



1.6 MW BUNDLED RICE HUSK BASED COGENERATION PLANT BY M/S MILK FOOD LIMITED (MFL) IN PATIALA (PUNJAB) & MORADABAD (U.P) DISTRICTS



Document Prepared by ENEN Green Services Private Limited

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The purpose of the project activity is to utilize rice husk (biomass) available in the region for cogeneration of steam and electricity for captive consumption at two locations of Milk food Limited viz. Patiala and Moradabad. The implementation of the bundled project activity has resulted in the partial displacement of power supply and the complete displacement of steam generation new rice husk-based co- generation plants.

As the project activity utilizes a carbon neutral fuel, it thereby reduces the anthropogenic Green House Gas (GHG) emission that would have been generated as a result of continued operation of coal-based boilers.

Brief description of the installed technology and equipment:

The two projects that form the project activity are:

Project I: 1 MW Rice Husk Based Cogeneration Plant at Post Office (P.O.) Bahadurgarh, Distt. Patiala –147021, Punjab, India:

The boiler of this cogeneration plant generates 14 TPH of steam with the outlet parameters i.e. pressure 45 kg/cm², and temperature as 420°C. The part of the steam generated in the boiler i.e. 1.2 TPH at 17kg/cm², 275°C is fed directly to the process and the rest 12.8 TPH is fed to a back pressure turbine-generator. The bleed steam flow from the turbine is at 17 kg/cm², 3.1 TPH, 240°C and the exhaust steam flow from the turbine is at 4 kg/cm², 9.7 TPH, 170°C. This steam is further sent for process requirement. The electricity generating capacity is 1 MW.

Project II: 0.6 MW Rice Husk Based Cogeneration Plant at Village: Mugalpur urf Agwanpur Mustakam, Dist.: Moradabad, Uttar Pradesh, India:

The boiler involved in this cogeneration plant generates 12 TPH of steam with the outlet parameters i.e. pressure 32 kg/cm², and temperature as 400°C. Out of 12 TPH steam generated in the boiler 2.3 TPH is fed to a Dryer at 17 Kg/ cm², 360°C and another 9.7 TPH of steam is fed to a Back Pressure TG set at 30 Kg/cm², 360°C, the exhaust steam is at 3 kg/cm², 240°C. The electricity generating capacity is 0.6 MW.

Relevant dates for the project activity:

Project Activity I was commissioned on 6th May, 2009

Project Activity II was commissioned on 4th June, 2009

Both the project activities have been operational since then at full capacity.

Total GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period (01-January-2022 to 30-June-2023) are 96,510 tCO₂e.

Audit Type	Period	Program	VVB Name	Number of years
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	(Inclusive of both dates)			
Validation	06-May-2009 to 05-May-2019	VCS	TUV NORD CERT GmbH	10 years (First crediting period)
Verification	06-May-2009 to 31-May-2011	VCS	TUV NORD CERT GmbH	02 years 00 month and 26 Days
Verification	01-June-2011 to 13-february-2012	VCS	Perry Johnson Registrars Carbon Emissions Services, Inc	00 years 08 month and 13 Days
Verification	14-february-2012 to 31-January-2014	CDM	Perry Johnson Registrars Carbon Emissions Services, Inc	01 years 11 month and 18 Days
Verification	01-February-2014 to 31-December-2017	VCS	LGAI Technological Center, S.A. (Applus+ Certification)	03 years 11 month and 00 Days
Verification	01-January-2018 to 05-May-2019	VCS	Earthood Services Private Limited	01 years 04 month and 05 Days
Renewal of Crediting period	06-May-2019 to 05-May-2029	VCS	Earthood Services Private Limited	10 years (Second crediting period)
Verification	06-May-2019 to 31-December-2020	VCS	LGAI Technological Center, S.A. (Applus+ Certification)	01 years 07 month and 26 Days
Verification	01-January-2021 to 31-Dec-2021	VCS	LGAI Technological Center, S.A. (Applus+ Certification)	01 years 00 month and 00 Days
Verification	01-January-2022 to 30-June-2023	VCS	VKU Certification Pvt Ltd	01 years 06 month and 00 Days
Total	06-May-2009 to 30-June-2023			14 years 01 month 25 days

1.2 Sectoral Scope and Project Type

Sectoral Scope: The project belongs to Sectoral Scope 1, Energy industries (renewable / non-renewable sources)

TYPE I – Renewable energy power project

Category I.C: Thermal Energy Production with or without electricity

This is not a grouped project as it does not involve combination of GHG projects or other project categories. It is a single project and there are no other project participants involved.

1.3 Project Proponent

Organization name	M/s Milk food Limited
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Contact person	Amar Baljeet Singh
Title	Chief Operations Officer
Address	5th Floor, Bhandari House, 91 Nehru Place New Delhi-110019 (India)
Telephone	+91-11-26460670, 26463773
Email	abs@milkfoodltd.com

1.4 Other Entities Involved in the Project

Organization name	ENEN Green Services Private Limited
Role in the Project	Project participant
Contact person	Ruchika Sharma
Title	Director
Address	C 094, Vipul Plaza, sector 81, Faridabad, Haryana, India
Telephone	+91-9953935506
Email	enengreen@gmail.com

1.5 Project Start Date

The project start date is 06-May-2009.

1.6 Project Crediting Period

The validated choice of crediting period is 10 years (renewed twice)

The first crediting period is 06-May-2009 to 05-May-2019 (10 years)

The Second crediting period is 06-May-2019 to 05-May-2029 (10 years)

Duration of the project activity: 20 years

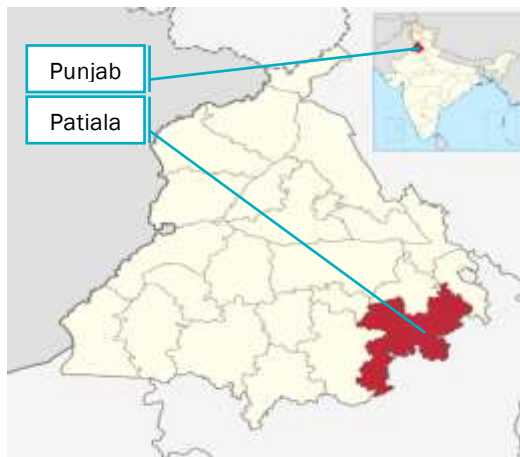
Life time of the Boilers: 20 years¹

¹ Page no 6, Section 1.9 of the approved VCS-PD version 03, dated 28-August-2020. [VCS-Project-Description-MILKFOOD_V3_Final.pdf](#)

1.7 Project Location

Project I; The project is located at Milk food Limited at P.O. Bahadurgarh and Patiala District of Punjab.

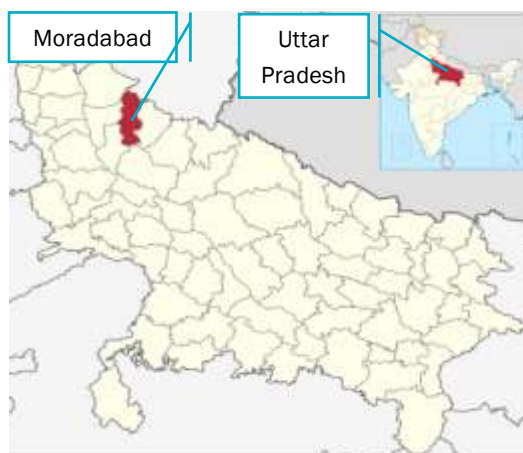
The project site is located within latitude 30°22'20.5" N and longitude 76°28'28.0" E respectively. The map with location of the project plant is depicted below:



Map and Geo-Coordinates for Patiala

Project II: The project activity site is located at Village: Mugalpur urf Agwanpur, Mustakam, and Moradabad district of UP.

The latitude and longitude for the project site are 28°54'50.10" N and 78°43'23.80" E respectively. The map with location of the Project Plant is depicted below:



Map and Geo-Coordinates for Moradabad

1.8 Title and Reference of Methodology

Title of the methodology applied: Thermal energy production with or without electricity

TYPE I – Renewable energy project

Category I.C: Thermal Energy production with or without electricity I.C/Version 21

Sectoral Scope: 1

1.9 Participation under other GHG Programs

The project is also registered under CDM mechanism of UNFCCC. Reference no of project is 5219. Credits from period 14-Feb-2012 - 31-Jan-2014 is claimed as CDM project. However, for the current monitoring period there is no application for verification under CDM mechanism in order to avoid double counting. For the current monitoring period the project activity is claiming GHG credits in VCS program only.

