PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title	:	Biomass based thermal energy generation project by M/S Ginni International Ltd
Version	:	2.0
PCN Date	:	13/04/2023
CoU Issuance Period	:	09 Years and 00 Months
Monitoring Duration	:	01/01/2013 to 31/12/2021

Project Concept Note (PCN)

CARBON OFFSET UNIT (CoU) PROJECT

BASIC INFORMATION	
Title of the project activity	Biomass based thermal energy generation project by M/S Ginni International Ltd.
Scale of the project activity	Small Scale
Completion date of the PCN	13/04/2023
Project participants	Creduce Technologies Private Limited (Project Aggregator) M/S Ginni International Ltd. (Project Owner)
Host Party	India
Applied methodologies and standardized baselines	Applied Baseline Methodology: AMS-I.C: "Thermal energy production with or without electricity", Version 22
Sectoral scopes	01 Energy industries (Renewable/Non-Renewable Sources)
Estimated amount of total GHG emission reductions	To be estimated during monitoring [An ex-ante estimate is 32142 CoUs per year]

SECTION A. Description of project activity

A.1 General description of Carbon offset Unit (CoU) project activity

Ginni International Ltd. (GIL) is a public limited company engaged in the production of high-quality textile products. It is located at Neemrana, Dist. Alwar, Rajasthan. To meet the thermal load, it operates 3 boilers and a thermic fluid heater as mentioned below.

Table-1- Boiler Specification

Boiler Type	**Travelling grate**	**Fluidized bed combustion**	**Manual fired-water tube**
Rated Capacity (TPH)	13	8	4
Steam Temperature (°C)	186	186	186
Rated Steam Pressure (kg/cm^2)	10.5	10.5	10.5
Feed Water Temperature (°C)	89	89	89
Feedstock	Mustard husk, Rice husk, Groundnut shell	Mustard husk, Rice husk, Groundnut shell	Mustard straw briquettes
Annual running hour	6430	3270	456
Commissioning date	31/03/2016	08/08/2007	14/07/2014
Boiler Tag	RJ-2297	RJ-1364	RJ-888

Table-2- Thermic fluid heater Specification

Thermic Fluid Heater	
Rated capacity (lacs kCal/hr)	15
Thermic fluid	Shell Heat Transfer Oil 52
Thermic fluid inlet temperature (°C)	223
Thermic fluid outlet temperature (°C)	240
Annual running hour	5466
Feedstock	Mustard Husk and Rice Husk
Commissioning date	31/03/2016

The date from which all the boilers and heaters were being put into service or successful operation are taken as the date of commissioning. The 4TPH and 8TPH are used as a standby boiler in place of 13 TPH when it goes for shutdown and/or routing maintenance.

As shown in the table above, the different agro-residues are used in place of fossil fuel in the boiler. The purpose of the project activity is to meet the thermal energy (steam) requirement & displace GHG emissions by utilizing biomass as fuel in the boilers and thermopack.

Figure-1- Photos of the project activity

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

A.2 Project's Contribution to Sustainable Development

India, being a predominately agrarian country, large amount of biomass is abundantly available throughout the country. A large portion of agro-residues are being burned in-efficiently in the fields, primarily to clear the fields from straw and stubble after the harvest of the preceding crops, saving cost and time of cleaning field. The practice of burning of straw in open fields is so common that it has now become an environmental threat as well as a health hazard. Several farmers choose to burn rice straw in

their fields each year. The emission statistics suggest a strong need for an alternate utilization of these biomass, that can reduce environmental impact due to burning of crop residue in open fields.

It is essential to note that the use of biomass is not limited only to woody biomass, but it also includes the other lignocelluloses material e.g., agro-residues and forest residues that are considered as waste, this includes rice husk, rice straw, wheat straw, sugarcane bagasse and etc.

As we are aware that Indian economy is highly dependent on "Coal" as fuel to generate energy. Thermal power plants are the major consumers of coal in India and yet the basic electricity needs of a large section of population are not being met. This results in excessive demands for electricity and places immense stress on the environment. This biomass, if effectively utilized, could generate electricity, reduce environmental burden from fossil fuels and can help to achieve sustainable living. In order to achieve these requirements, effective and efficient use of the biomass is the key.

