MONITORING REPORT

CARBON OFFSET UNIT (CoU) PROJECT

Title	**:**	Biomass based thermal energy generation project by M/S Ginni International Ltd.
Version	**:**	2.0
MR Date	**:**	14/04/2023
First CoU Issuance Period	**:**	09 Year and 00 Month
First Monitoring Duration	**:**	01/01/2013 to 31/12/2021

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

BASIC INFORMATION

Title of the project activity	Biomass based thermal energy generation project by M/S Ginni International Ltd.
UCR Project Registration Number	227
Version	2.0
Completion date of the MR	14/04/2023
Monitoring period number and duration of this monitoring period	Monitoring Period Number: 01 Duration of this monitoring Period: 09 Year and 00 Month (First and last days included (01/01/2013 to 31/12/2021)
Project participants	Creduce Technologies Private Limited (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 Scope	01 Energy industries (Renewable/Non-Renewable Sources)
Estimated amount of GHG emission reductions for this monitoring period	2013 : 14,599 CoUs (14,599 tCO_2e) 2014 : 17,139 CoUs (17,139 tCO_2e) 2015 : 16,994 CoUs (16,994 tCO_2e) 2016 : 19,309 CoUs (19,309 tCO_2e) 2017 : 23,353 CoUs (23,353 tCO_2e) 2018 : 23,226 CoUs (23,226 tCO_2e) 2019 : 22,974 CoUs (22,974 tCO_2e) 2020 : 12,878 CoUs (12,878 tCO_2e) 2021 : 19,735 CoUs (19,735 tCO_2e)

Total:	1,70,207 CoUs (1,70,207 tCO_2e)

SECTION - A - Description of project activity

A.1 Purpose and 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 in Tables 1 & 2. The date from which all the boilers and heaters were put into service or successful operation is taken as the date of commissioning. The 4TPH and 8TPH are used as a standby boilers when 13 TPH boiler goes for shutdown and/or routine maintenance.

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

Table-1- Boiler Specification

Boiler Type	Travelling grate	Fluidized bed combustion	Manual fired-water tube
Rated Capacity (TPH)	13	8	4
Make	Cheema	Cheema	IBL
Steam Temperature (°C)	186	186	186
Hydraulically Tested Pressure	14	13.5	13.5
Rating (m^2)	617.31	247	84
Feedstock	Mustard husk, Rice husk, Groundnut shell	Mustard husk, Rice husk, Groundnut shell	Mustard straw briquettes
Pollution Control Measure	Dust Collector , Multi Cyclone , Bag Filter,Stack	Dust Collector , Multi Cyclone , Bag Filter,Stack	Dust Collector , Multi Cyclone , Bag Filter,Stack
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
Make	Thermax
Thermic fluid	Shell Heat Transfer Oil 52
Thermic fluid inlet temperature (°C)	223
Thermic fluid outlet temperature (°C)	240
Feedstock	Mustard Husk and Rice Husk
Pollution Control Measure	Cyclone , Dust Collector , Stack

Commissioning date	31/03/2016

A.1.1 Purpose of the project activity:

The project is located near Alwar District and the region has surplus availability of agro-residues mainly mustard husk, mustard straw, rice husk, and ground nutshell. In absence of the offtake of these agro-residues, it would have been burned in the field and created a negative impact on the environment. The GIL has opted for these agro-residues for thermal energy generation instead of fossil fuel to mitigate the negative impact on the environment.

A.1.2 Description of the installed technology and equipment:

The project activity includes 13, 8, and 4 TPH biomass-fired boilers for steam generation and 15 lacs kCal/hr thermopack. The fly ash downstream is separated by a cyclone separator followed by the bag house filter. The flue gas is further passed through the wet scrubber to ensure that the minimum amount of pollutants is released into the environment. The detailed specifications are mentioned the table 1 and 2.

A.1.3 Relevant dates for the project activity (e.g., construction, commissioning, continued operation periods, etc.)

The duration of the crediting period corresponding to the monitoring period is covered in this monitoring report.