1.10 Other Forms of Credit and Supply Chain (Scope 3) Emissions

Include the following information, as applicable:

- Emission Trading Programs and Other Binding Limits: The PP has not applied this project in any Emission Trading Programs and other Binding Limits.
- Other Forms of Environmental Credit: The project is also registered under CDM mechanism of UNFCCC. Reference no of project is 5219. Credits from period 14-Feb-2012 – 31-Jan-2014 is claimed as CDM project. However, for the current monitoring period there is no application for verification under CDM mechanism in order to avoid double counting. Project activity is not registered under REC mechanism.
https://www.recregistryindia.nic.in/index.php/publics/registered_regens
- The project activity has retrofitted petcoke based boilers to rice husk-based boilers and in this monitoring period there has been no supply of petcoke to the plant location. Whereas the project activity has used rice husk as a feedstock for the boiler in this monitoring period so the Scope 3 emissions related to the production and supply of rice husk to the project location shall be considered.
- The project procures rice husk from within 40km radius and pays for the rice husk and as well as the transportation cost. And so is the case for any industry that is using rice husk as a fuel in India. The nearest major rice husk consumer is located more than 100km from the project location, so it does not make any business sense for a plant to procure rice husk from 100+ km and pay additional transportation charges when it can procure rice husk from their neighboring areas. Thus, in the absence of the project activity, the rice husk in the region of project location would have gone into landfills or burnt in open areas otherwise, making it a waste material.

Since, it is a waste material and would have gone into landfills or burnt in open areas in the absence of project activity, it will not impact the emissions of goods and services in the supply chain.

Similarly, the emissions from the transport of rice husk is also considered to have not impacted the emissions of goods and services in the supply chain as it has replaced the transport of petcoke to the project location².

Apart from this there is no change in the operations as the project activity is all about fuel transition in boilers so, whichever fuel is used in the boilers there will be no effect in any categories in Scope 3 except for categories 1 and 4 as defined by the GHG Protocol under Scope 3 emissions. Due to this there is no other impact in the emissions of goods and services in the supply chain.

² The project activity was procuring petcoke from more than 50 km radius in baseline and the rice husk is being procured within 40 km radius that is less than the distance travelled due to transportation. Also, as mentioned in the approved PD “as per Para 78 of AMS I C version 21, the leakage has to be considered if the biomass residue is transported over a distance of more than 200 Km due to the implementation of the project activity otherwise it can be neglected.”

1.11 Sustainable Development Contributions

Project's contribution to Sustainable Development

The contributions of proposed project activity towards sustainable development are explained with indicators like social, economical, environmental and technological well-being, as follows:

Environmental well-being

The project activity by switching to rice husk from coal has avoided extraction and utilisation of coal that would have been used to generate steam and power from coal fired boiler. This would, in turn, avoid any emissions related to extraction and utilisation of coal contributing to environmental well-being.

Social well-being:

The project activity will pave the way for development and increases the social status and living conditions and the prevailing living standard in the vicinity of the project activity and thus results in empowering the nearby population (supplier of the major amount of workforce for construction of the project activity). Also, it will contribute to a small increase in the local employment by employing skilled and un-skilled personnel for operation and maintenance of the equipment. This Proposed Project Activity will result in reduced migration of the local population.

Economic well being

The project has created a business opportunity during construction phase for local stakeholders such as suppliers, contractors, bankers etc. contributing to economic well-being aspects. Further, the project also influences creation of employment opportunities for local people, which would enhance their social status. Also, it saves the coal and HSD and thus allows it to be diverted to other needy sections of the economy.

Technological well being

The project activity utilizes biomass as fuel to generate steam and electricity. It is an advanced and sustainable technology for long term benefits. The project activity is expected to increase awareness and interest among the industry players to make investments in similar areas.

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1)	7.2	7.2.1: Renewable energy share in the total final energy consumption	Implemented activities to increase	About 2,18,715.31 MWh (1,15,420.11 in P-I and 103,295.20 in P-II) of renewable energy has been generated during current monitoring period.	Overall, 20,00,344.51 MWh (10,58,393.88 and 9,41,950.63 MWh in P-I & P-II respectively) renewable energy has been generated by project activity in the project lifetime.
2)	8.6	8.6.1: proportion of youth (aged 15–24 years) not in education, employment, or training	Implemented activities to decrease	No further changes this monitoring period	The project has provided full time employment to 108 local youths since the start of the project activity till the end of this monitoring period.
3)	9.4	9.4.1: CO ₂ emissions per unit of value added	Implemented activities to decrease	In the current monitoring period, the project has reduced the carbon intensity by 0.4413 tCO ₂ /MWh (0.4408 & 0.4418 tCO ₂ /MWh in P-I and P-II respectively).	The project has retrofitted 2 boilers to generate energy from renewable biomass for captive consumption instead of going for affordable but inefficient fossil fuel fired boilers. This has reduced the carbon intensity from 0.4443 tCO ₂ /MWh to 0.0010 tCO ₂ /MWh till this monitoring.

4)	11.6	11.6.2: Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)	Implemented activities to decrease	The project has prevented the release of PM particles into the air by avoiding the burning of 40,946.13 tonnes (21,608.03 and 19,338.10 tonnes in P-I & P-II respectively) of coal in this monitoring period.	The project has prevented the release of PM particles into the air by avoiding the burning of 3,74,488.46 tonnes of coal (sum of 1,98,144.01 tonnes and 1,76,344.45 tonnes of coal in P-I & P-II respectively) which would have happened in the absence of project activity during current and previous monitoring periods.
5)	12.2	12.2.1: Material footprint, material footprint per capita, and material footprint per GDP	Implemented activities to decrease	The project has prevented the extraction of fossil fuel by avoiding the burning of 40,946.13 tonnes (21,608.03 and 19,338.10 tonnes in P-I & P-II respectively) of coal in this monitoring period. The project is utilizing renewable biomass to meet its material demand.	The project has prevented the extraction of fossil fuel by avoiding the burning of 3,74,488.46 tonnes (1,98,144.01 tonnes and 1,76,344.45 tonnes of coal in P-I & P-II respectively) and replaced with renewable biomass for energy generation from the beginning of the project till the end of this monitoring period.
6)	13.0	13.2.2: Total greenhouse gas emissions per year	Implemented activities to decrease	By utilizing renewable biomass available in the region for cogeneration of steam and electricity for captive consumption, 96,510 tonnes of carbon (50,873 and 45,637 tCO ₂ e in P-I & P-II respectively) into the atmosphere during current monitoring period have been avoided.	Overall, prevented the release of 9,25,013 tCO ₂ e (4,89,836 tCO ₂ e in P-I & 4,35,177 tCO ₂ e in P-II) emissions to the environment since commissioning.

2 SAFEGUARDS

2.1 No Net Harm

No potential negative environmental and socio-economic impacts have been identified by the project proponent. The project activity promotes environmental and socio-economic well-being. Also, project activity generated local employment which supports upliftment of socio-economic status of region.

2.2 Local Stakeholder Consultation

Project I- 1 MW captive power plant is installed within the company's premises and no additional land is procured for the project. The stakeholders involved in the project, other than the company, are:

- Punjab State Electricity Board (PSEB)
- Punjab Pollution Control Board (PPCB)
- Punjab Energy Development Agency (PEDA)
- Authorities of the local administration
- Rice husk suppliers
- Local villagers and village panchayat

Invitation for stakeholder's consultation meetings were sent out by Milkfood Limited via advertisement in the newspaper (dated 17th July, 2009) and personal letters. The village Panchayat/local villagers have been informed through munadi (announcement by a hired person in the village/localities) about the project and requested to attend the meeting communicate any suggestions / objections regarding the project activity. A public notice was affixed at main gate of Milkfood Limited.

Milkfood Limited organized stakeholder consultation meetings on 27th July 2009 held at its unit at Bahadurgarh and Patiala District of Punjab. The objective of the meeting was to inform the stakeholders about the environmental and social impacts of the project activity and discuss their concerns regarding the same, if any. The comments and suggestions were invited throughout the period of Stakeholders meet.

Project II- 0.6 MW captive power plant is installed within the company's premises and no additional land is procured for the project. The stakeholders involved in the project, other than the company, are;

- Uttar Pradesh State Electricity Board (UPSEB)
- Uttar Pradesh Pollution Control Board (UPPCB)
- Uttar Pradesh New and Renewable Energy Development Agency (UPNEDA)
- Authorities of the local administration
- Rice husk suppliers

- Local villagers and village panchayat

Invitation for stakeholder's consultation meetings were sent out by Milkfood Limited via advertisement in the newspaper (dated 17th July, 2009) and personal letters. The village Panchayat/local villagers have been informed through munadi (announcement by a hired person in the village/localities) about the project and requested to attend the meeting communicate any suggestions / objections regarding the project activity. A public notice was affixed at main gate of Milkfood Limited.

