Monitoring Report

CARBON OFFSET UNIT (CoU) PROJECT

Title: 7.9 MW Biomass based Cogeneration Project at Hardoi, Uttar Pradesh.

Version 1.0

Date 06/01/2023

First CoU Issuance Period: 4 years, 10 months

Monitoring Period: 19/02/2018 to 31/12/2022

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

Monitoring Report	
Title of the project activity	7.9 MW Biomass based Cogeneration Project at Hardoi, Uttar Pradesh.
UCR Project Registration Number	210
Version	1.0
Completion date of the MR	06/01/2023
Monitoring period number and duration of this monitoring period	Monitoring Period Number: 1st Duration of this monitoring Period: 4 Years 10 Months (19/02/2018 to 31/12/2022)
Project participants	First Climate (India) Private Limited (AGGREGATOR) DCM Shriram Ltd (Distillery Unit Hariawan) (DEVELOPER)
Host Party	India
Applied methodologies and standardized baselines	CDM UNFCCC Methodology ACM0006: Electricity and heat generation from biomass (Ver. 16) & UCR Standard for Emission Factor
Sectoral scopes	01- Energy industries (renewable -/ non-renewable sources)
Estimated amount of GHG emission reductions for this monitoring period in the registered PCN	2018: 1,37,058 CoUs (1,37,058 tCO_{2eq})
	2019: 1,59,680 CoUs (1,59,680 tCO_{2eq})
	2020: 1,59,680 CoUs (1,59,680 tCO_{2eq})
	2021: 1,59,680 CoUs (1,59,680 tCO_{2eq})
	2022: 1,59,680 CoUs (1,59,680 tCO_{2eq})
Total:	7,75,778 CoUs (7,75,778 tCO_{2eq})

SECTION A. Description of project activity

A.1. Purpose and general description of project activity >>

a) Purpose of the project activity and the measures taken for GHG emission reductions >>

The project activity is promoted by DCM Shriram Ltd (Distillery Unit Hariawan) (henceforth referred as DCM) in their distillery unit located at Hariawan Village- Hariawan, Distt.- Hardoi- 241405, Uttar Pradesh, India. The purpose of the project activity is to install one 55 TPH biomass fired boiler and a 7.9 MW turbine to cater the electricity and steam demand of distillery unit of DCM. Surplus power generated from the system would be exported to grid.

The plant has supplied 1,108,828.2 MT of process steam and generated 202.778 GWh in this crediting period both for captive consumption and grid export. In absence of this project, equivalent amount of steam would have been sourced from a fossil fuel (i.e. Coal) fired boiler and electricity would have been sourced from grid which is mainly dominated by fossil fuel. The project activity, for this monitoring period, thus reduces 347,673 t-CO2e greenhouse gas emissions (GHG) collectively by avoiding fossil fuel combustion for steam, power usages from grid and surplus green power supplied to the grid which is 55% less than the ex-ante estimation i.e., 776,964 t-CO_{2e}.

This project results in avoidance of GHG emissions associated with generation of equivalent amount of energy from a coal based captive co-generation plant. The proposed project activity is using the biomass which is carbon neutral and thus prevents depletion of non-renewable natural resources like coal.

b) Brief description of the installed technology and equipment>>

The projects activity was commissioned on 2018 i.e. after 2002 which make the project activity eligible under UCR (The eligibility is as per UCR Project Standard).
The project activity involves generation of renewable energy from the combustion of renewable biomass i.e. bagasse and other biomass residue, to generate process steam and electricity for captive consumption and grid supply. The technology employed is biomass-based cogeneration plant, which leads to avoidance of GHG emission associated with the direct coal combustion for steam generation and indirect emission due to fossil fuel dominated grid electricity. Thus, the technology to be used in this project is indigenous and is environmentally safe & sound.

Details of the installed major equipment are as below:

Boiler:

Parameter	Unit	Details
Type of boiler	-	Biomass TG Boiler
Boiler rated capacity	TPH	55
Steam Pressure	kg/cm2	45
Steam Temperature	Deg. C	400 +/- 5
Feed water Temperature	Deg. C	150
Fuel Type	-	Bagasse and other biomass residue

Turbine:

Parameter	Unit	Details
Type of turbine	-	STG Turbine
Inlet steam pressure	kg/cm2	42.5
Inlet steam temperature	Deg. C	395
Inlet steam quantity	TPH	54.6
Extraction pressure	kg/cm2	5.25
Extraction steam quantity	TPH	47.1

Alternator:

Parameter	Unit	Details
Type	-	4 pole synchronous generator
Rated Capacity	MW	7.9
Rated power factor	-	0.8
Generation voltage	V	11000
Frequency	Hz	50

c) 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 covered in this monitoring report is: 19/02/2018 to 31/12/2022.

UCR Project ID: 210
Start Date of Crediting Period: 19/02/2018
Project Commissioned: 27/01/2018.
Operation Period: The UCR Project activity is still operational.

d) 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 is as follows:

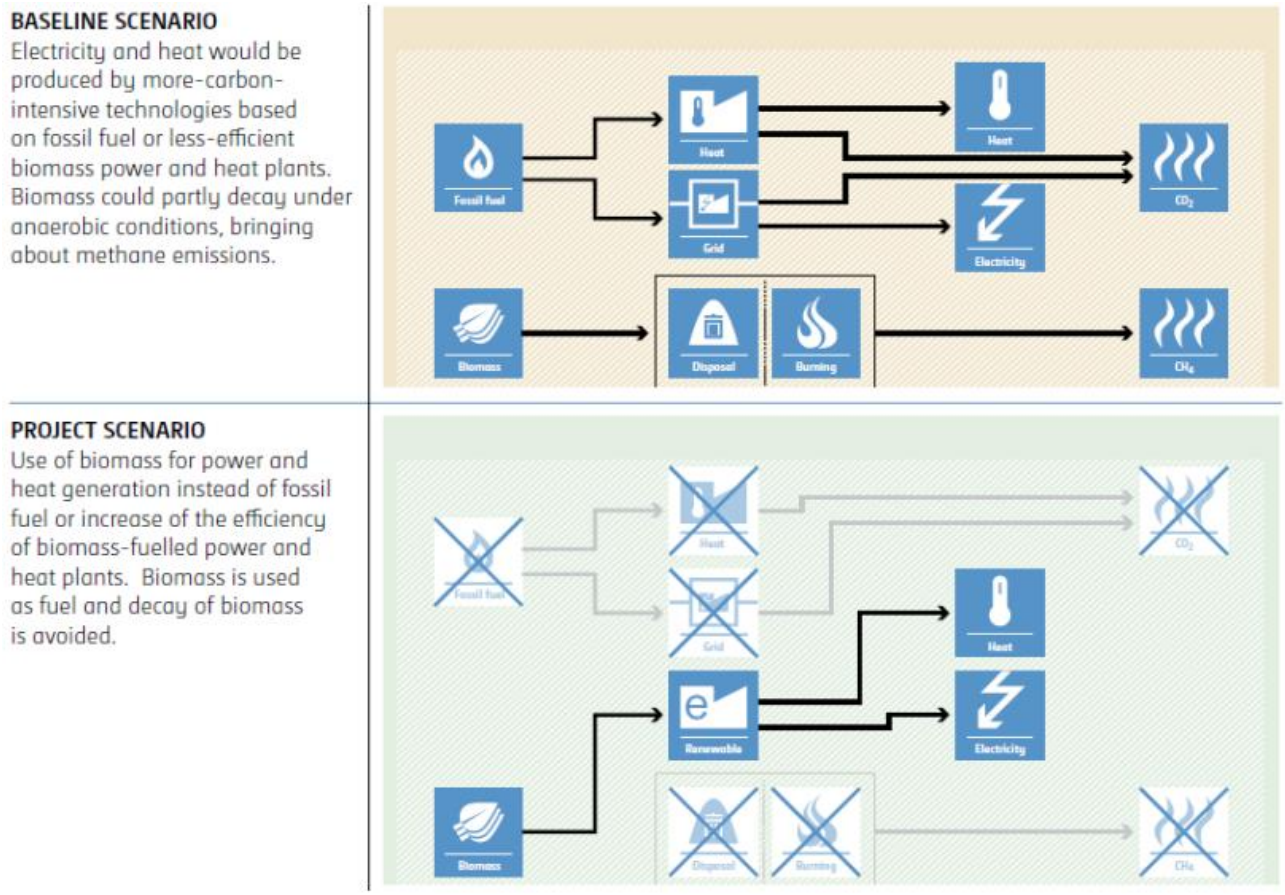
Summary of the Project Activity and ERs Generated for the Monitoring Period	
Start date of this Monitoring Period	19/02/2018
Carbon credits claimed up to	31/12/2022
Total ERs generated (tCO_{2eq})	347,673 tCO_{2eq}

e) Baseline Scenario>>

In-house steam generation for running the process is an indispensable need of the Project owner, who intends to run a distillery. Whatever the source of the electricity be, an in-house boiler is an absolute necessity. Also, having an in-house boiler and simultaneously purchasing electricity from outside is not an economically viable model. Therefore, in the absence of this project, the Project owner would have installed a coal-fired cogeneration boiler coupled with a turbine system. The above statement representing the baseline scenario, it would have led to GHG emissions contributed by the burning

of coal.