- **With regards to ESG credentials:**

At present specific ESG credentials have not been evaluated, however, the project essentially contributes to various indicators which can be considered under ESG credentials. Some of the examples are as follows:

Under Environment:

The following environmental benefits are derived from the utilization of biomass in the boilers:

- Produces thermal energy without any net GHG emissions.
- Avoidance of emissions from open field burning of biomass which would have released CO, SO_x and NO_x.

Under Social:

The social well-being is assessed by contribution to improvement in living standards of the local community. The implementation of the project activity would provide job opportunities to the local community; contribute in poverty alleviation of the local community and development of basic amenities to community, leading to improvement in living standards of the community.

Under Governance:

Governance criteria relates to overall operational practices and accounting procedure of the organization. With respect to this project activity, the PP practices a good governance practice with transparency, accountability and adherence to local and national rules & regulations etc. This can be further referred from the company's annual report. The energy generated from the project can be accurately monitored, recorded and further verified under the existing management practice of the company. Thus, the project and the proponent ensure good credentials under ESG.

A.3 Do no harm or Impact test of the project activity

The project activity uses biomass in their boiler and biomass being the carbon neutral, the net GHG emission to the environment is zero. It has been envisaged that the project shall contribute to sustainable development using the following ways:

Social well-being: The project would help in generating direct and indirect employment benefits through sustainable harvesting rather than burning the residues on the field. It will lead to development

of supply chain network around the project area in terms of improved road connectivity, etc. and will also directly contribute to the development of renewable the region.

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

Technological well-being: The project activity will promote practice for small scale industries to reduce the dependence on coal to meet their energy requirement. The controlled combustion in the boiler ensures complete burning of the fuel and hence less emission. The pollution control mechanism/devices at boiler downstream like cyclone separators and wet scrubbers ensures the pollutants released into the atmosphere are within permissible limits as per the CPCB norms.

Environmental well-being: The project activity utilizes biomass which is carbon neutral and it will lead to net zero emission from the operation of boilers. Also, uses of renewable fuels will reduce the GHG emissions to the environment as compared to non-renewable fuels. The air pollution (particulate, SO_x, NO_x) arising due to coal firing would be reduced. It will contribute to emissions reduction. There is no SO_X formation since biomass has zero or negligible content of Sulphur in it. Thus, the project causes no negative impact on the surrounding environment contributing to environmental well-being.

A.4 Location of project activity

Country	:	India
State	:	Rajasthan
District	:	Alwar
Town	:	Neemrana
Co-ordinates	:	27°58'33.6"N 76°23'35.6"E