Milkfood Limited organized stakeholder consultation meetings on 30th July 2009 held at its unit at Village Mugalpur urf Agwanpur Mustakam, and Moradabad district of UP. The objective of the meeting was to inform the stakeholders about the environmental and social impacts of the project activity and discuss their concerns regarding the same, if any. The comments and suggestions were invited throughout the period of Stakeholders meet.

Ongoing communication with stakeholders and interested parties is maintained through an open invitation of feedback and criticism for both the plants. At the gate of Milkfood Limited, a complaint and feedback register are kept for comments of stakeholders and to inform them back for action taken on the comments. A display is maintained to inform the purpose of the register and to encourage any feedback from stakeholders that they may like to convey to Milkfood Limited. Up to the date of preparation of this report, there are no adverse comments from stakeholders regarding implementation of the project.

Both the plants have register and contact details at reception for local stakeholders to communicate. Local stakeholders may even meet after prior appointment with appointed person by management for any issues or concern. Appointed person resolves their issues if any and also notify higher management about their concern and steps taken to resolve their issues. The same will be recorded and reviewed on quarterly basis.

2.3 AFOLU-Specific Safeguards

Not Applicable as this is not an AFOLU project activity.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

Project I (part of VCS project activity) was commissioned on 06-May-2009 followed by Project II (part of VCS project activity) on 04-June-2009. Since then, project is operation at full capacity. Project activity was operational during this monitoring period.

However, all equipments (Boiler, TG units and other accessories) were undergone for maintenance (planned shutdown). The Project I (part of VCS project activity) was non-operational for 29 days and Project II (part of VCS project activity) was non-operational for 32 days during the

current monitoring period. The details of the plant non-operational (for how many days plants were non-operational/shutdown) are given following:

Project Activity	No of days in Monitoring Period	No of non-operational Days	% of the non-operational days	01-Jan-2022 to 31-Dec-2022	01-Jan-2023 to 30-Jun-2023
Project I	546	29 (14+15)	5.31%	11-Jun-2022 to 24-Jun-2022	16-Jun-2023 to 30-Jun-2023
Project II	546	32 (17+15)	5.86%	20-Jul-2022 to 05-Aug-2022	01-Jun-2023 to 15-Jun-2023

There is no exchange of equipment during the monitoring period. There is no other event occurred during this monitoring period, which may have impact on the applicability of the applied methodology (AMS-I.C.: Thermal Energy production with or without electricity, version 21) as well as emission reduction.

3.2 Deviations

3.2.1 Methodology Deviations

No deviation from methodology is sought during this monitoring period.

3.2.2 Project Description Deviations

The project has not applied/requested for any deviations from Project Description under previous monitoring periods (06-May-2019 to 31-Dec-2021) in the current crediting period. However, the following project description deviation is requested in 3rd verification (3rd monitoring period: 01-Jan-2022 to 30-Jun-2023) for 2nd crediting period:

The project locations in approved PD had an editorial mistake. The coordinate mentioned in approved PD were inconsistent with the plant locations. The coordinates of the project activity have now been corrected to the exact locations. And the map image has also been corrected in accordance to the corrected coordinates. The image also showcases nearby sites to contextualize the location of the plant.

The same has been corrected in section 1.7. This deviation does not impact the applicability of the methodology, additionality, or the appropriateness of the baseline scenario.

There are no other project description deviations applied during this monitoring period or in previous monitoring reports. Nature of deviation is permanent.

3.3 Grouped Projects

This is not a grouped project activity.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	EF_{EF,CO_2}
Data unit	tCO ₂ / TJ
Description	The CO ₂ 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	As per IPCC 2006 Volume 2 Energy Table 1.4
Value applied	94.6
Justification of choice of data or description of measurement methods and procedures applied	Default values, as per table 1.4 of IPCC 2006 Volume 2 Energy. Para 34 of AMS I C version 21, also suggested to adopt IPCC default emission factor.
Purpose of Data	Baseline emission calculations
Comments	-

Data / Parameter	$\eta_{BL, thermal}$
Data unit	%
Description	The efficiency of the boiler using coal that would have been used in the absence of the project activity.
Source of data	Manufacturer specification
Value applied	82
Justification of choice of data or description of measurement methods and procedures applied	This value is provided by the boiler manufacturer.
Purpose of Data	Baseline emission calculations
Comments	-

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO ₂ / MWh
Description	Combined margin CO ₂ emission factor for Indian grid
Source of data	Central Electricity Authority (CEA) version 15 Value of data
Value applied	0.94193

Justification of choice of data or description of measurement methods and procedures applied	The Combined Emission Factor for Indian grid has been calculated in accordance with Version 7 of “Tool to calculate the emission factor for an electric system”. The weightage for Operating and Build margin emission factors are taken as 0.25 and 0.75. The operating and build margin values (including imports) have been sourced from CEA Baseline Database, version 15.
Purpose of Data	Baseline emission calculations
Comments	-

Data / Parameter	COEF_{i,y}
Data unit	tCO ₂ / litre
Description	The CO₂ emission coefficient of fuel type I (Diesel) (tCO₂/mass or volume unit) It is calculated based on EB 41, Annex 11; $COEF_{i,y} = NCV_{i,y} \cdot EF_{CO_2,i,y}$ Where, NCV_{i,y}= weighted average net calorific value of the fuel type i (Diesel) in year y (GJ/mass or volume unit) EF_{CO₂,i,y} = weighted average CO₂ emission factor of fuel type I (Diesel) in year y (tCO₂/GJ)
Source of data	Table 1.2 & Table 1.4 Chapter 1 Volumes 2 of IPCC, 2006.
Value applied	0.0032
Justification of choice of data or description of measurement methods and procedures applied	Default values, as per EB 41, Annex 11 (IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 & Table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories if values are not provided by the fuel supplier
Purpose of Data	Baseline emission calculations
Comments	-

Data / Parameter	PLF
Data unit	%
Description	Plant Load Factor
Source of data	Third party Determination
Value applied	90
Justification of choice of data or description of measurement methods and procedures applied	According to EB48 annex 11 third party determination of the PLF is required and the same value to be used.

Purpose of Data	Baseline emission calculations
Comments	-

Data / Parameter	$\eta_{BI,biomass}$
Data unit	%
Description	The efficiency of the project activity biomass-based boiler.
Source of data	Manufacturer specification
Value applied	78
Justification of choice of data or description of measurement methods and procedures applied	As per feasibility report approved by PEDDA and technical specification provide by boiler supplier
Purpose of Data	Baseline emission calculations
Comments	-

4.2 Data and Parameters Monitored

Data / Parameter	Net Electricity ($EG_{PI,y}$)
Data unit	MWh/yr
Description	Net electricity generated by project I
Source of data	On-site instruments (energy meter)
Description of measurement methods and procedures to be applied	Monitoring: electronic energy meter at the sent-out point of the project activity plant is used to measure the data of net electricity generated. Data type: Measured Accuracy: 0.5s Archiving policy: Paper. Recording Frequency: hourly Responsibility: Manager (power plant) is responsible for regular calibration of the meter Calibration Frequency: once in a three year.
Frequency of monitoring/recording	Hourly
Value monitored	5,669.46 MWh (cumulative value for the monitoring period)
Monitoring equipment	Equipment: Energy meter Type: Electronic Accuracy: 0.5s Calibration details: PI. refer to appendix 1. Results: under the specified limits

QA/QC procedures to be applied	Energy meter was duly calibrated. It was calibrated by accredited agency and Yes, Quality Management System will be used and the same procedurally records of net electricity generation will be checked by Plant in charge and a consolidated monthly monitoring report will be submitted to top management for internal review.
Purpose of the data	Calculation of baseline emissions
Calculation method	-
Comments	Data will be kept for crediting period + 2 years.

Data / Parameter	Net Electricity ($EG_{PJ,y}$)
Data unit	MWh/yr
Description	Net electricity generated by project II
Source of data	On-site instruments (energy meter)
Description of measurement methods and procedures to be applied	Monitoring: electronic energy meter at the sent-out point of the project activity plant is used to measure the data of net electricity generated. Data type: Measured Accuracy: 0.5s Archiving policy: Paper. Recording Frequency: hourly Responsibility: Manager (power plant) is responsible for regular calibration of the meter Calibration Frequency: once in a three year.
Frequency of monitoring/recording	Hourly
Value monitored	5,382.04 MWh (cumulative value for the monitoring period)
Monitoring equipment	Equipment: Energy meter Type: Electronic Accuracy: 0.5s Calibration details: Pl. refer to appendix 1. Results: under the specified limits.
QA/QC procedures to be applied	Energy meters will be duly calibrated by accredited agency and Yes, Quality Management System will be used and the same procedurally records of net electricity generation will be checked by Plant in charge and a consolidated monthly monitoring report will be submitted to top management for internal review.
Purpose of the data	Calculation of baseline emissions
Calculation method	-
Comments	Data will be kept for crediting period + 2 years.