Flow showing baseline scenario:



A.2. Location of project activity>>

Country: INDIA
District: Hardoi
Village: Hariawan Village
State: Uttar Pradesh
Code: 241405

The project site is well connected by district and village roads to the nearest town. The geographic co-ordinates of the project location are:

Latitude: 27.2979° N
Longitude: 80.1875° E

The representative location map is included below:

Project Location

A.3. Parties and project participants >>

Party (Host)	Participants
India	**First Climate (India) Pvt. Limited (AGGREGATOR)** Contact person: Partha P Chaudhuri Mobile: +91 9831012824 Address: 903 ERGO Tower, Plot No. A1-4, Block EP & GP, Sector V, Salt Lake, Kolkata 700 091 **DCM Shriram Ltd (Distillery Unit Hariawan) (DEVELOPER)** Address: Hariawan Village- Hariawan, Distt.- Hardoi- 241405, Uttar Pradesh, India.

A.4. References to methodologies and standardized baselines >>

SECTORAL SCOPE -- 01 Energy industries (Renewable/Non-renewable sources)

TYPE -Renewable Energy Projects

CATEGORY- ACM0006: Electricity and heat generation from biomass (Ver. 16)

1. Indicate the exact references titles and reference numbers of:
   (1.a)The applied methodologies is ACM0006: Electricity and heat generation from biomass (Ver. 16);

The grid emission factor is determined using the latest approved version of UCR Standard , Version 6.0.Hence, the Grid emission factor is calculated as 0.9.

2. Refer to the UNFCCC CDM website for the exact reference of the applied methodologies, methodological tools and standardized baselines.

This is a large scale project with thermal capacity of 39.28 MWth and electrical capacity of 7.9 MW. So, the total thermal capacity of the project activity 62.98 MWth. Hence, the applied methodology here is ACM0006.

A.5. Crediting period of project activity >>

The duration of the crediting period corresponding to the monitoring period covered in this monitoring report.
Length of the crediting period corresponding to this monitoring period: 4 years 10 months and 12 days – 19/02/2018 to 31/12/2022

A.6. Contact information of responsible persons/entities >>

Project Aggregator: First Climate (India) Pvt. Ltd.

Contact person: Partha P Chaudhuri
Mobile: +91 9831012824
Address: 903 ERGO Tower,
Plot No. A1-4, Block EP & GP,
Sector V, Salt Lake, Kolkata 700 091

Project Owner/Developer: DCM Shriram Ltd (Distillery Unit Hariawan)
Contact person: Rajeev Bharti
Mobile: +91 9811144224
Address: Hariawan Village- Hariawan, Distt.- Hardoi- 241405, Uttar Pradesh, India

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity >>

a) Provide information on the implementation status of the project activity during this monitoring period in accordance with UCR PCN>>

The UCR Project Activity is an operational project activity which was commissioned in 2018.

a) Description of the installed technologies, technical processes and equipment

The distillery unit demands both electrical and thermal energy to run the process. To meet the demand, plant has installed a biomass fired co-generation system at their facility. Plant has installed a 55 TPH biomass fired boiler which can generate superheated steam at a pressure of 45 kg/cm2 pressure and 400 ^{O}C temperature. Superheated steam directly entered to a 7.9 MW turbine. After turbine, steam is being extracted for process use at a pressure of 5.25 kg/cm2.

To operate the plant, proponent could have used coal as a fuel. Bagasse is considered as renewable biomass and surplus in the region of Uttar Pradesh. Owing to some operational barriers, plant has decided to operate the co-gen system with bagasse and other biomass residue to reduce the carbon emission caused by fossil fuels.

As the project is a co-gen system, conventional Rankine cycle is considered. Equipment required for the project are as follows:

- Boiler
- Turbine
- Alternator
- Boiler and Turbine Auxiliaries
- Cooling water system
- Air pollution controlling system
- BOP

Technical details of boiler, turbine and alternator are tabulated below:

Boiler:

Parameter	Unit	Details
Type of boiler	-	Biomass TG Boiler
Boiler rated capacity	TPH	55
Steam Pressure	kg/cm2	45
Steam Temperature	Deg. C	400 +/- 5
Feed water Temperature	Deg. C	150
Fuel Type	-	Bagasse and other biomass residue

Turbine:

Parameter	Unit	Details
Type of turbine	-	STG Turbine
Inlet steam pressure	kg/cm2	42.5
Inlet steam temperature	Deg. C	395
Inlet steam quantity	TPH	54.6
Extraction pressure	kg/cm2	5.25
Extraction steam quantity	TPH	47.1

Alternator:

Parameter	Unit	Details
Type	-	4 pole synchronous generator
Rated Capacity	MW	7.9
Rated power factor	-	0.8
Generation voltage	V	11000
Frequency	Hz	50

(b) Information on the implementation and actual operation of the project activity, including relevant dates (e.g. construction, commissioning, start of operation).

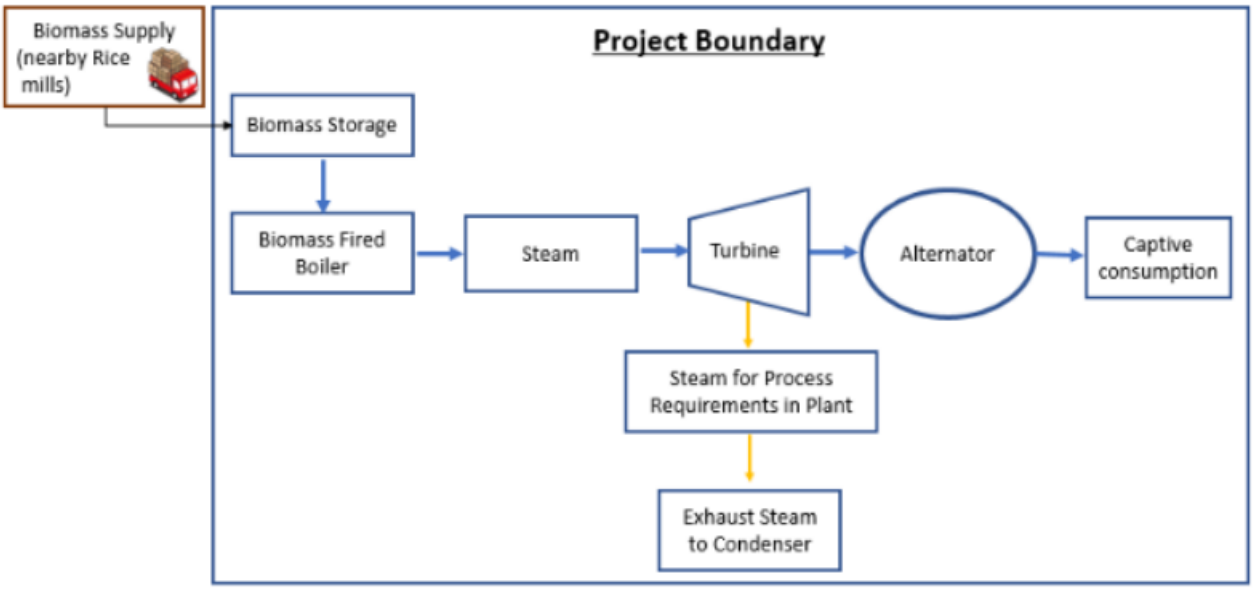
Project Commissioned: 27/01/2018.
Start Date of Crediting Period: 19/02/2018

The duration of the crediting period corresponding to the monitoring period covered in this monitoring report is: 19/02/2018 to 31/12/2022

b) For the description of the installed technology(ies), technical process and equipment, include diagrams, where appropriate>>

The installed technology involves generation of renewable energy from the combustion of renewable biomass i.e. bagasse and other biomass residue, to generate process steam and electricity for captive consumption and grid supply.