The representative location map is shown below

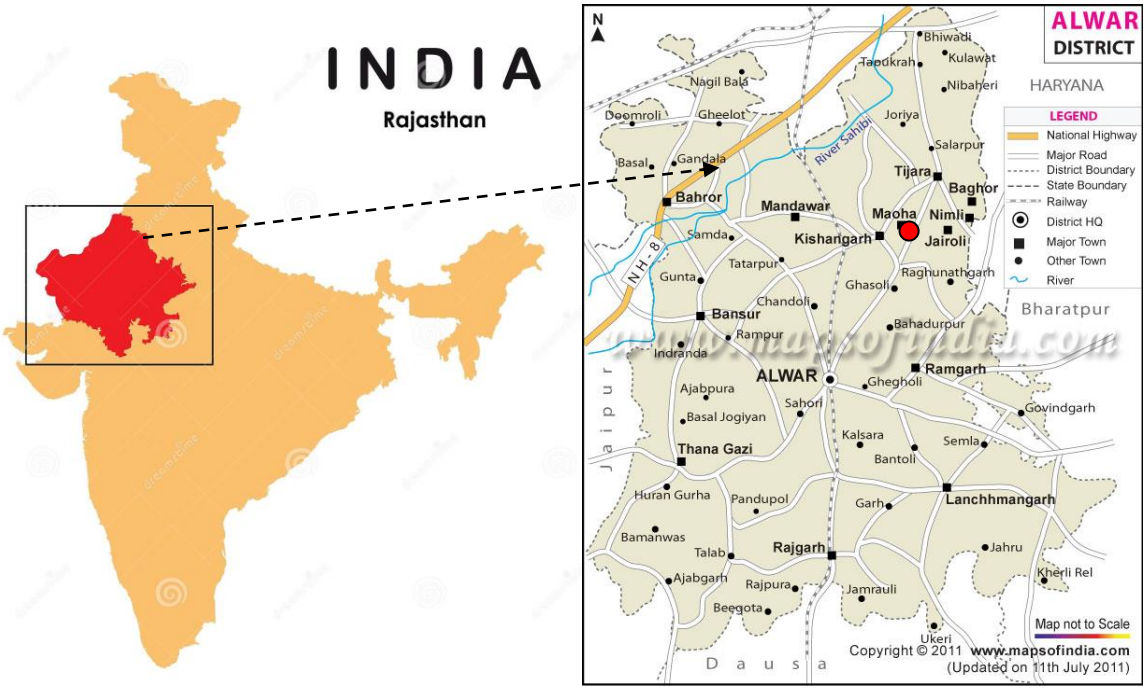


Figure-2- Location of the project activity (courtesy: google images and www.mapofindia.com)

A.5 Technologies/measures

The project activity utilizes the biomass fired boiler for steam generation. The process steam is utilized for the different textile process requirement. The biomass used is different agro-residues which otherwise would have been burned on the farm field. The solid particles at downstream is separated by cyclone separator. The flue gas is further passed through the wet scrubber to ensure that the minimum amount of pollutants are released into the environment. The detailed specifications are mentioned the table 1 and 2.

A.6 Parties and project participants

Party (Host)	Participants
India	**Creduce Technologies Private Limited (Aggregator)** **Contact person** : Shailendra Singh Rao **Mobile** : +91 9016850742, 9601378723 **Address** : 2-O-13,14 Housing Board Colony, Banswara, Rajasthan -327001, India **M/S Ginni International Ltd. (Project Owner)** Address: RIICO Industrial Area, Delhi Jaipur Highway NH 8 Neemrana, District-Alwar, Rajasthan-301705

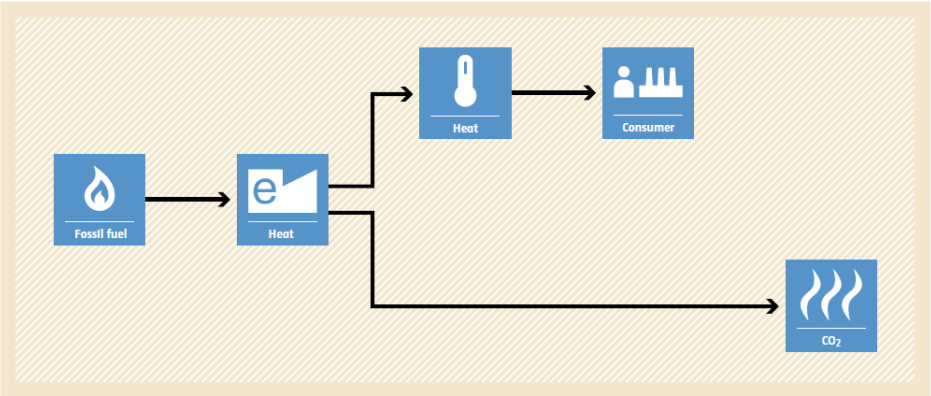
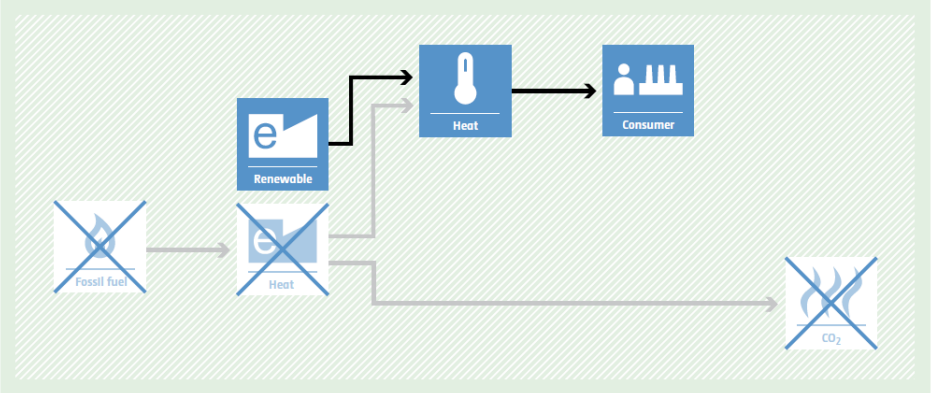
A.7 Baseline Emissions

Baseline Scenario:

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

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

Schematic diagram below shows the baseline scenario and project scenario:

BASELINE SCENARIO Energy generation (thermal heat and / or electricity) by more-carbon-intensive technologies based on fossil fuel. In case of retrofits or capacity addition, operation of existing renewable power units without retrofit and capacity addition.	
PROJECT SCENARIO Energy generation by installation of new renewable energy generation units, by retrofitting or replacement of existing renewable energy generation units as well as by switch from fossil fuel to biomass in modified existing facilities.	

