no net emissions to the atmosphere, as compared to non-renewable fuels which have net positive emissions to the atmosphere. So the project activity has resulted in lower emissions to the surrounding environment contributing to environmental well-being on a regional as well as global level.

Economic benefits:

The project activity has created job opportunities for local people during operation period. The project activity provides business opportunity for local stakeholders such as suppliers of biomass, manufacturers of smaller parts and accessories, contractors etc. The project activity also helps to conserve the fast depleting natural resources like coal, thereby contributing to the economic well being of country as a whole.

A.3. Location of project activity >> (27.9724° N, 76.3875° E)
Country: India.
District: Kotputli-Behror (Rajasthan)
State: Rajasthan

A.4. Technologies/measures >>

A steam boiler is a steam producing heating system. It creates energy by heating water to get steam. It is a heat exchanger that makes steam for outside usage and has a combustion chamber and water container.

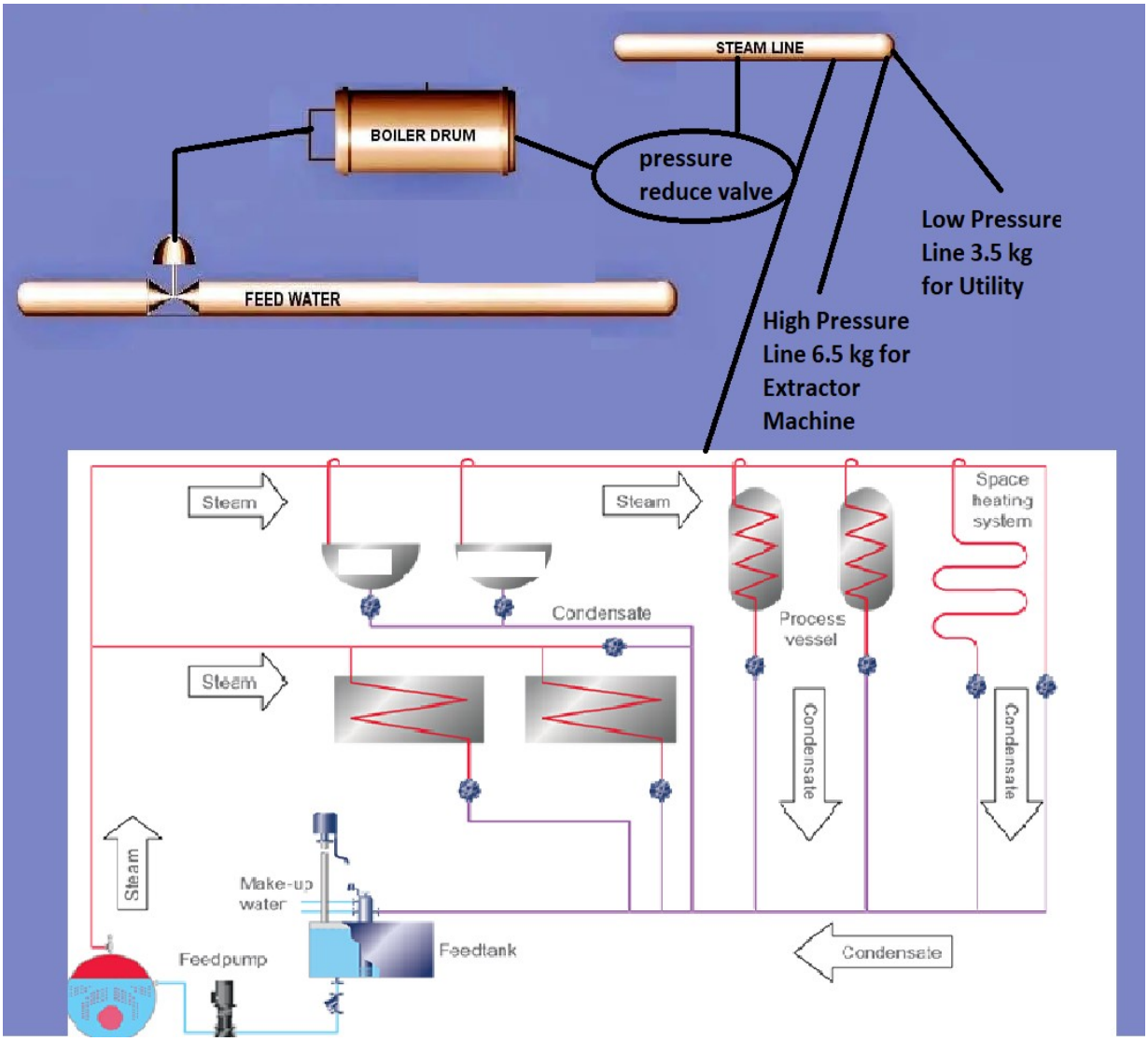
The steam generated by these boilers is of 10.5 kg pressure. This saturated steam. A Pressure reducing valve is installed in the system which regulates the pressure requirement in to 2 categories of High-Pressure Steam (6.5 to 8 Kg) pressure and Low Pressure Steam (2 to 4 kg) pressure. The high-pressure system is primarily used for distillation process where higher temperature and quantity is required for distillation of solvents, De-solventizer of Herb and in Extraction Process.