Data / Parameter	$Q_{fossil, i,y}$
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Data unit	Tonnes
Description	Quantity of fossil fuel (coal) of type i combusted in boiler in year y
Source of data	On site measurement; plant log sheet/records.
Description of measurement methods and procedures to be applied	Monitoring: Weigh bridge will monitor the data (If used) Data type: Measured. Archiving policy: Paper. Recording Frequency: Daily Responsibility: Manager (power plant) is responsible for regular calibration of the Weigh bridge Range of weigh bridge: 0 to 40 TON Calibration Frequency: once in a three year.
Frequency of monitoring/recording	Daily
Value monitored	0
Monitoring equipment	Equipment: Weigh bridge Type: Electronic Range: 0 to 40 TON Calibration details: Pl. refer to appendix 1. Results: under the specified limits.
QA/QC procedures to be applied	The data is recorded by the supervisor daily and it is verified by the plant manager by cross checking it with the fossil fuel of type i procurement data (Invoices). Weigh scale was calibrated annually by external accredited agencies.
Purpose of the data	Calculation of baseline emissions
Calculation method	-
Comments	Data will be kept for crediting period + 2 years.

Data / Parameter	FC _{i,j,y}
Data unit	Litre
Description	Quantity of fossil fuel (diesel) combusted in boiler in year y
Source of data	On site measurement; plant log sheet/records.
Description of measurement methods and procedures to be applied	Quantity of fossil fuel type i-(Diesel) used in project activity I & II (DG sets) would be measured through procurement data. Monitoring: Measurement through invoices. Data type: Measured Archiving policy: Paper. Recording: Frequency: Daily Responsibility: Manager (power plant) is responsible for regular achieving of diesel used.
Frequency of monitoring/recording	Daily
Value monitored	Project I: 13,400 (cumulative value for the monitoring period) Project II: 28,819 (cumulative value for the monitoring period)

Monitoring equipment	Log book
QA/QC procedures to be applied	The data is recorded by the supervisor daily and it is verified by the plant manager by cross checking it with the fossil fuel procurement data (Invoices).
Purpose of the data	Calculation of project emissions
Calculation method	-
Comments	Data will be kept for crediting period + 2 years.

Data / Parameter	Q_{steam}
Data unit	Tonnes
Description	Quantity of steam generated from project activity biomass fired boiler.
Source of data	On site measurement taken from steam flow meters.
Description of measurement methods and procedures to be applied	Reading is directly taken from steam flow meter by boiler attendant supervisor on hourly basis. Monitoring: steam flow meter. Data type: Measured. Range: 0 to 18 Ton Archiving policy: Paper. Recording Frequency: hourly Responsibility: Manager (power plant) is responsible for regular calibration of the meter. Calibration Frequency: Once in a three year.
Frequency of monitoring/recording	Hourly
Value monitored	Project I: 153,753.40 (cumulative value for the monitoring period) Project II: 135,080.40 (cumulative value for the monitoring period)
Monitoring equipment	Equipment: Stem flow meter Type: Paper and Electronic Range: 0 to 18 Ton Calibration details: Pl. refer to appendix 1. Results: under the specified limits.
QA/QC procedures to be applied	The data is recorded by the supervisor every and it is verified by the plant manager. Steam flow meters is calibrated by external accredited agencies.
Purpose of the data	Calculation of project emissions
Calculation method	-
Comments	Data will be kept for crediting period + 2 years.

Data / Parameter	T_{steam}
Data unit	Degree Celsius (°C)

Description	Temperature of the steam generated.
Source of data	On site measurement taken from temperature gauge installed at steam outlet from the boiler.
Description of measurement methods and procedures to be applied	Monitoring: temperature gauge Data type: Measured Range: 0 to 1200 DEG. C Archiving policy: Paper Recording Frequency: hourly Responsibility: Manager (power plant) is responsible for regular calibration of the meter. Calibration Frequency: Once in a three year.
Frequency of monitoring/recording	Hourly
Value monitored	Project I: 397°C Project II: 400°C
Monitoring equipment	Equipment: Temperature gauge. Type: Electronic Range: 0 to 1200 DEG. C Calibration details: Pl. refer to appendix 1. Results: under the specified limits.
QA/QC procedures to be applied	The data is recorded by the supervisor every hour and it is verified by the plant manager. Temperature gauges is calibrated by external accredited agencies.
Purpose of the data	Calculation of baseline emissions
Calculation method	-
Comments	Data will be kept for crediting period + 2 years.

Data / Parameter	P_{steam}
Data unit	Kg/cm ²
Description	Pressure of the steam generated.
Source of data	On site measurement from pressure gauge.
Description of measurement methods and procedures to be applied	Monitoring: Pressure gauge Data type: Measured. Range: 0 to 80 bar Archiving policy: Paper Recording Frequency: hourly Responsibility: Manager (power plant) is responsible for regular calibration of the meter. Calibration Frequency: Once in a three year
Frequency of monitoring/recording	Hourly

Value monitored	Project I: 42 Kg/cm ² Project II: 32 Kg/cm ²
Monitoring equipment	Equipment: Pressure gauge. Type: Electronic Range: 0 to 80 bar Calibration details: Pl. refer to appendix 1. Results: under the specified limits.
QA/QC procedures to be applied	The data is recorded by the supervisor every hour and it is verified by the plant manager. Pressure gauges is calibrated by external accredited agencies.
Purpose of the data	Calculation of baseline emissions
Calculation method	-
Comments	Data will be kept for crediting period + 2 years.

Data / Parameter	$Q_{\text{steam,HP,I}}$
Data unit	Tonne
Description	Quantity of steam used in the process at high pressure (after conjunction point of direct and bleed steam) (at high pressure side)
Source of data	Onsite measurement taken from steam flow meter.
Description of measurement methods and procedures to be applied	Reading is directly taken from steam flow meter by boiler supervisor on hourly basis. Monitoring: steam flow meter at plant. Data type: Measured. Range: 0 to 7.50 TPH Archiving policy: Paper. Recording Frequency: hourly Responsibility: Manager (power plant) is responsible for regular calibration of the meter. Calibration Frequency: Once in a three year
Frequency of monitoring/recording	Hourly
Value monitored	Project I: 83,443.91 (cumulative value for the monitoring period)
Monitoring equipment	Equipment: Steam flow meter. Type: Electronic Range: 0 to 7.50 TPH Calibration details: Pl. refer to appendix 1. Results: under the specified limits.
QA/QC procedures to be applied	The data is recorded by the supervisor every hour and it is verified by the plant manager. Steam flow meter is calibrated by external accredited agencies.
Purpose of the data	Calculation of baseline emissions
Calculation method	-

Comments	Data will be kept for crediting period + 2 years.
Data / Parameter	$T_{\text{steam,HP,I}}$
Data unit	Degree Celsius
Description	Temperature of the steam used in the process at high pressure (after conjunction point of direct and bleed steam) (at high pressure side)
Source of data	On-site measurement from temperature gauge installed at steam outlet from boiler
Description of measurement methods and procedures to be applied	Monitoring: temperature gauge Data type: Measured Range: 0 to 500 DEG. C Archiving policy: Paper. Recording Frequency: hourly Responsibility: Manager (power plant) is responsible for regular calibration of the meter. Calibration Frequency: once in a three year.
Frequency of monitoring/recording	Hourly
Value monitored	Project I: 318 °C
Monitoring equipment	Equipment: temperature gauge. Type: Electronic Range: 0 to 500 DEG. C Calibration details: Pl. refer to appendix 1. Results: under the specified limits
QA/QC procedures to be applied	The data is recorded by the supervisor every hour and it is verified by the plant manager. Temperature gauge is calibrated by external accredited agencies.
Purpose of the data	Calculation of baseline emissions
Calculation method	-
Comments	Data will be kept for crediting period + 2 years.

Data / Parameter	$P_{\text{steam, HP,I}}$
Data unit	Kg/cm ²
Description	Pressure of the steam used in the process at high pressure (after conjunction point of direct and bleed steam) (at high pressure side)
Source of data	On-site measurement from Pressure gauge.
Description of measurement methods and procedures to be applied	Monitoring: Pressure gauge Data type: Measured Range: 0 to 60.00 KG/CM ² Archiving policy: Paper.