UCR Project ID	:	**227**
Start Date of Crediting Period	:	01/01/2013
The project was commissioned on	:	Boiler and thermopack commissioning is mentioned in table 1 & 2

A.1.4 Total GHG emission reductions achieved or net anthropogenic GHG removals by sinks achieved in this monitoring period

The total GHG emission reductions achieved in this monitoring period are as follows:

Summary of the Project Activity and ERs Generated for the Monitoring Period	
Start date of this Monitoring Period	01/01/2013
Carbon credits claimed up to	31/12/2022
Total ERs generated (tCO_2e)	1,70,207 tCO_2e
Leakage Emission	0
Project Emission	7114.25

A.1.5 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:

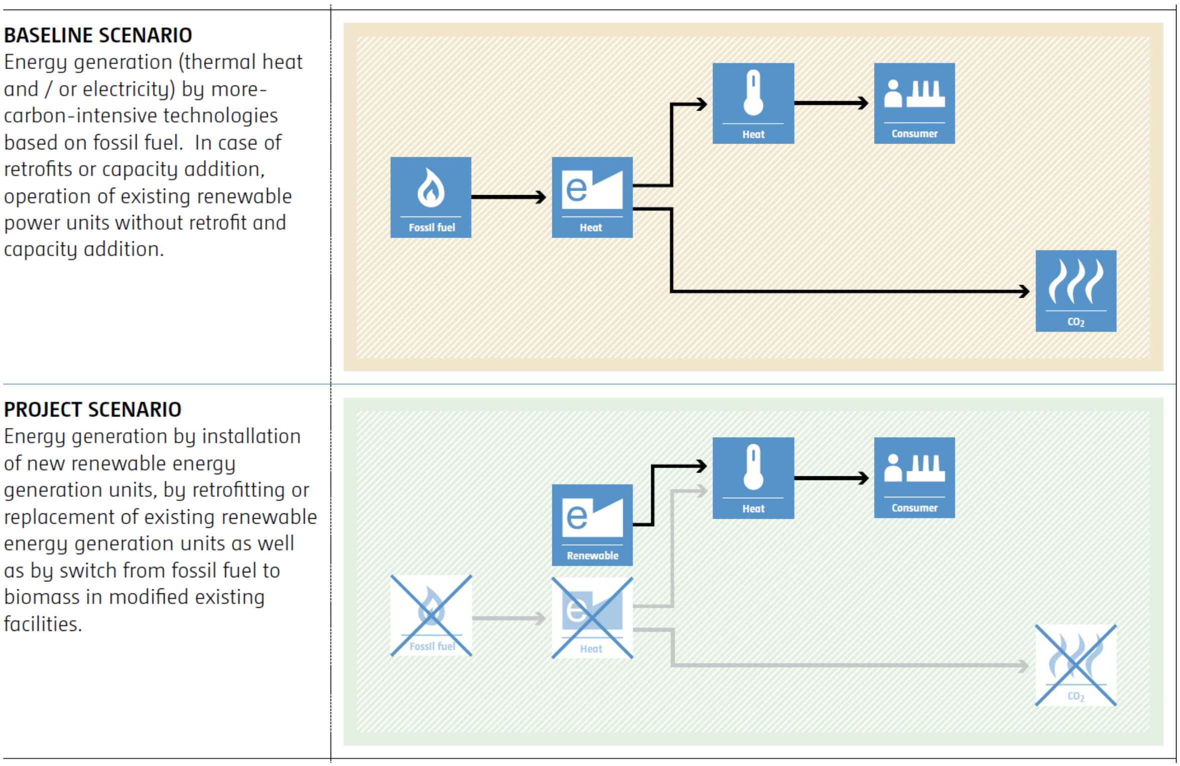


Figure 1 Baseline Scenario

A.2 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.3 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. (Owner)** Address: RIICO Industrial Area, Delhi Jaipur Highway NH 8 Neemrana, District-Alwar, Rajasthan-301705.