The Low-pressure system is used in Jackets of reactors for maintaining the desired temperature of the mass which varies as per product requirements. The low-pressure system is also used in controlling drying temperature of products and in indirect heating of the system. The condensate from all these operations is collected and is transferred back to the boiler which in turn reduces the total water consumption used for generating steam and increases the temperature of the inlet water. Higher condensates require of over 70% is regard as good and we achieve this figure quite comfortably.

The technical specifications of the Boiler as Below:

Specification	Value
Capacity of boiler	8TPH
Type	Solid fuel fired
Number Boilers	1 Effectively working.
Feed Material	Rice Husk
Steam Temperature	170 Degree C
Steam Pressure	8 Bar
Efficiency of Boiler	80%
Calorific Value Biomass (Rice Husk)	3800 Kcal/Kg.

Steam utilization process depiction for various process:



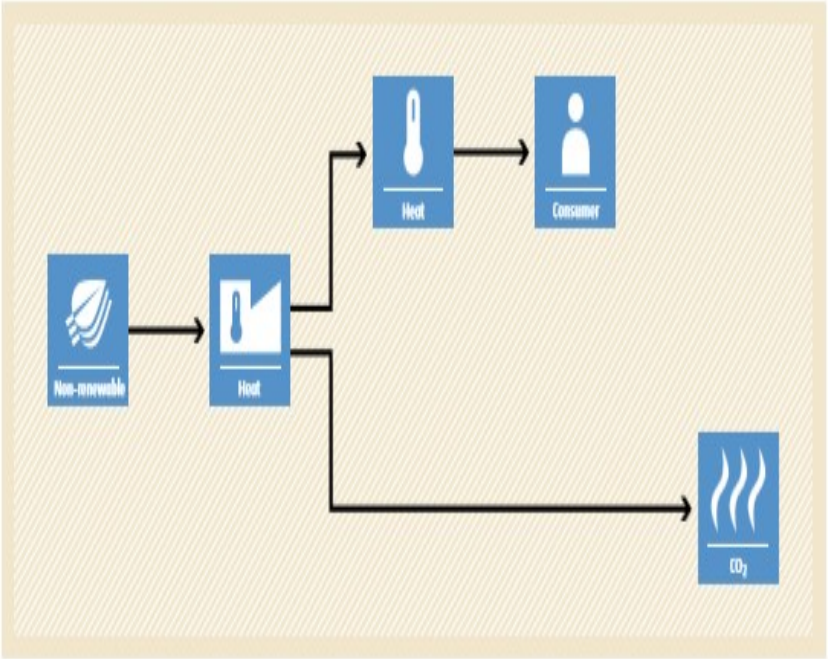
A.5. Parties and project participants >>

Party (Host)	Participants
India	Alchem International Private Limited **Unit-II**-SP-2-5, RIICO Industrial Area, Neemrana, Rajasthan India.