Process Flow Chart:



The detailed description of installed technology is already provided in Section B1(a).

The Single line Diagram:

B.2 Do no harm or Impact test of the project activity>>
There are social, environmental, economic and technological benefits which contribute to sustainable development.

Social benefits:

- The project activity helps to alleviate poverty in the area as it creates employment opportunities for the local people during the construction, operation and maintenance phases and also through handling of biomass material to the project plant.

Environmental benefits:

- Reduction of fossil fuels consumption: With the implementation of the proposed project activity, the renewable energy source will replace the fossil fuels source thus contributing to reduced GHG emissions.
- Utilization of Agricultural residues – The project activity utilizes agricultural residue, which is a carbon neutral fuel hence do not contribute to additional atmospheric CO2 emission as compared to baseline coal.
- The project activity helps in proper utilization of agro waste, which otherwise would have been dumped openly.
- The project activity will help in conservation of fast depleting natural resources like fossil fuels, thereby contributing to the economic well-being of the country as a whole

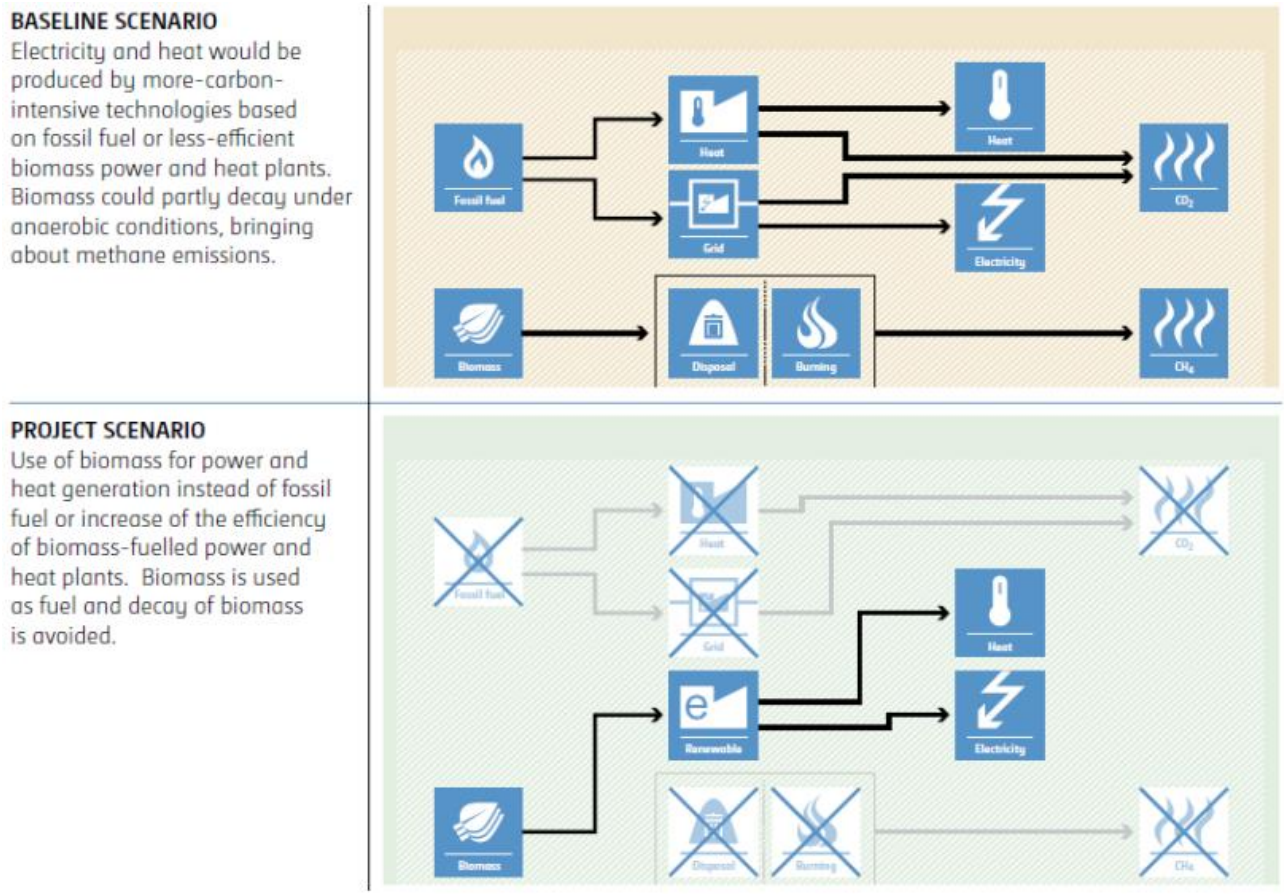
Economic benefits:

- Reduction of dependence from fossil fuels: The project activity will reduce the Production facility's dependence on fossil fuel. This will reduce the overall dependence of the whole region from the imports and availability of fossil fuels and will allow other industries to use energy resources which will allow their development.
- Results in increased business opportunities for local contractors and suppliers during the various phases.

B.3. Baseline Emissions>>

In-house steam generation for running the process is an indispensable need of the Project owner, who intends to run a distillery.
Whatever the source of the electricity be, an in-house boiler is an absolute necessity. Also, having an in-house boiler and simultaneously purchasing electricity from outside is not an economically viable model. Therefore, in the absence of this project, the Project owner would have installed a coal-fired cogeneration boiler coupled with a turbine system.
The above statement representing the baseline scenario, it would have led to GHG emissions contributed by the burning of coal.

Flow showing baseline scenario:



B.4. Debundling>>

This 7.9 MW Biomass based Cogeneration Project is not a debundled component of a larger project activity or a PoA. The project boiler and turbine have its dedicated NOC and commissioning certificate. Steam generated from the boiler is fed into project turbine and extracted steam and electricity are used only in the distillery process. Hence, this is a stand along project.

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- ACM0006: Electricity and heat generation from biomass (Ver. 16)

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

The project activity is a biomass based co-generation system set to cater the electricity and steam demand of the distillery unit of DCM. It replaced the baseline technology fossil fuel fired traditional co-generation system that used non-renewable fuel or more carbon intensive fuel sources i.e. Coal. This project results in avoidance of GHG emissions associated with generation of equivalent amount of energy from a coal based captive co-generation plant. Moreover, the project activity also utilizing the biomass which is a renewable source of energy and thus prevents depletion of non-renewable natural resources like coal.
Here, the project activity is to install one 55 TPH biomass fired boiler and a turbo-alternator set to cater the electricity and steam demand of distillery unit of DCM.