	Recording Frequency: hourly Responsibility: Manager (power plant) would be responsible for regular calibration of the gauge. Calibration Frequency: once in a three year.
Frequency of monitoring/recording	Hourly
Value monitored	Project I: 17 Kg/cm ²
Monitoring equipment	Equipment: Pressure gauge. Type: Electronic Range: 0 to 60.00 KG/CM ² Calibration details: PI. refer to appendix 1. Results: under the specified limits.
QA/QC procedures to be applied	The data is recorded by the supervisor every hour and it is verified by the plant manager. Pressure gauge is calibrated by external accredited agencies.
Purpose of the data	Calculation of baseline emissions
Calculation method	-
Comments	Data will be kept for crediting period + 2 years.

Data / Parameter	$Q_{\text{steam,HP,II}}$
Data unit	Tones
Description	Quantity of steam used in the process at high pressure side.
Source of data	On-site measurement from Steam flow meter.
Description of measurement methods and procedures to be applied	Reading is directly taken from steam flow meter by boiler supervisor on hourly basis. Monitoring: steam flow meter at plant. Data type: Measured. Range: 0 to 7.50 TPH Archiving policy: Paper. Recording Frequency: hourly Responsibility: Manager (power plant) would be responsible for regular calibration of the meter. Calibration Frequency: once in a three year.
Frequency of monitoring/recording	Hourly
Value monitored	Project II: 35,086.80 (cumulative value for the monitoring period)
Monitoring equipment	Equipment: Steam flow meter. Type: Electronic Range: 0 to 7.50 TPH Calibration details: PI. refer to appendix 1. Results: under the specified limits

QA/QC procedures to be applied	The data is recorded by the supervisor every hour and it is verified by the plant manager. Steam flow meter is calibrated by external accredited agencies.
Purpose of the data	Calculation of baseline emissions
Calculation method	-
Comments	Data will be kept for crediting period + 2 years.

Data / Parameter	$T_{\text{steam,HP,II}}$
Data unit	Degree Celsius
Description	Temperature of the steam used in the process at high pressure (at high pressure side).
Source of data	On-site measurement from temperature gauge installed at steam outlet from boiler.
Description of measurement methods and procedures to be applied	Monitoring: temperature gauge Data type: Measured Range: 0 to 500 DEG. C Archiving policy: Paper. Recording Frequency: hourly Responsibility: Manager (power plant) is responsible for regular calibration of the meter. Calibration Frequency: once in a three year
Frequency of monitoring/recording	Hourly
Value monitored	Project II: 375°C
Monitoring equipment	Equipment: Temperature gauge. Type: Electronic Range: 0 to 500 DEG. C Calibration details: Pl. refer to appendix 1. Results: under the specified limits.
QA/QC procedures to be applied	The data is recorded by the supervisor every hour and it is verified by the plant manager. Temperature gauge is calibrated by external accredited agencies.
Purpose of the data	Calculation of baseline emissions
Calculation method	-
Comments	Data will be kept for crediting period + 2 years.

Data / Parameter	$P_{\text{steam,HP,II}}$
Data unit	Kg/cm ²
Description	Pressure of the steam used in the process at high pressure (at high pressure side).
Source of data	On-site measurement from pressure gauge.

Description of measurement methods and procedures to be applied	Monitoring: pressure gauge Data type: Measured Range: 0 to 70 KG/CM ² Archiving policy: Paper. Recording Frequency: hourly Responsibility: Manager (power plant) is responsible for regular calibration of the meter. Calibration Frequency: once in a three year.
Frequency of monitoring/recording	Hourly
Value monitored	Project II: 30 Kg/cm ²
Monitoring equipment	Equipment: Pressure gauge. Type: Electronic Range: 0 to 70 KG/CM ² Calibration Details: Pl. refer to appendix 1. Results: under the specified limits.
QA/QC procedures to be applied	The data is recorded by the supervisor every hour and it is verified by the plant manager. Pressure gauge is calibrated by external accredited agencies.
Purpose of the data	Calculation of baseline emissions
Calculation method	-
Comments	Data will be kept for crediting period + 2 years.

Data / Parameter	$Q_{\text{steam,LP}}$
Data unit	Tonnes
Description	Quantity of steam extracted from the turbine that is used in the process at low pressure (Exhaust Steam at the outlet of the turbine) (at Low pressure side)
Source of data	On-site measurement from steam flow meter.
Description of measurement methods and procedures to be applied	Monitoring: steam flow meter Data type: Measured Range: 0 to 7.50 TPH Archiving policy: Paper. Recording Frequency: hourly Responsibility: Manager (power plant) is responsible for regular calibration of the meter. Calibration Frequency: once in a three year.
Frequency of monitoring/recording	Hourly
Value monitored	Project I: 70,309.49 (cumulative value for the monitoring period) Project II: 99,993.60 (cumulative value for the monitoring period)
Monitoring equipment	Equipment: steam flow meter. Type: Electronic

	Range: 0 to 7.50 TPH Calibration details: Pl. refer to appendix 1. Results: under the specified limits.
QA/QC procedures to be applied	The data is recorded by the supervisor every hour and it is verified by the plant manager. Steam flow meter is calibrated by external accredited agency
Purpose of the data	Calculation of baseline emissions
Calculation method	-
Comments	Data will be kept for crediting period + 2 years.

Data / Parameter	$T_{\text{steam,LP}}$
Data unit	Degree Celsius
Description	Temperature of the steam extracted from the turbine that is used in the process (at low pressure side)
Source of data	On-site measurement from temperature gauge installed at steam outlet from boiler.
Description of measurement methods and procedures to be applied	Monitoring: Temperature gauge. Data type: Measured Range: 0 to 400 DEG. C Archiving policy: Paper. Recording Frequency: hourly Responsibility: Manager (power plant) is responsible for regular calibration of the meter. Calibration Frequency: once in a three year.
Frequency of monitoring/recording	Hourly
Value monitored	Project I: 212 °C Project II: 250 °C
Monitoring equipment	Equipment: Temperature gauge. Type: Electronic Range: 0 to 400 DEG. C Calibration details: Pl. refer to appendix 1. Results: under the specified limits.
QA/QC procedures to be applied	The data is recorded by the supervisor every hour and it is verified by the plant manager. Temperature gauge is calibrated by external accredited agencies.
Purpose of the data	Calculation of baseline emissions
Calculation method	-
Comments	Data will be kept for crediting period + 2 years.

Data / Parameter	$P_{\text{steam,LP}}$
Data unit	Kg/cm ²

Description	Pressure of the steam extracted from the turbine that is used in the process (at low pressure side)
Source of data	On-site measurement from Pressure gauge.
Description of measurement methods and procedures to be applied	Monitoring: Pressure gauge. Data type: Measured Range: 0 to 10 KG/CM ² Archiving policy: Paper. Recording Frequency: hourly Responsibility: Manager (power plant) is responsible for regular calibration of the meter. Calibration Frequency: once in a three year.
Frequency of monitoring/recording	Hourly
Value monitored	Project I: 3.61 Kg/cm ² Project II: 3.79 Kg/cm ²
Monitoring equipment	Equipment: Pressure gauge. Type: Electronic Range: 0 to 10 KG/CM ² Calibration details: Pl. refer to appendix 1. Results: under the specified limits.
QA/QC procedures to be applied	The data is recorded by the supervisor every hour and it is verified by the plant manager. Pressure gauges is calibrated by external accredited agencies.
Purpose of the data	Calculation of baseline emissions
Calculation method	-
Comments	Data will be kept for crediting period + 2 years.

Data / Parameter	T _{FW}
Data unit	Degree Celsius
Description	Temperature of the feed water in the boiler.
Source of data	On-site measurement from temperature gauge installed at feed water inlet.
Description of measurement methods and procedures to be applied	Monitoring: temperature gauge Data type: Measured Range: 0 to 1200 DEG.C Archiving policy: Paper. Recording Frequency: hourly Responsibility: Manager (power plant) is responsible for regular calibration of the meter. Calibration Frequency: once in a three year
Frequency of monitoring/recording	Hourly
Value monitored	Project I: 100 °C

	Project II: 98 °C
Monitoring equipment	Equipment: Temperature gauge. Type: Electronic Range: 0 to 1200 DEG.C Calibration details: Pl. refer to appendix 1. Results: under the specified limits.
QA/QC procedures to be applied	The data is recorded by the supervisor every hour and it is verified by the plant manager. Temperature gauge is calibrated by external accredited agencies.
Purpose of the data	Calculation of baseline emissions
Calculation method	-
Comments	Data will be kept for crediting period + 2 years.