A.6. Baseline Emissions>>

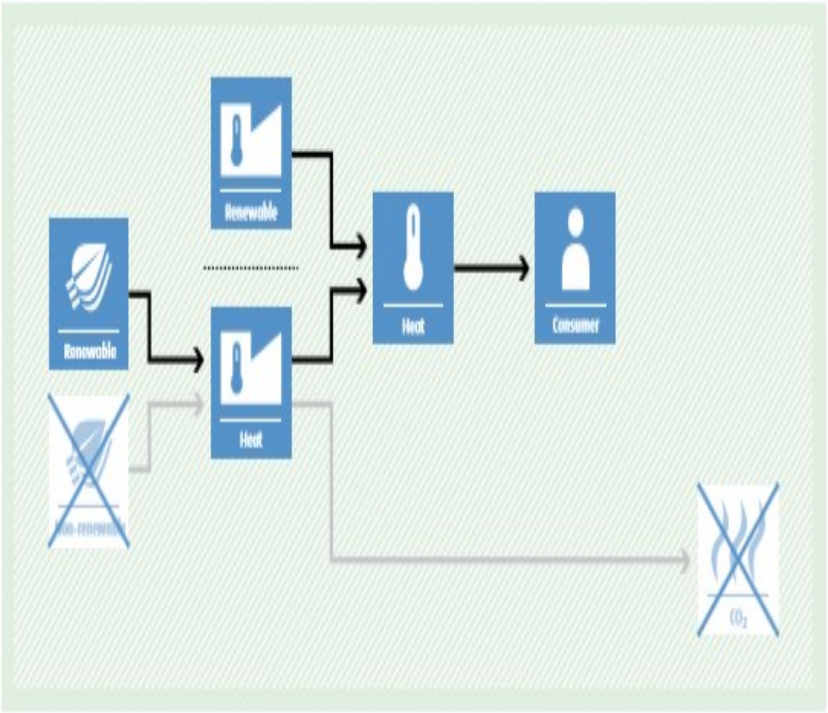
BASELINE SCENARIO

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



PROJECT SCENARIO

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



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

The project proponent requires approx. 8 TPH of steam at Neemrana Unit/hr for their industrial processes heat requirement. As per para 5 of the approved methodology AMS I. C version 22, '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.' All the boilers included in the project activity are multi solid fuel fired boilers and cannot use liquid or gaseous fuels like Natural Gas or Furnace Oil. Hence the fuel alternatives for the boiler will only include use of various types of solid fuels. Coal is available in the region due to presence of mines in the region with well connected transport means like railways and biomass is also available in surplus quantities in the region. Surplus availability is demonstrated through 'Biomass assessment report' and will be provided to the Validator/Verifier during validation/Verification.

All these biomass based boiler within the project activity is a voluntary investment which replaced equivalent amount of thermal energy from non-renewable source (coal). The project proponents are not bound to use biomass as source of fuel as use of coal is permitted to industries in India. There is not uncertainty associate with use of coal as fuel because of its robust supply chain and authentic suppliers. However biomass as fuel is not having robust supply chain also the supplier are farmers of surrounding area hence reliability is matter of concern.

The Project Proponents hopes that carbon revenues from 2013-2022 accumulated as a result of carbon credits generated will help PP to invest in such renewal energy project like solar and in the continued maintenance of this project activity.

Project proponent has chosen coal baseline fuel.

According to approved methodology (AMS I. C. Version 22) 'Type – I.C: ***Thermal Energy for the user with or without electricity***' of the "Indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity categories", baseline of the project activity is selected as per paragraph 5. The project activity is using the fossil fuel in baseline case for generation of steam and therefore paragraph 5 "the steam/heat produced using fossil fuels the baseline emissions" as a baseline case is justified for the project activity.

According to the paragraph 5 baseline emissions are calculated as per the equation below:

$$tBEy = HGy * EFCO2 / h$$

Where:

BEy = the baseline emissions from steam/heat displaced by the project activity during the year y in tCO2e.

HGy = the net quantity of steam/heat supplied by the project activity during the year y in TJ.

EFCO2 = the CO2 emission factor per unit of energy of the fuel that would have been used in the baseline plant in (tCO2/TJ), IPCC default emission factors are used.

_th = the efficiency of the plant using fossil fuel that would have been used in the absence of the project activity.

Baseline data requirement and data source

S.No	Parameter	Unit	Data Source
1	Emission Coefficient of Coal	tCO2/TJ	IPCC/Plant
2	Thermal Energy generated by the boilers	TJ/annum	Plant
3	Boiler efficiency	80%	Plant / Manufacturer data

A.7. Debundling>>

As per 'Appendix C of simplified modalities and procedures for Small Scale CDM project activities' occurrence of debundling is determined as follows:

A proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity;

• With the same project participants

• In the same project category and technology/measure; and

• Registered within the previous 2 years; and

• Whose project boundary is within 1 km of the project boundary of the proposed small-scale

activity at the closest point

The proposed project activity is the first by the company for neemrana unit and satisfies all the above conditions. Thus the project activity is not debundled component of a large 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 version 22.