A.8 De-bundling

This project activity is not a de-bundled component of a larger project activity.

SECTION B. Application of methodologies and standardized baselines

B.1 References to methodologies and standardized baselines

Sectoral scope	:	01, Energy industries (Renewable/Non-renewable sources)
Type	:	I-Renewable Energy Projects
Category	:	AMS-I.C. (Title: "Thermal energy production with or without electricity", Version 22)

B.2 Applicability of methodologies and standardized baselines

The project activity involves installation of biomass fired boiler with cumulative capacity of 25 TPH and a 15 lakh kCal/hr thermic fluid heater (thermopack) for the steam generation.

The project activity generates less than 45 $MW_{thermal}$ and it will qualify as small-scale project activity under Type-I of the Small-Scale methodology. The project status is corresponding to the methodology AMS-I.C., Version 22 and applicability of methodology is discussed below:

Applicability Criterion	Project Case
1. This methodology comprises renewable energy technologies that supply users i.e., residential, industrial or commercial facilities with thermal energy that displaces fossil fuel use. These units include technologies such as solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass and other technologies that provide thermal energy that displaces fossil fuel.	The project activity uses biomass fired boiler and thermopack for thermal energy generation.
2. Emission reductions from a biomass cogeneration or trigeneration system can accrue from one of the following activities: a) Electricity supply to a grid; b) Electricity and/or thermal energy production for on-site consumption or for consumption by other facilities; c) Combination of (a) and (b).	Not applicable as the plant is not cogeneration or tri-generation.
3. Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category.	The boilers and thermopack are biomass fired.

4. In the case of new facilities (Greenfield projects) and project activities involving capacity additions the relevant requirements related to determination of baseline scenario provided in the "General guidelines for SSC CDM methodologies" for Type-II and Type-III Greenfield/capacity expansion project activities also apply	Not applicable as the project is existing project activity.
5. The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW thermal (see paragraph 9 for the applicable limits for cogeneration and trigeneration project activities).	The installed capacity of the project activity is less than 45 MW thermal.
6. For co-fired systems, the total installed thermal energy generation capacity of the project equipment, when using both fossil and renewable fuel, shall not exceed 45 MW thermal (see paragraph 7 for the applicable limits for cogeneration project activities).	Not applicable. The system solely runs through the combustion of biomass and no other fossil fuels are used.

7. The following capacity limits apply for biomass cogeneration and trigeneration units: a) If the emission reductions of the project activity are on account of thermal and electrical energy production, the total installed thermal and electrical energy generation capacity of the project equipment shall not exceed 45 MW thermal. For the purpose of calculating the capacity limit the conversion factor of 1:3 shall be used for converting electrical energy to thermal energy (i.e., for renewable energy project activities, the installed capacity of 15 MW(e) is equivalent to 45 MW thermal output of the equipment or the plant); b) If the emission reductions of the project activity are solely on account of thermal energy production (i.e., no emission reductions accrue from the electricity component), the total installed thermal energy production capacity of the project equipment shall not exceed 45 MW thermal; c) If the emission reductions of the project activity are solely on account of electrical energy production (i.e., no emission reductions accrue from the thermal energy component), the total installed electrical energy generation capacity of the project equipment shall not exceed 15 MW.	The project activity is only thermal energy generation hence, this criterion is not applicable
8. If solid biomass fuel (e.g., briquette) is used, it shall be demonstrated that it has been produced using solely renewable biomass and all project or leakage emissions associated with its production shall be taken into account in the emissions reduction calculation.	In 4TPH boiler, biomass briquettes are used. During ex-post calculation its, project and leakage emissions will be considered as per the methodology.
9. Where the project participant is not the producer of the processed solid biomass fuel, the project participant and the producer are bound by a contract that shall enable the project participant to monitor the source of the renewable biomass to account for any emissions associated with solid biomass fuel production. Such a contract shall also ensure that there is no double-counting of emission reductions.	Not applicable as the generation of thermal energy is used for captive consumption.