Data / Parameter	$Q_{biomass, i, y}$
Data unit	Tones
Description	Quantity of rice husk consumed annually
Source of data	On-site measurement.
Description of measurement methods and procedures to be applied	Monitoring: weigh bridge Data type: measured Range: 0 to 40 TON Archiving policy: Paper Recording Frequency: Daily Responsibility: Manager (power plant) is responsible for regular calibration of the meter. Calibration Frequency: once in a three year.
Frequency of monitoring/recording	Daily
Value monitored	Pl. Refer to Appendix - 2
Monitoring equipment	Equipment: Weigh bridge. Type: Electronic Range: 0 to 40 TON Calibrations details of weighbridge: Pl. refer to appendix 1. Results: under the specified limits.
QA/QC procedures to be applied	The data is recorded by the supervisor daily and it is verified by the plant manager by cross checking it with the invoices raised by biomass (rice husk) suppliers. Weigh scale is calibrated by external accredited agencies.
Purpose of the data	Cross-check of energy balance
Calculation method	-
Comments	Data will be kept for crediting period + 2 years.

Data / Parameter	NCV _{biomass}			
Data unit	Kcal/kg			
Description	Net Calorific Value of biomass residue (rice husk)			
Source of data	Third party (lab test of biomass)			
Description of measurement methods and procedures to be applied	Monitoring: Net calorific value of biomass was checked through Govt. approved independent laboratory. Data type: Estimated Archiving policy: Paper. Recording Frequency: Once in a year. Responsibility: Manager (power plant) is responsible for regular calibration of the meter			
Frequency of monitoring/recording	Annually			
Value monitored	Project-I		Project-II	
	Date	Value	Date	Value
	21-03-2022	2988	13-04-2022	2968
	12-01-2023	3011	15-02-2023	2974
Monitoring equipment	Third party lab test reports			
QA/QC procedures to be applied	The net calorific value of the biomass is obtained from the external Govt. approved independent laboratory			
Purpose of the data	Cross-check of energy balance			
Calculation method	-			
Comments	Data will be kept for crediting period + 2 years.			

4.3 Monitoring Plan

For above stated parameters for which monitoring and measurements apply, Supervisors take measurements and records are made.

Management of Milk food Limited ensures that appropriate equipments required for the measurement are provided.

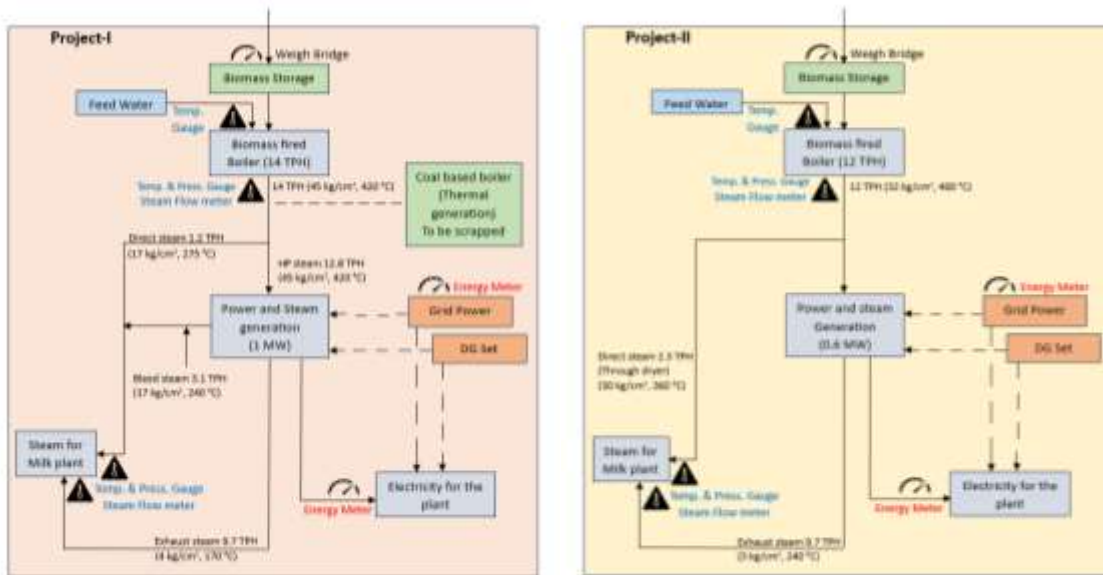
These measuring instruments viz., weigh bridge, thermos gauges, pressure gauges and energy meters are calibrated from third party instrumentation labs once in a three year, and records of it are maintained.

All the monitoring equipments required for the calculation of emission reductions have been installed after procedural check; therefore, there is less possibility of defects. However, all these equipments are daily inspected by the concerned operator while taking the reading. In case of any irregular reading or unexpected reading the shift in charge is informed for further check and calibration of the equipments. Moreover, all the monitoring equipments were well calibrated.

Monthly report of the cogeneration plant performance parameters were submitted to the top management for review and regular internal audits were conducted by the top management in every three months. No, ambiguities/NC was detected during the internal audits.

Monitoring Data are achieved properly. Plant records such as log books, purchase receipts, calibration certificates of measuring devices, and public data such as IPCC and CEA are maintained systematically during the 1st monitoring period and same will be kept for the retention period specified.

The single line diagram for the data collection and management system is given below:



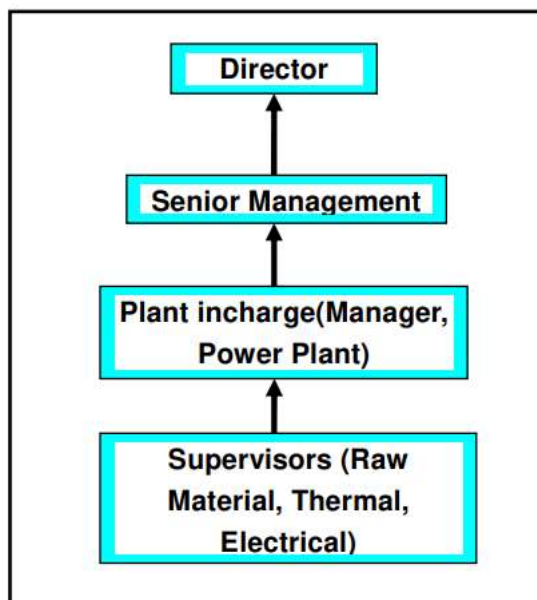
Single line diagram for Project-I & Project-II

Operational & Management Structure-

The project proponent has practiced the monitoring as per the designed measurement & verification plan and ensures the proper, regular measurement and recording of the data pertaining to the GHG emission reduction.

For carrying out the task of monitoring, the responsibilities were lined with a monitoring team consisting of supervisors (raw material, thermal and electrical). Hourly and daily recording of all monitoring parameters were done by supervisors. Daily plant records were properly reviewed by plant in-charge.

Monthly consolidated reports and periodical internal review reports were made available to the top management. An organogram regarding the hierarchy of monitoring and QA/QC is given below:



All monitoring personnel undergo comprehensive initial training on equipment operation, data collection, and adherence to the monitoring plan. Regular refresher sessions and specialized training for any replaced new equipment are provided to ensure accurate data collection. Emergency response drills are also conducted periodically, emphasizing specific roles and responsibilities during unexpected situations. These measures ensure that monitoring staff stay informed and well-prepared to handle various monitoring scenarios.

In the event of irregular or unexpected readings, the concerned operator immediately notifies the plant in-charge for investigation, with recalibration initiated if necessary. A clear protocol addresses equipment failures, outlining temporary measures and prompt reporting to management. Communication hierarchies are established for emergencies, ensuring a swift reporting chain. Periodic emergency review meetings analyze past events, fostering continuous improvement.

It is important to note that during these kinds of events when equipment's are not working properly or irregular reading or unexpected reading are found, the plant operation does not affect and runs continuously however readings are not recorded for that period which results in a conservative ER. However, in the current monitoring period such incidents had not taken place.

Detailed documentation of emergency events is maintained, and lessons learned are shared during training sessions for ongoing refinement of emergency response plans.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

Project I:

A. Baseline Emission

1. Baseline emissions for supply of electricity to and / or displacement electricity from a grid shall be calculated as per the procedures detailed in AMS-I.D version 18.