Applicability Criteria	Project Condition
The methodology is applicable under the following conditions: (a) Biomass used by the project plant is limited to biomass residues, biogas, RDF2 and/or biomass from dedicated plantations; (b) Fossil fuels may be co-fired in the project plant. However, the amount of fossil fuels co-fired does not exceed 80% of the total fuel fired on energy basis. (c) For projects that use biomass residues from a production process (e.g. production of sugar or wood panel boards), the implementation of the project does not result in an increase of the processing capacity of (the industrial facility generating the residues) raw input (e.g. sugar, rice, logs, etc.) or in other substantial changes (e.g. product change) in this process; (d) The biomass used by the project plant is not stored for more than one year; (e) The biomass used by the project plant is not processed chemically or biologically (e.g. through esterification, fermentation, hydrolysis, pyrolysis, bio-	The project activity is using bagasse and other type of renewable biomass without any chemical, physical and biological processing. Biomass would not stored in the project boundary more than one years. Project is not using any fossil fuel for co-firing. Hence the criteria points (a), (b), (d) and (e) are applicable.

or chemical-degradation, etc.) prior to combustion. Drying and mechanical processing, such as shredding and pelletisation, are allowed.	
In the case of fuel switch project activities, the use of biomass or the increase in the use of biomass as compared to the baseline scenario is technically not possible at the project site without a capital investment in: (a) The retrofit or replacement of existing heat generators/boilers; or (b) The installation of new heat generators/boilers; or (c) A new dedicated supply chain of biomass established for the purpose of the project (e.g. collecting and cleaning contaminated new sources of biomass residues that could otherwise not be used for energy purposes); or Equipment for preparation and feeding of biomass.	The project is a new greenfield project and hence this criterion is not applicable.
If biogas is used for power and heat generation, the biogas must be generated by anaerobic digestion of wastewater, and: (a) If the wastewater generation source is registered as a CDM project activity, the details of the wastewater project shall be included in the PDD, and emission reductions from biogas energy generation are claimed using this methodology; If the wastewater source is not a CDM project, the amount of biogas does not exceed 50% of the total fuel fired on energy basis.	There is no production of biogas and hence this criteria is not applicable.
In the case biomass from dedicated plantations is used, the "TOOL16: Project and leakage emissions from biomass" shall apply to determine the relevant project and leakage emissions from cultivation of biomass and from the utilization of biomass residues.	Dedicated plantation is not applicable for the project and hence the given clause is not applicable to the Project so concerned.

C.3 Applicability of double counting emission reductions >>

This Project Activity has not been registered with any other GHG program prior to this monitoring period.

There is no double accounting of emission reductions in the project activity due to the following reasons:

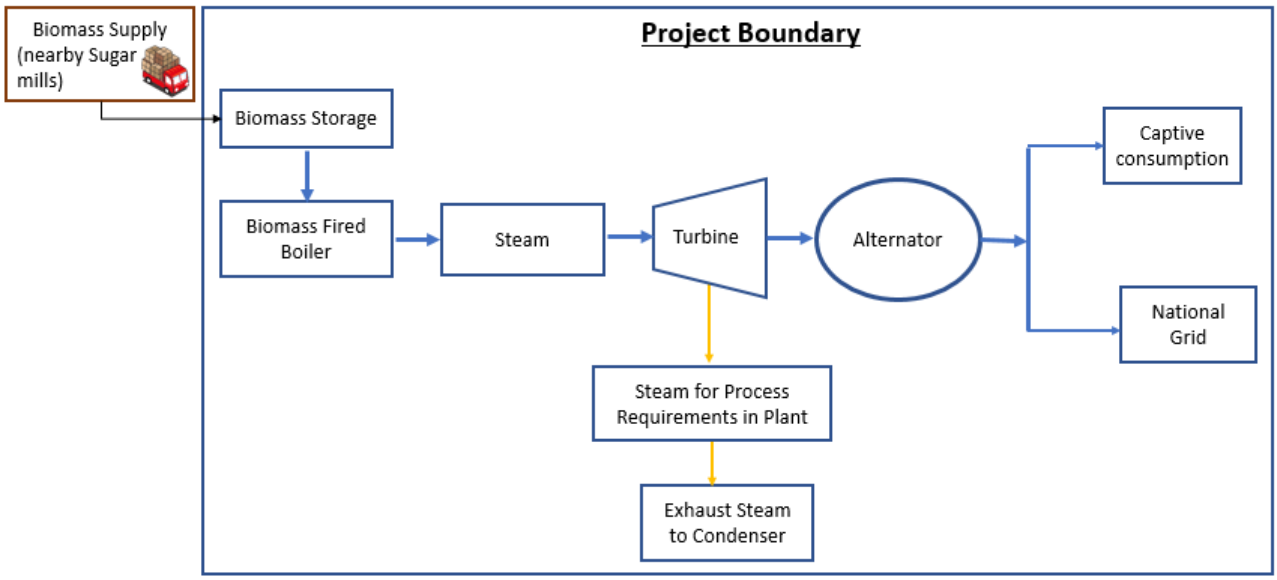
• Project is uniquely identifiable based on its location coordinates,

• Project has dedicated commissioning certificate and connection point and was not registered in any other GHG programme,

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

In line with the methodology, the project boundary encompasses the industrial facility of DCM, equipment installed for the operation of cogeneration plant, the biomass storage facility, the facility (distillery unit) consuming the energy (electrical and thermal) generated by the project activity plant and its supply to the grid.

Project boundary of this project is illustrated below:



The table below provides an overview of the emission sources included or excluded from the project boundary for determination of baseline and project emissions.

Source		Gas	Included	Justification/Explanation
Baseline	Electricity and heat generation	CO2	Yes	Main emission source
		CH4	No	Excluded for simplification. This is conservative
		N2O	No	Excluded for simplification. This is conservative
	Uncontrolled burning or decay of surplus biomass residues	CO2	No	Biomass is a carbon neutral fuel.
		CH4	No	Excluded for simplification. This emission source is assumed to be very small
		N2O	No	Excluded for simplification.

Source		Gas	Included	Justification/Explanation
Project activity	On-site fossil fuel consumption	CO2	No	Project Activity does not use fossil fuel.
		CH4	No	Project Activity does not use fossil fuel.
		N2O	No	Project Activity does not use fossil fuel.
	Off-site transportation of biomass	CO2	No	Biomass is not transported to the outside of the plant premises.
		CH4	No	Biomass is not transported to the outside of the plant premises.
		N2O	No	Biomass is not transported to the outside of the plant premises.
	Combustion of biomass for electricity and heat	CO2	No	Biomass is a carbon neutral fuel.
		CH4	No	Not applicable, as not considered in baseline scenario either.
		N2O	No	Excluded for simplification. This emission source is assumed to be small
	Wastewater from the treatment of biomass	CO2	No	Biomass does not undergo any treatment. So no wastewater is generated.
		CH4	No	Biomass does not undergo any treatment. So no wastewater is generated.
		N2O	No	Biomass does not undergo any treatment. So no wastewater is generated.
	Cultivation of land to produce biomass feedstock	CO2	No	Not applicable, as the biomass is not sourced from dedicated plantations.
		CH4	No	Not applicable, as the biomass is not sourced from dedicated plantations.
		N2O	No	Not applicable, as the biomass is not sourced from dedicated plantations.

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

According to paragraph 23 under sub-section 5.3.1 ("Identification of alternative scenarios") of the ACM0006 CDM Methodology, the alternative baseline scenarios shall specify the following:

"The alternative scenarios shall specify:
(a) How electric power would be generated in the absence of the CDM project activity (P scenarios);
(b) How heat would be generated in the absence of the CDM project activity (H scenarios);
(c) If the CDM project activity generates mechanical power through steam turbine(s): how the mechanical power would be generated in the absence of the CDM project activity (M scenarios);
(d) If the CDM project activity uses biomass residues, what would happen to the biomass residues in the absence of the CDM project activity (B scenarios);
(e) If the CDM project activity uses biomass cultivated in dedicated plantations, what the land use would be in the absence of the CDM project activity (L scenarios); and
(f) If the CDM project activity uses biogas from on-site wastewater, what would happen to the biogas in the absence of the CDM project activity (BG scenarios)."

Therefore, for power generation, the realistic and credible alternatives may include:

Baseline scenario for power generation (ACM0006, V.16.0)	**Description (of P Scenarios)**	**Justification for choosing or not choosing the alternative, while comparing it with the Project activity**
P1	The proposed project activity not undertaken as a UCR project activity;	This is a possible power generation baseline alternative to the UCR Project activity.
P2	The continuation of power generation in existing power plants at the project site. The existing plants would operate at the same conditions (e.g. installed capacities, average load factors, or average energy efficiencies, fuel mixes, and equipment configuration) as those observed in the most recent three years prior to the starting date of the UCR project activity;	The Project being a greenfield one, such scopes do not exist hence this alternative is not applicable a baseline alternative.
P3	The continuation of power generation in existing power plants at the project site. The existing plants would operate with different conditions from those observed in the most recent three years prior to the starting date of the project UCR activity;	This is a greenfield Project and no other power generation facilities are present within the project site of the Project activity. Hence, this cannot be a possible alternative scenario.