10. If electricity and/or thermal energy produced by the project activity is delivered to a third party i.e another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered into that ensures there is no double-counting of emission reductions.	This criterion is not applicable as the generation of thermal energy is used for captive consumption.
11. If the project activity recovers and utilizes biogas for producing electricity and/or thermal energy and applies this methodology on a standalone basis i.e. without using a Type III component of a SSC methodology, any incremental emissions occurring due to the implementation of the project activity (e.g. physical leakage of the anaerobic digester, emissions due to inefficiency of the flaring), shall be taken into account either as project or leakage emissions as per relevant procedures in the tool "Emissions from solid waste disposal sites" and/or "Project emissions from flaring". In the event that the biomass fuel (solid/liquid/gas) is sourced from an existing CDM project, then the emissions associated with the production of the fuel shall be accounted with that project	No biogas involved in the entire project activity and hence this criterion is not applicable.
12. If project equipment contains refrigerants, then the refrigerant used in the project case shall have no ozone depleting potential (ODP).	Not applicable

13. Charcoal based biomass energy generation project activities are eligible to apply the methodology only if the charcoal is produced from renewable biomass sources, provided: a) Charcoal is produced in kilns equipped with methane recovery and destruction facility; or b) If charcoal is produced in kilns not equipped with a methane recovery and destruction facility, methane emissions from the production of charcoal shall be considered. These emissions shall be calculated as per the procedures defined in the approved methodology "AMS-III.K.: Avoidance of methane release from charcoal production by shifting from traditional open-ended methods to mechanized charcoaling process". Alternatively, conservative emission factor values from peer reviewed literature or from a registered CDM project activity can be used, provided that it can be demonstrated that the parameters from these are comparable e.g., source of biomass, characteristics of biomass such as moisture, carbon content, type of kiln, operating conditions such as ambient temperature.	Not applicable.
14. In the case the project activities utilize biomass, the "TOOL16: Project and leakage emissions from biomass" shall be applied to determine the relevant project emissions from the cultivation of biomass and the utilization of biomass or biomass residues.	Not applicable as the biomass used as fuel does not come from the dedicated plantation. The fuel fired is surplus agro-residues.

B.3 Applicability of double counting emission reductions

There is no double accounting of emission reductions in the project activity as the project is uniquely identifiable based on its location coordinates and it was not registered previously on other registry.

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

As per applicable methodology AMS-I.C. Version 22, the spatial extent of the project boundary encompasses:

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

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

c) Industrial, commercial or residential facility, or facilities, consuming energy generated by the system and the processes or equipment affected by the project activity;

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

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

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

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

As per the methodology, the project boundary is illustrated in the diagram given below.

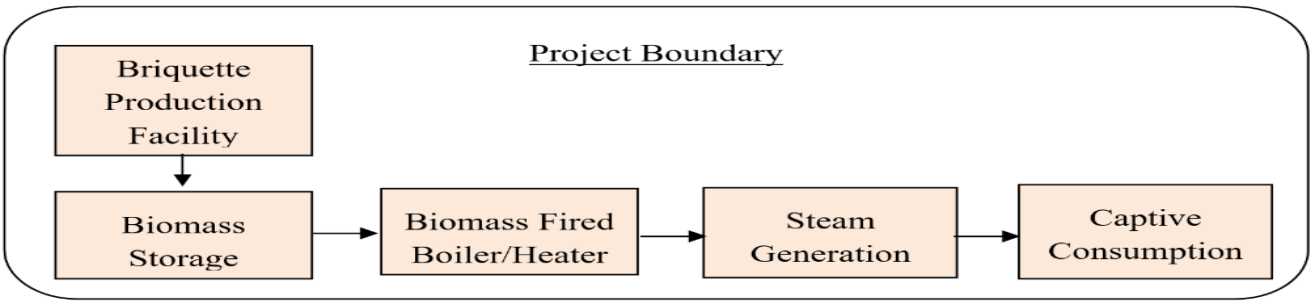


Table-3- Project and baseline emission

Source		Gas	Included?	Justification/Explanation
Baseline	Steam generation (thermal energy) from fossil fuel	**CO_2**	**Yes**	**CO_2 emissions as the steam requirement would have been met through the combustion of fossil fuel.**
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
		Other	No	No other GHG emissions were emitted from the project
Project	Briquette production	CO_2	Yes	CO_2 emission is included for the electricity consumption,
	On-site biomass consumption	CO_2	No	Does not apply to the project activity as there is no uncontrolled burning or decay of biomass residues that would lead to GHG emissions
		CH_4	No	
		N_2O	No	
		Other	No	
	On site fossil fuel and	CO_2	Yes	The emission due to the electricity consumption attributable to the project activity has been included in the project activity.