A.4 Methodologies and standardized baselines

Sectoral Scope : 01 Energy industries (Renewable/Non-Renewable Sources)

Type : Renewable Energy Projects

Category : AMS-I.C: “Thermal energy production with or without electricity”, Version 22

A.5 Crediting period of project activity

Start date of the crediting period: 01/01/2013

Crediting period corresponding to this monitoring period: 09 Year and 00 Month

01/01/2013 to 31/12/2021 (Both dates are inclusive)

A.6 Contact information of responsible persons/entities

Contact person	**:**	**Shailendra Singh Rao**
Mobile	:	+91 9016850742, 9601378723
Address	:	2-O-13,14 Housing Board Colony, Banswara, Rajasthan -327001, India

SECTION - B - Implementation of project activity

B.1 Description of implemented registered project activity

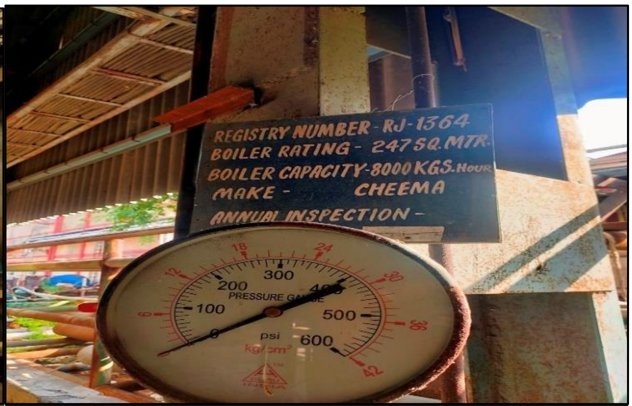
B.1.1 Provide information on the implementation status of the project activity during this monitoring period in accordance with UCR PCN

As mentioned in the previous section, the project activity consists of 3 biomass fired boiler and a thermic fluid heater. The agro-residues used are mustard husk, mustard straw briquettes, rice husk and groundnut shell. All three boilers and thermopack are operational and was in service during the monitoring period. These boilers are operated at the rated pressure of 9 to 10.5 kg/cm^2. Total steam generated is determined through the dedicated steam flowmeters. The boiler operator maintains the daily log book with major boiler parameters (pressure, temperature, steam flowmeter readings, boiler running hours).

The survey conducted by GIL proves that the region has surplus availability of biomass. In addition, the energy consumption for briquette production is included in the project emission. The samples from every batch of biomass received from the supplier are analyzed for determining calorific value, moisture content and ash content in the laboratory.

B.1.2 For the description of the installed technology, technical process, and equipment, include diagrams, where appropriate

The detailed specifications of the boilers and thermopack are mentioned in Tables 1 and 2 above.