P4	The retrofitting of existing power plants at the project site. The retrofitting may or may not include a change in fuel mix;	The Project being a greenfield one, such scopes do not exist hence this alternative is not applicable a baseline alternative.
P5	The installation of new power plants at the project site different from those installed under the UCR project activity;	This is a possible alternative scenario, with respect to power generation.
P6	The generation of power in specific off-site plants, excluding the power grid;	The cost of transportation of electricity from off-site generation point(s) shall be higher than on-site electric power generation system(s). Hence this alternative scenario is unattractive.
P7	The generation of power in the power grid.	This is a possible baseline alternative, with respect to electricity generation.

Similarly, from the UCR perspective, for power generation, the realistic and credible alternatives may include:

Baseline scenario for heat generation (ACM0006, V.16.0)	**Description (of H scenarios)**	**Justification for choosing or not choosing the alternative, with regards to the Project activity**
H1	The proposed project activity not undertaken as a UCR project activity;	This is a possible alternative scenario from the heat generation perspective.
H2	The continuation of heat generation in existing plants at the project site. The existing plants would operate at the same conditions (e.g. installed capacities, average load factors, or average energy efficiencies, fuel mixes, and equipment configuration) as those observed in the most recent three years prior to the UCR project activity;	The project is a greenfield establishment hence such possibilities do not exist. So this scenario is not applicable.
H3	The continuation of heat generation in existing plants at the project site. The existing plants would operate with different conditions from those observed in the most recent three years prior to the UCR project activity;	The project is a greenfield establishment hence such possibilities do not exist. So this scenario is not applicable.

H4	The retrofitting of existing plants at the project site. The retrofitting may or may not include a change in fuel mix;	The project is a greenfield establishment hence such possibilities do not exist. So this scenario is not applicable.
H5	The installation of new plants at the project site different from those installed under the UCR project activity;	This is a possible alternative scenario, with respect to heat generation.
H6	The generation of heat in specific off-site plants;	Steam transportation from outside the plant premises to the process unit within the plant shall be more expensive than in-house steam generation and transportation. Hence, this alternative proposition is not attractive.
H7	The use of heat from district heating	Such facilities do not exist within the district of location of the Project.

Paragraph 26 of the same methodology document includes the M scenarios as in:

"*The alternative scenarios for mechanical power should include, but not be limited to, inter alia:*
(a) M1: The proposed project activity not undertaken as a CDM project activity;
(b) M2: If applicable, the continuation of mechanical power generation from the same steam turbines in existing plants at the project site;
(c) M3: The installation of new steam turbines at the project site
(d) M4: If applicable, the continuation of mechanical power generation from electrical motors in existing plants at the project site;
(e) M5: The installation of new electrical motors at the project site."

However, as the project activity does not employ the use of mechanical power from steam turbine(s), hence none of the M scenarios is applicable to our Project. Therefore, none of the M scenarios can be an alternative scenario.

Also, paragraph 29 of ACM0006 Version 16.0 states:

"*When using biomass residues, the alternative scenarios of the biomass residues in absence of the project activity shall be determined following TOOL16."*

As per CDM "Methodological TOOL 16: Project and leakage emissions from biomass", the following points with regards to project emission can be stated with respect to our Project:

Sr. No.	Project Emission	Justification

1	*"Project emissions resulting from cultivation of biomass in a dedicated plantation in year y ($PE_{BC,y}$)"*	**Not Applicable** As dedicated plantations are not exploited by the Project activity hence this entire section does not apply to the Project. So, $PE_{BC,y} = 0$
2	*"Project emissions resulting from transportation of biomass in year y ($PE_{BT,y}$) and Project emissions resulting from transportation of biomass residues in year y ($PE_{BRT,y}$)"*	**Negligible** As biomass is sourced from nearby sugar mills, the emissions occurring due to transportation of bagasse from these very close locations to the site of Project is considered to be zero for all purposes of calculation. Hence, $PE_{BT,y} = 0$ and $PE_{BRT,y} = 0$
3	*"Project emissions resulting from processing of biomass in year y ($PE_{BP,y}$) and Project emissions resulting from processing of biomass residues in year y ($PE_{BRP,y}$)"*	**Not Applicable** As no biomass processing is required or carried out, hence this section is not applicable to the Project. So, $PE_{BP,y} = 0$ and $PE_{BRP,y} = 0$

Hence, for all practical and calculation purposes, project emission is considered to be zero.

Using the same tool, the leakage emissions can be accounted as:

Sr. No.	Leakage Emission	Justification
1	*"Leakage due to shift of pre-project activities resulting from cultivation of biomass in a dedicated plantation in year y ($LE_{BC,y}$)"*	**Not Applicable** The project does not involve the use of resources from dedicated plantations. Hence, this clause is not applicable. Therefore, $LE_{BC,y} = 0$
2	*"Leakage due to diversion of biomass residues from other applications in year y ($LE_{BR,Div,y}$)"*	**Not possible** Uttar Pradesh being the largest sugar producing state of India has tremendous resources of bagasse. Hence, there is no dearth of bagasse within the state (on sugar seasons). More than enough bagasse is available for channelizing it into different purposes during the season. Also, as per the audit report of the Comptroller and Auditor General of India, Uttar Pradesh has a biomass power potential of 1477.9 MW (as assessed by MNRE) and 3757 MW (as assessed by SNAs); while the installed

		capacity scenario is of 776.5 MW as per MNRE and 1142 MW as per SNA. From the above data it is evident that even after commissioning the proposed plant, biomass would be surplus in that region. Hence, the surplus biomass availability is unquestionable and leakage due to diversion is neglected. So, $LE_{BR,Div,y}$ is considered as zero.
3	*"Leakage due to the transportation of biomass residues outside of the project boundary in year y ($LE_{BRT,y}$)"*	**Not applicable** $LE_{BRT,y}$ can be safely considered to be zero.
4	*"Leakage due to processing of biomass residues outside the project boundary in year y ($LE_{BRP,y}$)"*	**Not applicable** Biomass to be used within the project boundary shall not require any processing and hence no leakage can occur due to processing of biomass with respect to the Project activity. Therefore, $LE_{BRP,y} = 0$

Thus it is seen that using CDM Methodological TOOL 16, the leakage emissions due to the project activity in is zero.
And because the project emissions are also considered to be zero for all practical purposes using the same TOOL 16, **the total PE + LE from the project = 0.**

Paragraph 30 of the ACM0006 Version 16.0 Methodology document refers back to TOOL 16 as it mentions:

"*In addition to the alternative scenarios (B scenarios) included in TOOL16, the project participants shall include scenario B5: (a) The biomass residues are used for power or heat generation at the project site in new and/or existing plants."*

Therefore, with reference to the B scenarios of TOOL 16 and adding B5 to it, the most possible fate of the biomass in absence of the project activity shall be:

B Scenario	**Description**	**Justification**
B1	*"The biomass residues are dumped or left to decay mainly under aerobic conditions. This applies, for example, to dumping and decay of biomass residues on fields;"*	This is the most probable fate of the bagasse in absence of the project activity, where it would have been left unattended in the open- left to decay and

		rot at a natural pace under ambient environmental conditions. Therefore, this is the most likely alterative of the biomass so used in the project.
B2	*"The biomass residues are dumped or left to decay under clearly anaerobic conditions. This applies, for example, to landfills which are deeper than five meters. This does not apply to biomass residues that are stock-piled or left to decay on fields;"*	This cannot be a possible alternative, as the biomass, in absence of the project activity, is dumped in ambient air in the open on level land. Hence, this alternative is not generally possible.
B3	*"The biomass residues are burnt in an uncontrolled manner without utilizing it for energy purposes;"*	Biomass used in the project is not generally burnt in an uncontrolled manner; therefore, this alternative is not applicable.
B4	*"The biomass residues are used for energy or non-energy applications, or the primary source of the biomass residues and/or their fate cannot be clearly identified."*	This could be a likely alternative for some part of the biomass residues generated.
B5	*"The biomass residues are used for power or heat generation at the project site in new and/or existing plants"*	The Project is a greenfield project and all energy producing establishments within the Project site are new. Hence, this scenario is representative of the Project activity rather than the baseline alternative.

As this Project does not involve the use of biogas as a fuel source, hence none of the BG scenarios of ACM0006 methodology are applicable.