Source		Gas	Included?	Justification/Explanation
	electricity consumption due to the project activity	CH_4	No	Project activity does not emit CH_4
		N_2O	No	Project activity does not emit N_2O
		Other	No	No other emissions are emitted from the project
	Transportation of biomass	CO_2	No	Not included as transportation distance is within 200 km radius of the project activity.
		CH_4	No	Project activity does not emit CH_4
		N_2O	No	Project activity does not emit N_2O
		Other	No	No other emissions are emitted from the project
	Cultivation of biomass in a dedicated plantation	CO_2	No	Not applicable as the biomass is not sourced from the dedication plantation.
		CH_4	No	Project activity does not emit CH_4
		N_2O	No	Project activity does not emit N_2O
		Other	No	No other emissions are emitted from the project

B.5 Establishment and description of baseline scenario

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 for thermal energy production with or without electricity.

The project proponent has been using different biomass in order to meet the steam requirement of the project activity.

B.5.1 Baseline Emissions

a) Baseline emissions for heat production

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

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

Where:

$BE_{thermal,CO2,y}$ = Baseline emissions from thermal energy displaced by the project activity during the year y (t CO_2)

$EG_{thermal,y}$ = Net quantity of thermal energy supplied by the project activity during the year y (TJ)

$EF_{FF,CO2}$ = CO_2 emission factor of the fossil fuel that would have been used in the baseline plant obtained from reliable local or national data if available, alternatively, IPCC default emission factors can be used (t CO_2/TJ)

$\eta_{BL,thermal}$ = Efficiency of the plant using fossil fuel that would have been used in the absence of the project activity

Estimated annual baseline emission (BE) reductions $BE_{thermal,CO2,y}$

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

Boiler	Parameter					
TPH	Annual Running Hour	Enthaly in (kJ)	Enthalpy Out (kJ)	Annual Energy Generation (TJ)	EF (tCO_2/TJ)	Ex-ante tCO_2e/year
13	6430	2780.4	372.7	201.26	96.1	22754.2
8	3270	2780.4	372.7	62.985	96.1	7121.05
4	456	2780.4	372.7	4.391	96.1	496.51
Thermopack	5466	mCpΔT		15.665	96.1	1771.12
	Total BE reduction					32142

B.5.2 Project Emissions

Project emissions shall be calculated using the following equation:

$$PE_y = PE_{FF,y} + PE_{Ec,y} + PE_{Geo,y} + PE_{ref,y} + PE_{Biomass,y}$$

Where:

PE_y = Project emissions from the project activity during the year *y* (t CO_2)

$PE_{FF,y}$ = Project emissions from fossil fuel consumption during the year *y* (t CO_2)

$PE_{Ec,y}$ = Project emissions from electricity consumption during the year *y* (t CO_2)

$PE_{Geo,y}$ = Project emissions from a geothermal project activity in year *y* (t CO_2)

$PE_{ref,y}$ = Project emissions from use of refrigerant in project activity in year *y* (t CO_2)

$PE_{Biomass,y}$ = Project emissions associated with biomass and biomass residues in year *y* (t CO_2e)

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

a) Emissions from fuel combustion

Fossil fuels required for the operation of equipment related to the on-site or off-site preparation, storage, processing and transporting of fuels and biomass (e.g., for mechanical treatment of the biomass, conveyor belts, driers, pelletization, shredding, briquetting processes, etc.) shall be treated under

The project activity does not use fossil fuel. Thus, $PE_{EF,y} = 0$

b) Emissions from electricity consumption

Electricity required for the operation of equipment related to the on-site or off-site preparation, storage, processing and transportation of fuels and biomass (e.g. for mechanical treatment of the biomass, conveyor belts, driers, pelletization, shredding, briquetting processes, etc.) shall be treated under $PE_{cy.}$

As 4TPH boiler uses briquettes, its project emission will be estimated at the time of monitoring.

c) Emissions associated with biomass and biomass residues

Project emissions resulting from cultivation of biomass in a dedicated plantation in year y ($PE_{BC,y}$)