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.

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

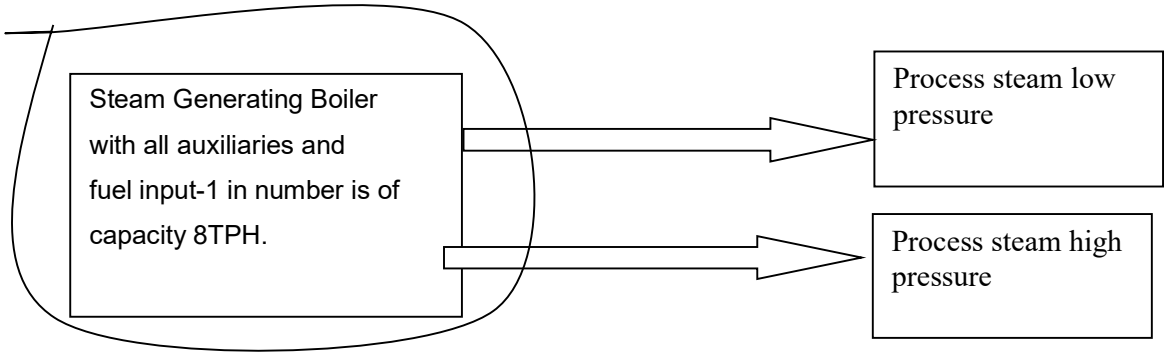
As per the methodology AMS I C version 22 cogeneration related criteria is not applicable as project does not involve any power generation. This does not involve any charcoal based energy generation, its does not involve retrofitting's, hence those applicability criteria are not being evaluated.
This category comprises renewable energy technologies that supply individual households or users with thermal energy that displaces fossil fuels. Examples include solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass for water heating, space heating, or drying, and other technologies that provide thermal energy that displaces fossil fuel. Biomass-based co-generating systems that produce heat and electricity are included in this category.
The project activity is a co-fired system that uses renewable fuels (rice husk), for steam generation and oil heating for meeting the process requirements in industry, thereby displacing the use of fossil fuels like coal, lignite, thus satisfying the above condition.
As demonstrated above the project activity satisfies the qualifying criteria Project Category: Type I (Capacity < 45 MWth) and also of the selected methodology AMS IC. Hence the choice of project category and methodology is justified.

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

Plant and machinery including the boiler house piping and its use happening in premises of Alchem international private limited at two location. The activity has never claimed any carbon credit under any voluntary or mandatory mechanism.

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

The project boundary includes the physical, geographical site(s) of boiler at the project location of site-I and Site-II as shown in Box A under closed curve as shown below



According to the approved methodology AMS. I.C, for the baseline emission calculation. The emissions due to fossil fuel used are considered as per approved methodology. The project activity is not expected to cause any leakage emissions; rather it is expected to result in reduced leakage emissions due to reduced transportation of fuel. In the absence of project scenario coal would be procured from the mines located at a distance of around 1000-1200 kms from the project site, where as in the post project scenario the project activity the biomass is procured from in a region of max 150 kms from the project site. However being conservative the project proponent is not claiming any emission reductions due to reduced fuel transportation.

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

The baseline scenario is thermal energy from more GHG intensive means based on the use of non-renewable biomass (coal). Thus, this project activity was a voluntary investment which replaced equivalent amount of thermal energy from renewable source, the Biomass. The baseline emission boundary is site of the project activity that consumes biomass as fuel for producing thermal energy and applies this methodology on a standalone basis, i.e. without using a Type III component of a SSC methodology.

The project proponents are not bound to incur this investment as it was not mandatory by national and sectoral policies. Thus, the continued operation of the project activity would continue to replace thermal energy from fuel wood.

The CoUs or emission reductions for small-scale biomass units are based on approved fossil fuel emission displacement rates established by the UCR Standard. These rates have taken into account the size of the unit, and fossil fuel displaced.

Estimated Annual Emission Reductions: t*BEy = HGy * EFCO*2 /h
Where:

BEy = the baseline emissions from steam/heat displaced by the project activity during the year y in tCO2e.