Hence to summarize the baseline scenario, the most probable alternatives are **P1, P5** and **P7** with respect to power generation and H1 and H5 with respect to heat generation. **B1** is the most suitable biomass baseline scenario, noting the surplus biomass availability.

In absence of financial support to the project from carbon credits so generated, the next best alternative for the Project owner is to install and commission a captive coal-fired cogeneration system of the same capacity and meet the energy requirements of the plant using GHG-emitting coal as the fuel source.

Therefore, an in-house coal-fired captive cogeneration system being the baseline of the project
As per ACM0006 Version 16.0, the formula to calculate emission reductions from a project is given in paragraph 34 as:

"*Emission reductions are calculated as follows:*

$$ER_y = BE_y - PE_y - LE_y$$

Where:
ER_y = Emissions reductions in year y (t CO_2)
BE_y = Baseline emissions in year y (t CO_2)
PE_y = Project emissions in year y (t CO_2)
LE_y = Leakage emissions in year y (t CO_2)"

As per paragraph 37 of methodology,

"*Baseline emissions are calculated as follows:*

$$BE_y = EL_{BL,GR,y} \times EF_{EG,GR,y} + \sum_f FF_{BL,HG,y,f} \times EF_{FF,y,f} + EL_{BL,FF/GR,y} \times min(EF_{EG,GR,y}, EF_{EG,FF,y}) + BE_{BR,y}$$

Where:

BE_y = Baseline emissions in year y (t CO_2)
$EL_{BL,,}$ = Baseline electricity sourced from the grid in year y (MWh)
$FE_{G,,}$ = Grid emission factor in year y (t CO_2/MWh)
$FF_{BL,,,}$ = Baseline fossil fuel demand for process heat in year y (GJ)
$EF_{FF,,}$ = CO_2 emission factor for fossil fuel type f in year y (t CO_2/GJ)
$EL_{BL,/GR,y}$ = Baseline uncertain electricity generation in the grid or on-site or off-site power-only units in year y (MWh)
$EF_{EG,,}$ = CO_2 emission factor for electricity generation at the project site or off-site plants in the baseline in year y (t CO_2/MWh)
$BE_{BR,}$ = Baseline emissions due to disposal of biomass residues in year y (t CO_2e)
f = Fossil fuel type"

In absence of the project activity, electricity would have been sourced from the grid Hence, $EL_{BL,,}$ would be the sum of captive consumption of electricity and electricity supplied to the grid.

Baseline uncertain electricity generation in the grid or on-site or off-site power-only units in year y (MWh) is not applicable for the project activity and the project activity does not account the emission due to disposal of biomass residue. Hence, the ex-ante baseline emissions for the project activity would be calculated as:

$$BE_y = EL_{BL,GR,y} \times EF_{EG,GR,y} + \sum FF_{BL,,y,f} \times EF_{FF,y,f}$$

As per the Steps of calculation elucidated in ACM0006 Methodology:

"*Step 1: Determine the total baseline process heat generation ($HC_{BL,y}$), electricity generation and capacity constraints, and efficiencies*

Step 1.1: Determine the total baseline process heat generation
The amount of process heat that would be generated in the baseline in year y ($HC_{BL,y}$) is determined based on continuously monitored data of process heat generated in the project scenario. The process heat should be calculated net of any parasitic heat used for drying of biomass.
This methodology assumes for the sake of simplicity that the steam consumed in the baseline scenario would be the same quality as the steam used in the proposed CDM project activity and transported through one steam header in both scenarios

Step 1.2: Determine the baseline capacity of electricity generation
The total capacity of electricity generation available in the baseline is calculated as follows:

$$CAP_{EG,total,y} = LOC_y \times \left[\sum_i \left(CAP_{EG,CG,i} \times LFC_{EG,CG,i} \right) + \sum_j \left(CAP_{EG,PO,j} \times LFC_{EG,PO,j} \right) \right]$$

Where:

$CAP_{EG,total,y}$	=	*Baseline electricity generation capacity in on-site and off-site plants in year y (MWh)*
$CAP_{EG,CG,i}$	=	*Baseline electricity generation capacity of cogeneration-type heat engine i (MW)*
$CAP_{EG,PO,j}$	=	*Baseline electricity generation capacity of power-only-type heat engine j (MW)*
$LFC_{EG,CG,i}$	=	*Baseline load factor of cogeneration-type heat engine i (ratio)*
$LFC_{EG,PO,j}$	=	*Baseline load factor of power-only-type heat engine j (ratio)*
LOC_y	=	*Operation of the industrial facility using the process heat in year y (hour)*
i	=	*Cogeneration-type heat engine in the baseline scenario*
j	=	*Power-only-type heat engine in the baseline scenario*

Step 1.3: Determine the efficiencies of heat generators, and efficiencies and heat-to-power ratio of heat engines"
As per para 42, efficiency of the heat engine would be calculated as per TOOL09.

"*Case 2: For heat engines without a minimum three-year operational history prior to the CDM project activity the heat-to-power ratio should be determined as per the design conditions of the plant, for the configuration identified as baseline scenario*"

As per para 38 of the methodology, Step 2 is "*Determine the baseline electricity generation in the grid and emission factors*". As base line of the project is coal fired cogeneration system this step is not applicable.

and Step 3 is "*Determine the baseline biomass-based heat and power generation*". As base line

does not involve the biomass based heat and power generation system, this step is not applicable.

Step 4 is *"Determine the baseline demand for fossil fuels to meet the balance of process heat and the corresponding electricity generation"*, and

"Step 4.1: Determine the baseline fossil fuel-based cogeneration of process heat and electricity and the remaining process heat demand" is seen mentioned in the methodology.

As per para 82, *"When the amount of biomass residues available is not sufficient to generate the heat required to meet the process heat demand, it is assumed that the balance of process heat is met using fossil fuels, resulting in related fossil fuel baseline emissions. Where fossil fuel based cogeneration, capacity is available it is assumed that the remaining process heat demand will first be supplied by cogeneration and then by direct use of heat supplied by heat generators."*

As baseline project activity does not involve biomass based cogeneration. Hence, this step is not applicable.

Step 4.2 states *"Determine the baseline heat generation to meet the fossil-based cogeneration of heat and power and the heat to meet the balance of process heat"*, under which it is mentioned:

"*Estimate the total amount of fossil fuels required to generate the heat required for the cogeneration in Step 4.1 and the balance of process heat as follows:*

$$\sum_h HG_{BL,FF,y,h} = HG_{BL,FF,DHE,y} + HG_{BL,FF,CG,y}$$

$$FF_{BL,HG,y,f} = \sum_h \left(\frac{HG_{BL,FF,y,h}}{\eta_{BL,HG,FF,h}} \right)$$

Where:

$FF_{BL,HG,y,f}$	=	*Baseline fossil fuel demand for process heat in year y (GJ)*
$HG_{BL,FF,y,h}$	=	*Baseline fossil-based heat generation in heat generator h in year y (GJ)*
$\eta_{BL,HG,FF,h}$	=	*Baseline fossil-based heat generation efficiency of heat generator h (ratio)*[1]
$HG_{BL,FF,DHE,y}$	=	*Baseline fossil-based heat used to meet baseline process heat demand via direct heat extraction in year y (GJ)*
$HG_{BL,FF,CG,y}$	=	*Baseline fossil-based heat cogeneration in year y (GJ)*

[1] In case of connection to a district heating system or off-site heat supply from which the individual sources cannot be identified, the district heating system shall be considered the most efficient heat source. The capacity of the district heating system shall be considered unlimited unless it can be justified (based on historical consumption data or heat purchase contracts) that the amount of heat to be consumed from/ or delivered to the district heat system was limited. The emission factor of the district heating system shall be considered 0.

The total heat generation required from fossil fuels ($HG_{BL,FF,y}$) shall be allocated to the different heat generators ($HG_{BL,FF,y,h}$), so as to maximize the heat generation efficiency, subject to the difference in heat content in the different heat carriers, up to the level required for meeting the balance of process heat demand."