Project emissions resulting from transportation of biomass in year y ($PE_{BT,y}$)

Project emissions resulting from transportation of biomass residues in year y ($PE_{BRT,y}$)

Project emissions resulting from processing of biomass in year y ($PE_{BP,y}$)

Project emissions resulting from processing of biomass residues in year y ($PE_{BRP,y}$)

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

B.5.3 Leakage Emission

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

B.5.4 Emission reductions

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y = Emission reductions in year y (t CO_2e)

BE_y = Baseline emissions in year y (t CO_2e)

PE_y = Project emissions in year y (t CO_2)

LE_y = Leakage emissions in year y (t CO_2)

ER_y = 32142 – 0 – 0 = 32142

Thus, as per the ex-ante calculations the project will displace steam generation from coal consumption leading to an emission reduction of 32142 tCO_2e equivalent every year. In the absence of the proposed project activity, the steam demand would have been supplied to the processing plants by the coal-based boiler.

B.6 Prior History

The project activity is a small-scale thermal energy generation project without electricity and was not applied under any other GHG mechanism prior to this registration with UCR. Also, the project has not been applied for any other environmental crediting or certification mechanism. Hence project will not cause double accounting of carbon credits (i.e., CoUs).

B.7 Changes to start date of crediting period

The start date of crediting under UCR is 01/01/2013. Monitoring period number and duration

First Monitoring Period: 09 Years and 00 Months

01/01/2013 to 31/12/2021 (inclusive of both dates)

B.8 Monitoring plan

Data and Parameters available (ex-ante values):

Data / Parameter:	$EF_{FF,CO2}$
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	IPCC 2006, guidelines for national greenhouse gas inventories, table 2.3, page 18.
Value Applied	96.1
Measurement procedures (if any):	-
Monitoring frequency:	-
QA/QC procedure	-
Any comment:	For calculation of baseline emission

Data / Parameter:	Q_{steam}
Data unit:	Ton per annum
Description:	Quantity of steam
Source of data	Plant records
Measurement procedures (if any):	Steam flow meter (totalizer)
Monitoring frequency:	Daily
Value Applied:	1,11,574 (ex-ante)
QA/QC procedure	Calibration shall be as per the relevant paragraphs of "General guidelines for SSC CDM methodologies"
Any comment:	

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

Monitoring frequency:	Daily
Value Applied:	284.30 (ex-ante)
QA/QC procedure	Measurement results shall be cross checked with records for sold/purchased thermal energy (e.g. invoices/receipts)
Any comment:	Metering the energy produced by a sample of the systems where the simplified baseline is based on the energy produced multiplied by an emission coefficient

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

Data / Parameter:	**MC**
Data unit:	%
Description:	Moisture content of the biomass (wet basis)
Source of data	Plant records
Measurement procedures (if any):	Not required as the emission reduction is not calculated using the biomass energy input
Value applied	

Monitoring frequency:	
QA/QC procedure	-
Any comment:	-

Data / Parameter:	T_{wi}, T_{so}, T_{thi}, T_{tho}
Data unit:	°C
Description:	T_{wi} = Water inlet temperature T_{so} = Steam outlet temperature T_{thi} = Thermic fluid inlet temperature T_{tho} = Thermic fluid outlet temperature
Source of data	Plant records
Measurement procedures (if any):	Thermocouple
Value Applied	T_{wi} = *89*, T_{so} = 186, T_{thi} = 223, T_{tho} = 240
Monitoring frequency:	Continuous hourly monitoring
QA/QC procedure	Thermocouple calibration
Any comment:	-

Data / Parameter:	***P***
Data unit:	kg/cm^2
Description:	Pressure
Source of data	Plant records
Value applied	10.54
Measurement procedures (if any):	Measured using calibrated meters
Monitoring frequency:	Continuous monitoring
QA/QC procedure	Pressure gauge calibration
Any comment:	Actual monitoring will be considered from the log book records.

Data / Parameter:	***NCV***
Data unit:	MJ/kg
Description:	Net calorific value of biomass
Source of data	Plant records/ Lab-report
Measurement procedures (if any):	Third Party measurement in NABL accredited laboratory
Monitoring frequency:	With every batch of biomass received through transportation.

Value Applied:	-
QA/QC procedure	-
Any comment:	Not required as the thermal energy generation will be calculated from the output of the boiler,