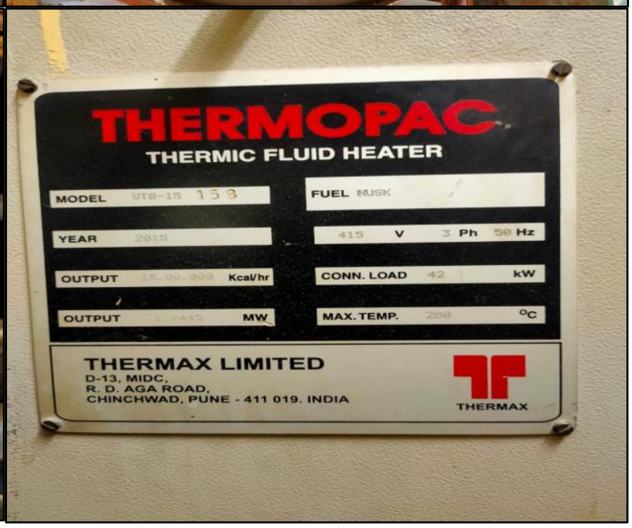
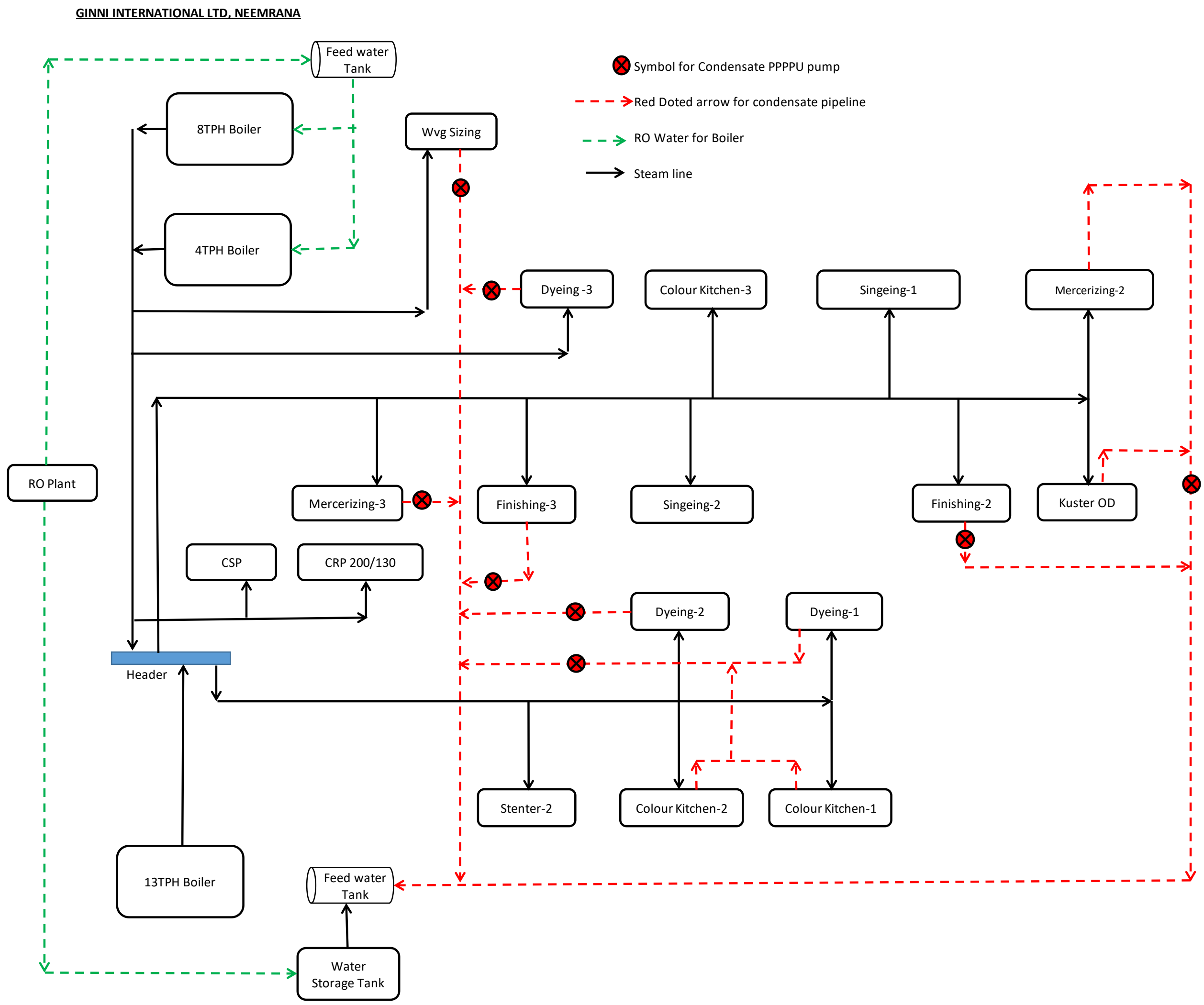


Figure-3- Nameplates of the tubine

The thermal energy generated from this boiler and thermopack is utilized as shown in the diagram below.



B.2 Do no harm or impact test of the project activity

GIL complies with all the local rules and regulations. During this monitoring period, the consent to operate the boiler and thermopack was duly permitted by the Rajasthan Pollution Control Board (RPCB). The project activity consists of a zero liquid discharge plant for effluent treatment and all the stacks are equipped with a pollution control device that ensures no net harm to the environment.

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 a 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 an 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.

The project activity contributes to the following SDGs;

SDG Goal	Description
	➢ The project activity has improved the renewable energy share in total final energy consumption. ➢ The project activity utilizes agro-residues to generate 1845.22 TJ thermal energy which otherwise would have been generated from fossil fuel burning.
	➢ The project activity provides clean water and sanitation facilities to each worker and staff. It also includes a zero-liquid discharge system where all the wastewater is treated within the project premises.