For current monitoring period,

$HG_{BL,,CG}$= 1108828.2*(2742.84-852.393)*10^{-6} TJ
$HG_{BL,,CG}$= 2096.18 TJ
Therefore, $HG_{BL,,CG}$= $HG_{BL,FF,CG}$= 2096.18 TJ

As direct steam extraction not applicable for the project case, $HG_{BL,FF,DHE,y}$ would be zero. Hence,
$HG_{BL,,CG}$= $HG_{BL,FF,CG}$= 2096.18 TJ

$FF_{BL,HG,y,f}$= 2096.18/0.90 TJ
$FF_{BL,HG,y,f}$= 2329.09 TJ

Step 5 states "*Determine the baseline emissions due to uncontrolled burning or decay of biomass residues*"
This step is not applicable for the project activity as the project activity would not account the emission due to the decay of biomass.

Thus, Baseline emission of the project activity would be:

$$BE_y = EL_{BL,GR,y} \times EF_{EG,GR,y} + \sum_f FF_{BL,HG,y,f} \times EF_{FF,y,f} + EL_{BL,FF/GR,y} \times min(EF_{EG,GR,y}, EF_{EG,FF,y}) + BE_{BR,y}$$

Where:

BE_y = Baseline emissions in year y (t CO_2)
$EL_{BL,,}$ = Baseline electricity sourced from the grid in year y (MWh)
$FE_{G,,}$ = Grid emission factor in year y (t CO_2/MWh)
$FF_{BL,,,}$ = Baseline fossil fuel demand for process heat in year y (GJ)
$EF_{FF,,}$ = CO_2 emission factor for fossil fuel type f in year y (t CO_2/GJ)
$EL_{BL,/GR,y}$ = Baseline uncertain electricity generation in the grid or on-site or off-site power-only units in year y (MWh)
$EF_{EG,,}$ = CO_2 emission factor for electricity generation at the project site or off-site plants in the baseline in year y (t CO_2/MWh)
$BE_{BR,}$ = Baseline emissions due to disposal of biomass residues in year y (t CO_2e)
f = Fossil fuel type"

Baseline uncertain electricity generation in the grid or on-site or off-site power-only units in year y (MWh) is not applicable for the project activity and the project activity does not account the emission due to disposal of biomass residue. Hence, the baseline emissions for the project activity would be

calculated as:

$$BE_y = EL_{BL,GR,y} \times EF_{EG,GR,y} + \sum FF_{BL,,y,f} \times EF_{FF,y,f}$$

BE =137,609.37 x 0.9 + 2329.09 x 96.1

BE =347,673 tCO2/year (Rounded off)

Summary of actual emission reductions:

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)
2018	68,036	0	0	68,036
2019	58,942	0	0	58,942
2020	73,595	0	0	73,595
2021	64,963	0	0	64,963
2022	82,136	0	0	82,136
Total	347,673	0	0	347,673
Total number of crediting years	4 years 10 months 12 days			

C.6. Prior History>>

The project activity has not applied to any other GHG program for generation or issuance of carbon offsets or credits.
Hence the project will not cause double accounting of carbon credits (i.e. COUs).

C.7. Monitoring period number and duration>>

First Issuance Period: 4years, 10 months & 12 days – 19/02/2018 to 31/12/2022

C.8. Changes to start date of crediting period >>

There is no change in the start date of the crediting period.
The crediting period under UCR has been considered from 19/02/2018.

C.9. Permanent changes from PCN monitoring plan, applied methodology or applied standardized baseline >>

There are no changes in applied methodology and standardized baseline. However, the monitoring parameter $HG_{BL,FF,CG}$ has been removed as the monitoring parameter $HG_{BL,y}$ has already been monitoring for this project activity. Also, emission reduction has been calculated based on the net electricity generation. Hence, monitoring parameters for grid export is not relevant for this project activity. Hence, the monitoring table for $EL_{MWh,y}$ has been removed. The quantity of the main product of the production process (P_x) has been incorporated in monitoring plan.

C.10. Monitoring plan>>

Provide a description of the monitoring system in accordance with the applicable provisions on the description of monitoring system in the Project Standard and the monitoring plan in the registered PCN.

Following parameters being used in emission reductions determination (Fixed Ex-Ante)

Data / Parameter:	$EF_{BL,CO2,FF}$
Methodology reference	ACM0006
Data unit	t-CO_2/GJ
Description	CO_2 emission factor of the fossil fuel type that would be used for power generation at the project site in the baseline (t CO_2/GJ)
Measured/calculated/default	Default
Data source	IPCC database
Value(s) of monitored parameter	0.0961
Measurement/ Monitoring equipment (if applicable)	Not Applicable
Measuring/reading/ recording frequency (if applicable)	Not Applicable
Calculation method (if applicable)	Not Applicable
QA/QC procedures	Data taken from IPCC database. Hence, no QA/QC required.
Purpose of data	To calculate baseline emission
Additional comments	Value is fixed ex-ante

Data / Parameter:	$\eta_{BL,FF}$
Methodology reference	ACM0006
Data unit	%
Description	Efficiency of the fossil fuel boiler at the project site in the baseline
Measured/calculated/default	Default
Data source	CDM methodological Tool 09
Value(s) of monitored parameter	90%
Measurement/ Monitoring equipment (if applicable)	Not Applicable
Measuring/reading/ recording frequency (if applicable)	Not Applicable
Calculation method (if applicable)	Not Applicable
QA/QC procedures	Data taken from CDM methodological Tool. Hence, no QA/QC required.
Purpose of data	To calculate baseline emission
Additional comments	Value is fixed ex-ante

Data / Parameter:	$NCV_{BR,n,x}$
Methodology reference	ACM0006
Data unit	KCal/kg
Description	Net calorific value of biomass
Measured/calculated/default	Measured
Data source	Bagasse Test Report

Value(s) of monitored parameter	2363
Measurement/ Monitoring equipment (if applicable)	As per Lab Test Report (Spectro Analytical Labs Pvt. Ltd)
Measuring/reading/ recording frequency (if applicable)	
Calculation method (if applicable)	Not Applicable
QA/QC procedures	Data taken from biomass suppliers. Hence, no QA/QC required.
Purpose of data	To calculate baseline emission
Additional comments	Value is fixed ex-ante

Data / Parameter:	$NCV_{FF,f,x}$
Methodology reference	ACM0006
Data unit	GJ/tonne
Description	Net calorific value of fossil fuel type f in year x
Measured/calculated/default	Measured
Data source	Supplier's quotation
Value(s) of monitored parameter	23.03
Measurement/ Monitoring equipment (if applicable)	Not Applicable
Measuring/reading/ recording frequency (if applicable)	As and when procured.
Calculation method (if applicable)	-
QA/QC procedures	Data taken from suppliers. Hence, no QA/QC required.
Purpose of data	To calculate baseline emission
Additional comments	Value is fixed ex-ante

Data/Parameter	$EF_{Grid,y}$
Data unit	tCO2 /MWh
Description	Combined Margin Grid Emission Factor
Source of data	UCR standard version 6.0
Value applied	0.9
Measurement methods and procedures	N/A
Monitoring frequency	Ex-ante fixed parameter
Purpose of Data	For the calculation of Emission Factor of the grid
Additional Comment	-

Data and parameters that require to be monitored at the Project location from time to time is tabulated below:

Data / Parameter:	$HG_{BL,y}$
Methodology	CDM Large-scale Consolidated Methodology ACM0006

<table>
<tr><td>reference</td><td></td></tr>
<tr><td>Data unit</td><td>TJ/Year</td></tr>
<tr><td>Description</td><td>Baseline process heat generation in year y (TJ)</td></tr>
<tr><td>Measured/calculated/default</td><td>Measured</td></tr>
<tr><td>Data source</td><td>Onsite measurement</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>2096.18</td></tr>
<tr><td>Measurement/ Monitoring equipment</td><td>
<table>
<tr><td colspan="2"></td></tr>
<tr><td>Type of meter</td><td>Steam Flow Meter [FT 502]</td></tr>
<tr><td>Location of meter</td><td>TG 7.9 MW</td></tr>
<tr><td>Accuracy of meter</td><td>0.25% FSD</td></tr>
<tr><td>Serial number of meter</td><td>Y1TA16492</td></tr>
<tr><td>Calibration frequency</td><td>Annually</td></tr>
<tr><td>Date of Calibration/ validity</td><td>22/07/2018 – 21/07/2019
10/11/2019 – 09/11/2020
20/11/2020 – 19/11/2021
04/11/2021 – 03/11/2022
03/08/2022 - 02/08/2023</td></tr>
<tr><td>Reference No. of Calibration Certificate</td><td>Certificate No. : 7</td></tr>
<tr><td>Calibration Status</td><td>Steam Flow meter is calibrated on 03/08/2022</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>Type of meter</td><td>Pressure Gauge [PT 502A]</td></tr>
<tr><td>Location of meter</td><td>TG 7.9 MW</td></tr>
<tr><td>Accuracy of meter</td><td>0.25% FSD</td></tr>
<tr><td>Serial number of meter</td><td>Y1TA16519</td></tr>
<tr><td>Calibration frequency</td><td>Annually</td></tr>
<tr><td>Date of Calibration/ validity</td><td>22/07/2018 – 21/07/2019
10/11/2019 – 09/11/2020
20/11/2020 – 19/11/2021
04/11/2021 – 03/11/2022
03/08/2022 - 02/08/2023</td></tr>
<tr><td>Reference No. of Calibration Certificate</td><td>Certificate No. : 5</td></tr>
<tr><td>Calibration Status</td><td>Calibrated on 03/08/2022</td></tr>
</table>
</td></tr>
</table>