HGy = the net quantity of steam/heat supplied by the project activity during the year y in TJ.

EFCO2 = the CO2 emission factor per unit of energy of the fuel that would have been used in the baseline plant in (tCO2/TJ), IPCC default emission factors are used.

_th = the efficiency of the plant using fossil fuel that would have been used in the absence of the project activity

Estimated total baseline emission reductions (BE_y) = 102910 CoUs (102910 tCO_{2eq})

Year	Baseline Emission (BE)	Project Emission (PE)	Emission Reduction (BE-PE)
2013	10682	101	10581
2014	10682	101	10581
2015	10388	98	10289
2016	7888	75	7813
2017	10442	99	10343
2018	11514	109	11405
2019	8012	76	7936
2020	8894	84	8810
2021	14127	134	13993
2022	15804	150	15654
Total Emission Reduction	108433	1027	107406

Note: year means calendar year January to December. For project emission applied default emission factor of **0.0142 tCO2/tonne** of biomass

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.

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: 10 years, 0 months – 01/01/2013 to 31/12/2022

B.8. Monitoring plan>>

Data / Parameter:	**BIOMASS**
Data unit:	Kilo Gram /MT
Description:	Measurement through weighing machine
Source of data	Log book of Boiler & Inward log book
Measurement procedures (if any):	If the emissions reduction per system is less than five tonnes of CO_2e a year; or In the case of household or commercial applications/systems, whose maximum output capacity is less than 45 kW thermal and where it can be demonstrated that the metering of thermal energy output is not plausible: (i) Recording annually the number of systems operating (evidence of continuing operation, such as on-going rental/lease payments could be a substitute), if necessary using survey methods; (ii) Estimating the annual hours of operation of an average system, if necessary using survey methods. Annual hours of operation can be estimated from total output (e.g. tonnes of grain dried) and output per hour if an accurate value of output per hour is available. Where necessary refer to the "Guideline for sampling and surveys for CDM project activities and programmes of activities"
Monitoring frequency:	Each truck
QA/QC procedure	Measurement through calibrate weighing machine (Weighing Bridge)
Any comment:	Calibration report of weighing bridge shall be made available to project verifier

Data / Parameter:	**Steam**
Data unit:	Kilo Gram (KG)/MT
Description:	Quantity of steam
Source of data	Boiler Logbook
Measurement procedures (if any):	Measured using calibrated meters
Monitoring frequency:	Daily
QA/QC procedure	Measurement through calibrate flow meter
Any comment:	Calibration report and log book shall be made available to verifier.

Data / Parameter:	**Moisture in biomass**
Data unit:	%
Description:	Moisture content of the biomass (wet basis)
Source of data	Plant records

Measurement procedures (if any):	On-site measurements. This applies in the case where emission reductions are calculated based on biomass energy input. For all cases, ex ante estimates should be provided in the PDD and used during the crediting period. Alternatively, moisture content value provided by supplier of biomass should be used if it can be shown that it is reliable (e.g. the price paid for the biomass procured depends on its moisture content) and provided that the project continues to use same type of biomass during the rest of the crediting period. In case of dry biomass, monitoring of this parameter is not necessary
Monitoring frequency:	Each truck (Every consignment)
QA/QC procedure	General testing method define
Any comment:	Plant records available for the period.

Data / Parameter:	***Pressure of Steam***
Data unit:	kg/cm^2/ bar
Description:	Pressure
Source of data	Boiler logbook
Measurement procedures (if any):	Measured using calibrated pressure gauge
Monitoring frequency:	hourly
QA/QC procedure	Measurement through calibrate pressure gauge
Any comment:	Calibration record of meters available

Data / Parameter:	CV_k
Data unit:	KJ/KG
Description:	calorific value of biomass type *k*
Source of data	Testing Reports from external agency available
Measurement procedures (if any):	Measurement in laboratories according to relevant national/international standards. Measure quarterly, taking at least three samples for each measurement. The average value can be used for the rest of the crediting period. Measure the NCV based on dry biomass - Check the consistency of the measurements by comparing the measurement results with, relevant data sources (e.g. values in the literature, values used in the national GHG inventory) and default values by the IPCC
Monitoring frequency:	Once in a year
QA/QC procedure	Through NABL approved lab
Any comment:	Test report from third party NABL approved lab shall be made available to verifier.