8 DECENT WORK AND ECONOMIC GROWTH	➢ Decent work and economic growth. The project activity generates additional employment for skilled and unskilled, also the project situated in a remote area will provide employment opportunities to unskilled people from villages. Training on various aspects including safety, operational issues, and developing skill sets will also be provided to employees.
13 CLIMATE ACTION	➢ This project activity meets the SDG 13 goal by saving fossil fuels and producing clean energy. ➢ This project has avoided 1,70,207 tons of CO_2 emissions during this monitoring period. ➢ **SDG 13** on clean energy is closely related and complementary. ➢ the project activity reduces the dependence on fossil fuel-based thermal energy generation and as there are no associated emissions with this project it contributes to the reduction of greenhouse gas (GHG) emissions.

B.3 De-bundling

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

SECTION - C - Application of methodologies and standardized baselines

C.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)

C.2 Applicability of methodologies and standardized baselines

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

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 the 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 greenfield project and no capacity additions were involved.
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.	Biomass briquettes were produced from mustard straw without any additives and binders. The emission associated with the production of the briquettes is included and shown in the project emission calculation section.
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.	The project participant has provided the double accounting agreement.

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 is 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.

C.3 Applicability of double counting emission reductions

The project was not applied under any other GHG mechanism. Hence the project will not cause double accounting of carbon credits (i.e., CoUs).

C.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.

The project boundary is illustrated in the diagram given below.

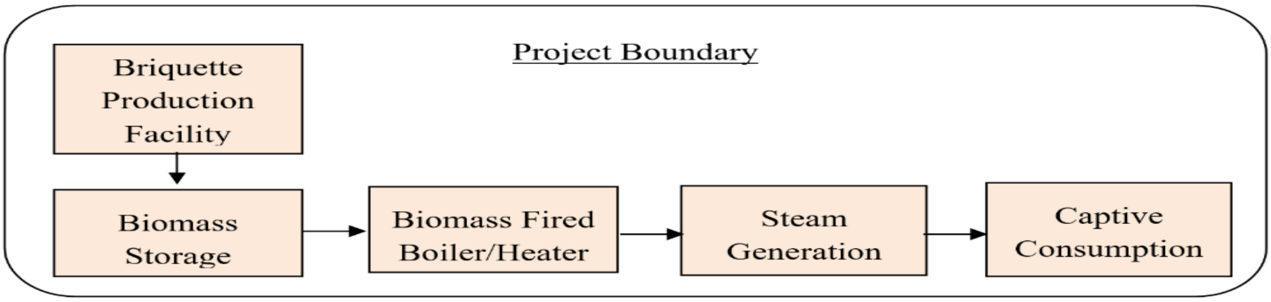


Table-3- Project boundary

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	CO_2	Yes	The emission due to the electricity consumption attributable to the project activity has been

Source		Gas	Included?	Justification/Explanation
	fuel and electricity consumption due to the project activity			included in 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

C.5 Establishment and description of the 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

C.5.1 Net GHG Emission Reductions and Removals

- **Baseline Emissions**

a) Baseline 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 and 92 % for thermic fluid heater (as per manufacturer's specification).

Year	BE (tCO_2e)			
	4TPH	8TPH	13TPH	Thermopack
2013	0.00	15102.79	0.00	0.00
2014	2396.12	15582.32	0.00	0.00
2015	3289.36	14513.08	0.00	0.00
2016	333.56	4312.91	14485.17	922.35
2017	476.32	976.51	21546.46	1298.38
2018	423.76	996.51	20940.94	1855.38
2019	534.78	6398.43	14783.03	2200.90
2020	138.60	2469.84	9530.39	1257.16
2021	231.60	1392.44	17183.29	1752.65

The detailed calculation is provided in annexure I.

- **Project Emissions**

As 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 $PE_{cy.}$

The project emission associated with auxiliary consumption and the briquetting process is tabulated below;

Year	Briquettes (Ton)	Briquettes Electricity Consumption (MWh)	Boiler and Thermopack Auxiliary Consumption (MWh)	Total Consumption	EF (tCO_2/MWh)	tCO_2e
2013	-	-	559.021	559.02	0.9	503.12
2014	3649.437	182.47185	749.861	932.33	0.9	839.10
2015	2452.664	122.6332	774.809	897.44	0.9	807.70
2016	339.728	16.9864	810.103	827.09	0.9	744.38
2017	1221.201	61.06005	988.379	1049.44	0.9	944.50
2018	562.465	28.12325	1072.32	1100.44	0.9	990.40
2019	494.796	24.7398	1022.34	1047.08	0.9	942.37
2020	94.235	4.71175	570.577	575.29	0.9	517.76
2021	218.547	10.92735	905.667	916.59	0.9	824.93

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

Thus, PE = 7114.25 tCO_2e

- **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.