As per the Para 22 of the AMS-I.D. version 18 and section 4.1 of validated VCS PD:

The combined margin emission factor is taken from the CEA data base and user guide version 15 (A publicly available official source), which provides CM equal to 0.94193 t CO₂e/MWh.

$$\begin{aligned}\text{Baseline emission (t CO}_2\text{)} &= \text{Net Electricity generated (MWh)} \times 0.94193 \text{ (t CO}_2\text{e/MWh).} \\ &= 5,669.46 \times 0.94193 \\ &= 5,340.24 \text{ t CO}_2\text{e}\end{aligned}$$

2. For steam/ heat produced using fossil fuels the baseline emissions are calculated as follows:

As per the Para 34 of the AMS.I.C version 21.0 and section 4.1 of validated VCS PD:

The baseline emissions are calculated as follows:

$$\begin{aligned}\text{BE}_{\text{thermal, CO}_2, y} &= [(\text{EG}_{\text{thermal, y}} / \eta_{\text{BL, thermal}}) * \text{EF}_{\text{EF, CO}_2}] \text{ HP} + [(\text{EG}_{\text{thermal, y}} / \eta_{\text{BL, thermal}}) * \text{EF}_{\text{EF, CO}_2}] \text{ LP} \\ &= [(221.48 / 0.82) \times 94.6] + [(173.59 / 0.82) \times 94.6] \\ &= 45,577.67 \text{ t CO}_2\text{e}\end{aligned}$$

The detailed calculation has been provided in the Excel Sheet. Thermal energy is calculated as a product of Quantity of steam produced and Enthalpy (as a function of steam temperature and pressure). The enthalpy of steam used in the calculations for thermal energy has been derived from the steam tab application³. The enthalpy of feed water has been deducted from the enthalpy of steam to arrive at the thermal energy generated.

“Since the project activity displaces both grid power and steam from coal fired boiler, the baseline is summation of both 1 and 2.”

$$\begin{aligned}\text{Total Baseline Emission} &= 5,340.24 + 45,577.67 \\ &= 50,917 \text{ t CO}_2\text{e (Round down)}\end{aligned}$$

Project II:

A. Baseline Emission

1. Baseline emissions for supply of electricity to and / or displacement electricity from a grid shall be calculated as per the procedures detailed in AMS I.D version 18.

As per the Para 23 of the AMS.I. D version 18 and section 4.1 of validated VCS PD:

$$\begin{aligned}\text{Baseline emission (t CO}_2\text{)} &= \text{Net Electricity generated (MWh)} \times 0.94193 \text{ (tCO}_2\text{e/MWh)} \\ &= 5,382.04 \times 0.94193\end{aligned}$$

³ Download SteamTab Companion (chemicallogic.com)

$$= 5,069.50 \text{ t CO}_2\text{e}$$

2. For steam/ heat produced using fossil fuels the baseline emissions are calculated as follows:

As per the Para 34 of the AMS.I.C version 21 and section 4.1 of validated VCS PD:

The baseline emissions are calculated as follows:

$$\begin{aligned} BE_{\text{thermal, CO}_2, y} &= [(EG_{\text{thermal, y}} / \eta_{\text{BL, thermal}}) * EF_{\text{EF, CO}_2}] \text{ HP} + [(EG_{\text{thermal, y}} / \eta_{\text{BL, thermal}}) * EF_{\text{EF, CO}_2}] \text{ LP} \\ &= [(97.01 / 0.82) \times 94.6] + [(255.45 / 0.82) \times 94.6] \\ &= 40,661.75 \text{ t CO}_2\text{e} \end{aligned}$$

The detailed calculation has been provided in the Excel Sheet.

“Since the project activity displaces both grid power and steam from coal fired boiler, the baseline is summation of both 1 and 2.”

$$\begin{aligned} \text{Total Baseline Emission} &= 5,069.50 + 40,661.75 \\ &= 45,731 \text{ t CO}_2\text{e (Round down)} \end{aligned}$$

$$\begin{aligned} \text{Final Baseline Emissions} &= 50,917 + 45,731 \\ &= 96,648 \text{ t CO}_2\text{e (Round down value)} \end{aligned}$$

5.2 Project Emissions

During the current monitoring period, project emission from diesel used in DG sets, has been calculated based on para 67 of AMS.I.C, version 21 “CO₂ emissions from on-site combustion of fossil fuels (PE_{FF, y}) shall be calculated using the latest version of the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion”.

As per Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion version 3 para 6 “CO₂ emissions from diesel combustion in process are calculated based on the quantity of diesel combusted and the CO₂ emission coefficient of those fuels, as follows:

The diesel consumption details are mentioned in appendix 2 for the current monitoring period.

Project I:

$$\begin{aligned} \text{Project Emission} &= \text{Total diesel consumption} \times \text{NCV of Diesel} \times \text{Emission factor of Diesel} \\ &= 13.40 \times 43.39 \times 0.0748 \\ &= 44 \text{ t CO}_2\text{e (Round up)} \end{aligned}$$

The detailed calculation has been provided in the Excel Sheet.

Project II:

$$\begin{aligned} \text{Project Emission} &= \text{Total diesel consumption} \times \text{NCV of Diesel} \times \text{Emission factor of Diesel} \\ &= 28.82 \times 43.39 \times 0.0748 \\ &= 94 \text{ t CO}_2\text{e (Round Up)} \end{aligned}$$

The detailed calculation has been provided in the Excel Sheet.

$$\begin{aligned}\text{Total Project Emission} &= 44 + 94 \\ &= 138 \text{ t CO}_2\text{e (Round Up Value)}\end{aligned}$$

5.3 Leakage

As per section 4.3 of VCS PD, project proponents confirm that the renewable energy technology is not equipment transferred from another activity. Hence, no leakage calculation is required.

Also, as mentioned in the approved PD “as per Para 78 of AMS I C version 21, the leakage has to be considered if the biomass residue is transported over a distance of more than 200 Km due to the implementation of the project activity otherwise it can be neglected.”

The project activity is procuring and utilizing biomass available within the 40 Km radius from Milkfood Limited. Hence, leakage has been considered as zero.

5.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
01-Jan-2022 to 31-Dec-2022	64,609	92	0	64,517
01-Jan-2023 to 30-Jun-2023	32,039	46	0	31,993
Total	96,648	138	0	96,510

The ex-ante GHG emissions reductions and removals and the achieved emission reductions and removals for this monitoring period is listed in the following table:

<u>Ex-ante emissions reductions/removals</u>	<u>Achieved emissions reductions/removals</u>	<u>Percent difference</u>	<u>Justification for the difference</u>
1,04,881	96,510	- 7.98	Boiler at project I has been non-operational for a period of 29 days and boiler at project II has also non-operational for a period of 32 days for the entire monitoring period i.e., from the 01-Jan-2022 to 30-Jun-2023. These are planned shutdowns for the purpose of maintenance.

APPENDIX 1: METER DETAILS

Project-I. Patiala Unit

S. N.	NAME	LOCATION	APPLICATION	ACCURACY CLASS OR RANGE OF EQUIPMENT	LEAST COUNT	SR. NO.	CALIB. DATE	VALID TILL
1.	DIGITAL ENERGY METER	STEAM TURBINE	MONITORING ENERGY PROD BY TURBINE	R T R	1 KWH	07 880005	08.05.2021, 07.05.2022, 06.05.2023	05.05.2024
2.	DIGITAL FLOW INDICATOR AND TOTALISER	MAIN STEAM LINE	MAIN STEAM FLOW INDICATOR AND TOTALISER	Range: 0 to 18 Ton	0.01 %	N/A	25.03.2021, 24.03.2022, 23.03.2023	22.03.2024
3.	FLOW TRANSMITTER	MAIN STEAM LINE	MAIN STEAM FLOW TRANSMITTER	Range: 0 to 7500 MM H ₂ O	0.1 MMH ₂ O	0237802	06.02.2021	05.02.2024
4.	DIGITAL PRESSURE INDICATOR	MAIN STEAM LINE	SUPER HEATER HEADER PRESSURE	Range: 0 to 60.00 KG/CM ²	0.5 KG/CM ²	DP1 50KA	27.03.2021, 26.03.2022, 25.03.2023	24.03.2024
5.	PRESSURE TRANSMITTER	MAIN STEAM LINE	MAIN STEAM PRESSURE TRANSMITTER	Range: 0 to 80 bar	0.1 BAR	08D0011	06.02.2021	05.02.2024
6.	DIGITAL PID CONTROLLER	MAIN STEAM LINE	MAIN STEAM TEMPRATURE MEASURING	Range: 0 to 600°C	5°C	T1P521531	06.06.2021, 04.06.2022, 29.05.2023	28.05.2024
7.	DIGITAL FLOW INDICATOR AND TOTALISER	BLEED STEAM LINE	BLEED STEAM FLOW INDICATOR AND TOTALISER	Range: 0 to 7.50 TON	0.01 TPH	FTX55PL	08.05.2021, 07.05.2022, 06.05.2023	05.05.2024