Hence, LE = 0

Thus, ER_y = $BE_y – PE_y – LE_y$

Where:

ER_y = Emission reductions in year y (tCO_2/y)

BE_y = Baseline Emissions in year y (t CO_2/y)

PE_y = Project emissions in year y (tCO_2/y)

LE_y = Leakage emissions in year y (tCO_2/y)

Thenet emission reduction achieved during the first CoU monitoring period is calculated below:

Year	**BE (tCO_2e)**				**PE (tCO_2e)**	**LE (tCO_2e)**	**Net Emission Reduction**
	4TPH	8TPH	13TPH	Thermopack			
2013	0.00	15102.79	0.00	0.00	503.12	0	14599
2014	2396.12	15582.32	0.00	0.00	839.10	0	17139
2015	3289.36	14513.08	0.00	0.00	807.70	0	16994
2016	333.56	4312.91	14485.17	922.35	744.38	0	19309
2017	476.32	976.51	21546.46	1298.38	944.50	0	23353
2018	423.76	996.51	20940.94	1855.38	990.40	0	23226
2019	534.78	6398.43	14783.03	2200.90	942.37	0	22974
2020	138.60	2469.84	9530.39	1257.16	517.76	0	12878
2021	231.60	1392.44	17183.29	1752.65	824.93	0	19735
Total Emission Resuctions (tCO_2e)							170207

Hence Net GHG emission reduction, = 1,70,207 tCO_2e

C.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).

C.7 Changes to the start date of crediting

The start date of crediting period is remained same as defined in the PCN.

C.8 Permanent changes from MR monitoring plan, applied methodology, or applied standardized baseline

From revised PCN 2.0 dated 13/04/2023, emission occurred from the consumption of electricity for briquette production is included in revised monitoring plan.

C.9 Monitoring period number and duration

Total Monitoring Period: 09 Year and 00 Month

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

C.10 Monitoring Plan

Data and Parameters available:

Data / Parameter	UCR recommended emission factor
Data unit	tCO_2 /MWh
Description	A "grid emission factor" refers to a CO_2 emission factor (tCO_2/MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO_2/MWh for the 2013 - 2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach.
Source of data	https://a23e347601d72166dcd6-16da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com//Documents/UCRCoUStandardAug2022updatedVer6_090822220127104470.pdf
Value applied	0.9
Measurement methods and procedures	-
Monitoring frequency	Fixed parameter
Purpose of Data	For the calculation of Emission Factor of the grid
Additional Comment	The combined margin emission factor as per CEA database (current version 16, Year 2021) results into higher emission factor. Hence for 2021 vintage UCR default emission factor remains conservative.

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:	$\mathbf{Q_{steam}}$
Data unit:	Ton of steam during this monitoring period
Description:	Quantity of steam
Source of data	Log book and totalizer reading of steam flow meter
Measurement procedures (if any):	Steam flow meter (totalizer)
Monitoring frequency:	Daily
Value Applied:	5,81,691
QA/QC procedure	Calibration of the steam flowmeter
Any comment:	-

Data / Parameter:	$EG_{thermal,y}$
Data unit:	TJ during this monitoring period
Description:	Net quantity of thermal energy supplied by the project activity during the year *y*
Source of data	Calculated based on quantity of steam generated and boiler operating parameters
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:	1845.22
QA/QC procedure	Not applicable
Any comment:	-

<table>
<tr><td>Data / Parameter:</td><td>$B_{Biomass,y}$</td></tr>
<tr><td>Data unit:</td><td>Mass (ton)</td></tr>
<tr><td>Description:</td><td>Mustard Husk, Groundnut Shell, Rice Husk, Briquettes</td></tr>
<tr><td>Source of data</td><td>Plant records</td></tr>
<tr><td>Measurement procedures (if any):</td><td>Weighing scale</td></tr>
<tr><td>Monitoring frequency:</td><td>Daily</td></tr>
<tr><td>Value Applied:</td><td><table><tr><th>Biomass</th><th>Mustard Husk</th><th>Rice Husk</th><th>Groundnut shell</th><th>Briquettes</th></tr><tr><td>Ton</td><td>97370.95</td><td>40143.63</td><td>5377.06</td><td>9033.08</td></tr></table></td></tr>
<tr><td>QA/QC procedure</td><td>Cross checked with invoice receipt of biomass purchase and weighing scale calibration records.</td></tr>
<tr><td>Any comment:</td><td>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.</td></tr>
</table>

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	$T_{wi} = 52$, $T_{so} = 186$, $T_{thi} = 223$, $T_{tho} = 240$
Monitoring frequency:	Continuous hourly monitoring
QA/QC procedure	Thermocouple calibration
Any comment:	-

Data / Parameter:	***P***
Data unit:	kg/cm^2
Description:	Average Pressure
Source of data	Plant records
Value applied	9.5
Measurement procedures (if any):	Measured using calibrated pressure gauge and daily log book
Monitoring frequency:	Continuous monitoring
QA/QC procedure	Pressure gauge calibration from NABL accredited Lab
Any comment:	

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:	Once in the first year of the crediting period
Value Applied:	Mustard Husk = 3400 kCal/kg, Rice Husk = 3200 kCal/kg GNS = 3870 kCal/kg Briquettes = 3300 kCal/kg
QA/QC procedure	-
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.

ANNEXURE I (Emission Reduction Calculation)

BE Calculation.

13 TPH Boiler

Year	Hours	kg/cm^2	Temperature	H_g (kJ/kg)	Total Steam in ton	Water inlet Temperature	H_{fi} (kJ/kg)	TJ	EF	BE (tCO_2e)
2016	5214	9.5	176.83	2774.2	50113.70	52	217.6	150.73	96.1	14485.17
2017	7495	9.5	176.83	2774.2	74543.31	52	217.6	224.21	96.1	21546.46
2018	7637	8.75	173.5	2771	72539.22	52	217.6	217.91	96.1	20940.94
2019	7862	8	169.6	2767.4	51280.58	52	217.6	153.83	96.1	14783.03
2020	4019	8	169.6	2767.4	33059.80	52	217.6	99.17	96.1	9530.39
2021	7363.5	9.5	176.83	2774.2	59448.26	52	217.6	178.81	96.1	17183.29
									Total	98469.29

4 TPH Boiler

Year	Hours	kg/cm^2	Temperature	H_g (kJ/kg)	Total Steam in ton	Water inlet Temperature	H_{fi} (kJ/kg)	TJ	EF	BE (tCO_2e)
2013										
2014	3275.5	9	175.4	2772.1	8296.57	52	217.6	24.93	96.1	2396.12
2015	4810.31	9	175.4	2772.1	11389.41	52	217.6	34.23	96.1	3289.36
2016	562.93	9	175.4	2772.1	1154.96	52	217.6	3.47	96.1	333.56
2017	788	9	175.4	2772.1	1649.26	52	217.6	4.96	96.1	476.32
2018	784	9	175.4	2772.1	1467.25	52	217.6	4.41	96.1	423.76
2019	784	9	175.4	2772.1	1851.69	52	217.6	5.56	96.1	534.78
2020	248	9	175.4	2772.1	479.89	52	217.6	1.44	96.1	138.60
2021	492	9	175.4	2772.1	801.90	52	217.6	2.41	96.1	231.60
									Total	7824.10

8 TPH Boiler

Year	Hours	kg/cm^2	Temperature	H_g (kJ/kg)	Total Steam in ton	Water inlet Temperature	H_{fi} (kJ/kg)	TJ	EF	BE (tCO_2e)
2013	7712	9.5	176.83	2774.2	52250.44	52	217.6	157.16	96.1	15102.79
2014	7727.75	9.5	176.83	2774.2	53909.45	52	217.6	162.15	96.1	15582.32
2015	7058.38	9.5	176.83	2774.2	50210.25	52	217.6	151.02	96.1	14513.08
2016	2236.25	9.5	176.83	2774.2	14921.17	52	217.6	44.88	96.1	4312.91
2017	529	9.5	176.83	2774.2	3378.39	52	217.6	10.16	96.1	976.51
2018	614.46	9.5	176.83	2774.2	3447.59	52	217.6	10.37	96.1	996.51
2019	4960	9.5	176.83	2774.2	22136.37	52	217.6	66.58	96.1	6398.43
2020	2371	9.5	176.83	2774.2	8544.80	52	217.6	25.70	96.1	2469.84
2021	1688	9.5	176.83	2774.2	4817.36	52	217.6	14.49	96.1	1392.44
									Total	61744.84