8.	FLOW TRANSMITTER	BLEED STEAM LINE	BLEED STEAM FLOW TRANSMITTER	Range: 0 to 10000 MMH ₂ O	0.1 MMH ₂ O	91M728060	06.02.2021	05.02.2024
9.	DIGITAL PID CONTROLLER	BLEED STEAM LINE	BLEED STEAM PRESSURE MEASURING	Range: 0 to 60.00 KG/CM ²	0.01 KG/CM ²	04B0078	27.03.2021, 26.03.2022, 25.03.2023	24.03.2024
10.	PRESSURE TRANSMITTER	BLEED STEAM LINE	BLEED STEAM PRESSURE	Range: 0 to 60 bar	0.1 BAR	0249655	06.02.2021	05.02.2024
11.	DIGITAL PID CONTROLLER	BLEED STEAM LINE	BLEED STEAM TEMPRATURE MEASURING	Range: 0 to 500°C	5°C	06D0023	27.03.2021, 26.03.2022, 25.03.2023	24.03.2024
12.	DIGITAL FLOW INDICATOR AND TOTALISER	EXHAUST STEAM LINE	EXHAUST STEAM FLOW INDICATOR AND TOTALISER	Range: 0 to 7.50 TPH	0.01 TPH	0612221	01.04.2021, 31.03.2022, 30.03.2023	29.03.2024
13.	FLOW TRANSMITTER	EXHAUST STEAM LINE	EXHASUT STEAM FLOW TRANSMITTER	Range: 0 to 3800 MMH ₂ O	0.1 MMH ₂ O	00271118 09/06	06.02.2021	05.02.2024
14.	DIGITAL PID CONTROLLER	EXHAUST STEAM LINE	EXHAUST STEAM PRESSURE	Range: 0 to 10 KG/CM ²	0.01 KG/CM ²	05L0012	23.01.2021, 22.01.2022, 21.01.2023	20.01.2024
15.	PRESSURE TRANSMITTER	EXHAUST STEAM LINE	EXHAUST STEAM PRESSURE	Range: 0 to 8 KG/CM ²	0.1 KG/CM ²	06G0098	06.02.2021	05.02.2024
16.	TEMPERATURE GAUGE 4 INCH	EXHAUST STEAM LINE	EXHAUST TEMPERATURE MEASURING	Range: 0 to 400°C	1°C	06-0093/14	27.03.2021, 26.03.2022, 25.03.2023	24.03.2024
17.	PRESSURE GAUGE	EXHAUST STEAM LINE	EXHAUST PRESSURE MEASURING	Range: 0 to 10 KG/CM ²	0.1 KG/CM ²	06-0093/06	06.03.2021, 05.03.2022, 04.03.2023	03.03.2024

18.	DIGITAL TEMP. INDICATOR	STEAM BOILER	FEED WATER TEMPRATURE INDICATION	Range: 0 to 1200°C	1°C	03122	01.04.2021, 31.03.2022, 30.03.2023	29.03.2024
19.	DIGITAL WEIGHING INDICATOR	WEIGH BRIDGE	MATERIAL WEIGHING INDICATION	Range: 0 to 40 TON	5 KG	14W800381	15.12.2021, 09.12.2022	08.12.2023

Project-II. Moradabad Unit

S. N.	NAME	LOCATION	APPLICATION	ACCURACY CLASS OR RANGE OF EQUIPMENT	LEAST COUNT	SR. NO.	CALIB. DATE	VALID TILL
1.	DIGITAL ENERGY METER	STEAM TURBINE	MONITORING ENERGY PROD BY TURBINE	R T R	1 KWH	104707/227-3706	18.11.2021, 07.09.2022	06.09.2023
2.	TEMPERATURE GAUGE 4 INCH	STEAM TURBINE	INLET STEAM TEMPERATURE MEASURING	Range: 0 to 600°C	5°C	GG17020270	18.11.2021, 07.09.2022	06.09.2023
3.	DIGITAL FLOW INDICATOR AND TOTALISER	MAIN STEAM LINE	MAIN STEAM FLOW INDICATOR AND TOTALISER	Range: 0 to 18 Ton	0.01 %	AL1380115	18.11.2021, 07.09.2022	06.09.2023
4.	PRESSURE GAUGE 12 INCH	MAIN STEAM LINE	MAIN LINE STEAM PRESSURE MEASURING	Range: 0 to 70.00 KG/CM ²	0.5 KG/CM ²	424-P5-07	18.11.2021, 07.09.2022	06.09.2023
5.	TEMPERATURE GAUGE 6 INCH	MAIN STEAM LINE	MAIN LINE STEAM TEMPRATURE MEASURING	Range: 0 to 600°C	5°C	150113660003	18.11.2021, 07.09.2022	06.09.2023

6.	PRESSURE/FLOW TRANSMITTER	MAIN STEAM LINE	MAIN STEAM FLOW TRANSMITTER	Range: 0 to 10000 MM H ₂ O	0.1 MMH ₂ O	06027897	18.11.2021, 07.09.2022	06.09.2023
7.	DIGITAL FLOW INDICATOR AND TOTALISER	EXHAUST STEAM LINE	EXHAUST STEAM FLOW INDICATOR AND TOTALISER	Range: 0 to 6.0 TPH	0.01 TPH	J0129-03	18.11.2021, 07.09.2022	06.09.2023
8.	FLOW TRANSMITTER	BLEED STEAM LINE	BLEED STEAM FLOW TRANSMITTER	Range: 0 to 10000 MMH ₂ O	0.1 MMH ₂ O	91H749346	18.11.2021, 07.09.2022	06.09.2023
9.	PRESSURE GAUGE 12 INCH	EXHAUST STEAM LINE	EXHAUST STEAM PRESSURE MEASURING	Range: 0 to 70.00 KG/CM ²	0.5 KG/CM ²	424-P5-05	18.11.2021, 07.09.2022	06.09.2023
10.	DIGITAL FLOW INDICATOR AND TOTALISER	EXHAUST STEAM LINE	EXHAUST STEAM FLOW INDICATOR AND TOTALISER	Range: 0 to 12 TPH	0.1 TPH	J0129-04	18.11.2021, 07.09.2022	06.09.2023
11.	FLOW TRANSMITTER	EXHAUST STEAM LINE	EXHASUT STEAM FLOW TRANSMITTER	Range: 0 to 2500 MMH ₂ O	N/A	91H749345	18.11.2021, 07.09.2022	06.09.2023
12.	TEMPERATURE GAUGE 4 INCH	EXHAUST STEAM LINE	EXHAUST TEMPERATURE MEASURING	Range: 0 to 500°C	5°C	91218274	18.11.2021, 07.09.2022	06.09.2023
13.	PRESSURE GAUGE 4 INCH	EXHAUST STEAM LINE	EXHAUST PRESSURE MEASURING	Range: 0 to 10 KG/CM ²	0.1 KG/CM ²	5034273	18.11.2021, 07.09.2022	06.09.2023
14.	DIGITAL TEMP. INDICATOR	STEAM BOILER	FEED WATER TEMPRATURE INDICATION	Range: 0 to 1200°C	1°C	1070043	18.11.2021, 07.09.2022	06.09.2023

15.	DIGITAL WEIGHING INDICATOR	WEIGH BRIDGE	MATERIAL WEIGHING INDICATION	Range: 0 to 40 TON	5 KG	17ES00282	26.05.2022, 26.05.2023	26.06.2024
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APPENDIX 2: FUEL DETAILS

Month	DIESEL CONSUMPTION				BIOMASS	
	Patiala		Moradabad		Patiala	Moradabad
	D.G. Sets Working Hrs	Diesel Consumption	D.G. Sets Working Hrs	Diesel Consumption	Q _{biomass}	Q _{biomass}
Jan-2022	20	1510	65	4850	2769	2340
Feb-2022	3.5	260	42	3150	2603	2124
Mar-2022	6.5	485	7.5	560	2775	2469
Apr-2022	10	740	1	74	2672	2424
May-2022	3.25	245	3	235	2755	2418
Jun-2022	3.75	280	2	145	1392	2375
Jul-2022	26.5	2080	5.5	410	2764	1493
Aug-2022	6.5	490	5	355	2757	2053
Sep-2022	8	630	2	150	2754	2348
Oct-2022	3.5	265	5.5	415	2767	2419
Nov-2022	7.5	560	21.75	1635	2733	2344
Dec-2022	29	2175	32	2410	2755	2406
Jan-2023	16	1200	57	4255	2754	2407
Feb-2023	7	525	13	975	2611	2221
Mar-2023	10	740	88	6600	2761	2428
Apr-2023	2	150	25	1910	2680	2334
May-2023	8.75	655	4	315	2763	2401
Jun-2023	5.5	410	5	375	1353	1149
Total	177.25	13,400	384.25	28,819	46,418	40,153