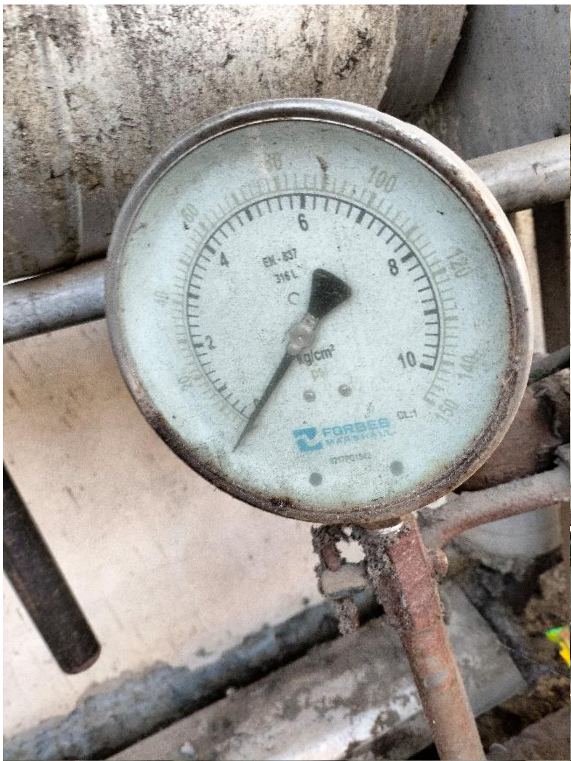
Thermopack

Year	Hours	Inlet Temperatu	Outlet Temperatureer	Diff of Temperature	TJ	EF	BE (tCO_2e)
2016	2909.79	245	227	18	9.60	96.1	922.3493448
2017	4337.033	247	230	17	13.51	96.1	1298.383206
2018	5545.2	244	225	19	19.31	96.1	1855.376737
2019	6577.885	247	228	19	22.90	96.1	2200.904351
2020	4199.318	244	227	17	13.08	96.1	1257.155283
2021	5529.198	245	227	18	18.24	96.1	1752.652835
						Total	9286.821756

PE Calculation

Auxillary Consumption (Electricity)(MWh)							
Year	4	8	13	Thermopac	Total (MWh)	EF (tCO_2/MWh)	tCO_2e
2013	0.00	559.02	0.00	0.00	559.02	0.90	503.12
2014	173.09	576.77	0.00	0.00	749.86	0.90	674.88
2015	237.62	537.19	0.00	0.00	774.81	0.90	697.33
2016	24.10	159.64	452.35	174.01	810.10	0.90	729.09
2017	34.41	36.14	672.87	244.96	988.38	0.90	889.54
2018	30.61	36.89	654.78	350.04	1072.32	0.90	965.08
2019	20.69	157.09	462.89	381.67	1022.34	0.90	920.11
2020	9.35	70.79	267.83	222.62	570.58	0.90	513.52
2021	16.73	51.54	506.74	330.66	905.67	0.90	815.10
Emission Associated With Briquet Production							
Year	Briquettes (Ton)	Electricity Consumption(MWh)	Auxillary	Total Consumption	EF (tCO_2/MWh)	tCO_2e	
2013			559.02	559.02	0.90	503.12	
2014	3649.44	182.47	749.86	932.33	0.90	839.10	
2015	2452.66	122.63	774.81	897.44	0.90	807.70	
2016	339.73	16.99	810.10	827.09	0.90	744.38	
2017	1221.20	61.06	988.38	1049.44	0.90	944.50	
2018	562.47	28.12	1072.32	1100.44	0.90	990.40	
2019	494.80	24.74	1022.34	1047.08	0.90	942.37	
2020	94.24	4.71	570.58	575.29	0.90	517.76	
2021	218.55	10.93	905.67	916.59	0.90	824.93	

Annexure II - Project Photos

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DOC - 18.10.2015
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