	<table><tr><td colspan="2"></td></tr><tr><td>Type of meter</td><td>Temperature Gauge [TT 502]</td></tr><tr><td>Location of meter</td><td>TG 7.9 MW</td></tr><tr><td>Accuracy of meter</td><td>+/-.25%</td></tr><tr><td>Serial number of meter</td><td>C2T902317</td></tr><tr><td>Calibration frequency</td><td>Annually</td></tr><tr><td>Date of Calibration/ validity</td><td>22/07/2018 – 21/07/2019 10/11/2019 – 09/11/2020 20/11/2020 – 19/11/2021 04/11/2021 – 03/11/2022 03/08/2022 - 02/08/2023</td></tr><tr><td>Reference No. of Calibration Certificate</td><td>Would be provided during verification</td></tr><tr><td>Calibration Status</td><td>Calibrated on 03/08/2022</td></tr></table>
Measuring/reading/ recording frequency	Monitoring procedure: Continuously with steam flow meter Data Type: measured Recording frequency: Daily Average Archiving method: Electronic
Calculation method (if applicable)	Calculation has been done by multiplying the generated steam quantity with its enthalpy.
QA/QC procedures	Meters & gauges are calibrated annually as per standards;
Purpose of data	To estimate baseline emission
Additional comments	Data would be archiving electronically up to 2 years from the end of crediting period.

Data / Parameter:	$EL_{PG,Gross,y}$
Methodology reference	CDM Large-scale Consolidated Methodology ACM0006
Data unit	MWh
Description	Gross quantity of electricity generated in all power plants which are located at the project site and included in the project boundary in year y
Measured/calculated/default	Measured
Data source	Plant Record
Value(s) of monitored parameter	202778.75 MWh

Measurement/ Monitoring equipment	<table><tr><td colspan="2"></td></tr><tr><td>Type of meter</td><td>Energy Meter [EM 1]</td></tr><tr><td>Location of meter</td><td>7.9 MW TG end</td></tr><tr><td>Accuracy of meter</td><td>0.2 s</td></tr><tr><td>Serial number of meter</td><td>X1004044</td></tr><tr><td>Calibration frequency</td><td>Annually</td></tr><tr><td>Date of Calibration/ validity</td><td>02/04/2018 – 01/04/2019 23/03/2019 – 22/03/2020 01/04/2020 – 31/03/2021 01/04/2021 – 31/03/2022 01/04/2022 - 31/03/2023</td></tr><tr><td>Reference No. of Calibration Certificate</td><td>NTS/S/8334</td></tr><tr><td>Calibration Status</td><td>Energy meter is calibrated on 01/04/2023</td></tr></table>
Measuring/reading/ recording frequency	Monitoring procedure: Continuously from Installed energy meter. Data Type: Measured Recording frequency: Daily cumulative Archiving method: Electronic
Calculation method (if applicable)	Calculated by subtracting previous reading from present reading of energy meter reading. Gross Generation = Present Reading – Previous Reading
QA/QC procedures	Meter is Calibrated annually.
Purpose of data	To calculate baseline emission
Additional comments	Data would be archiving electronically up to 2 years from the end of crediting period.

Data / Parameter:	$EL_{PJ,aux,y}$
Methodology reference	CDM Large-scale Consolidated Methodology ACM0006
Data unit	MWh
Description	Total auxiliary electricity consumption required for the operation of the power plants at the project site for the year y.
Measured/calculated/default	Measured
Data source	Onsite Measurement
Value(s) of monitored parameter	59287.083

<table>
<tr><td>Measurement/ Monitoring equipment</td><td>
<table>
<tr><td>Type of meter</td><td>Energy Meter 4 [EM4]</td></tr>
<tr><td>Location of meter</td><td>Power Plant Aux T/F-1</td></tr>
<tr><td>Accuracy class</td><td>0.2s</td></tr>
<tr><td>Serial number of meter</td><td>X1004047</td></tr>
<tr><td>Calibration frequency</td><td>Annually</td></tr>
<tr><td>Date of Calibration/ validity</td><td>02/04/2018 – 01/04/2019
23/03/2019 – 22/03/2020
01/04/2020 – 31/03/2021
01/04/2021 – 31/03/2022
01/04/2022 - 31/03/2023</td></tr>
<tr><td>Reference No. of Calibration Certificate</td><td>NTS/S/8337</td></tr>
<tr><td>Calibration Status</td><td>Energy meter is calibrated on 01/04/2022</td></tr>
</table>
<table>
<tr><td>Type of meter</td><td>Energy Meter 5 [EM5]</td></tr>
<tr><td>Location of meter</td><td>Power Plant Aux T/F-2</td></tr>
<tr><td>Accuracy class</td><td>0.2s</td></tr>
<tr><td>Serial number of meter</td><td>X10040478</td></tr>
<tr><td>Calibration frequency</td><td>Annually</td></tr>
<tr><td>Date of Calibration/ validity</td><td>02/04/2018 – 01/04/2019
23/03/2019 – 22/03/2020
01/04/2020 – 31/03/2021
01/04/2021 – 31/03/2022
01/04/2022-31/03/2023</td></tr>
<tr><td>Reference No. of Calibration Certificate</td><td>NTS/S/8338</td></tr>
<tr><td>Calibration Status</td><td>Energy Meter is calibrated on 01/04/2022</td></tr>
</table>
</td></tr>
<tr><td>Measuring/reading/ recording frequency</td><td>Monitoring procedure: Daily from Installed Energy Meter.
Data Type: Measured
Recording frequency: Daily
Archiving method: Electronic</td></tr>
<tr><td>Calculation method (if applicable)</td><td>Calculated by subtracting previous reading from present reading of energy meter reading.

Net auxiliary consumption = Present Reading – Previous Reading</td></tr>
<tr><td>QA/QC procedures</td><td>Meter is Calibrated annually.</td></tr>
<tr><td>Purpose of data</td><td>To calculate baseline emission.</td></tr>
<tr><td>Additional comments</td><td>Steam quantity data would be archiving electronically up to 2 years from the end of crediting period.</td></tr>
</table>

Data / Parameter:	$B_{biomass,y}$
Methodology reference	ACM0006
Data unit	Tonne/Year
Description	Quantity of biomass combusted in the year y.
Measured/calculated/d	Measured

<table>
<tr><td>efault</td><td></td></tr>
<tr><td>Data source</td><td>Weighbridge used Onsite for measurement</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>341779.0119</td></tr>
<tr><td>Measurement/ Monitoring equipment</td><td>
<table>
<tr><td colspan="2"></td></tr>
<tr><td>Type of meter</td><td>Mechanical Way Bridge</td></tr>
<tr><td>Location of meter</td><td>Inside the industrial premises of DCM Shriram Ltd. – Distillery Division Hariawan</td></tr>
<tr><td>Accuracy of meter</td><td>III (e)</td></tr>
<tr><td>Serial number of meter</td><td>JET 2463</td></tr>
<tr><td>Calibration frequency</td><td>Yearly</td></tr>
<tr><td>Date of Calibration/ validity</td><td>Calibration details:
17/10/2018 – 16/10/2019
14/10/2019 – 13/10/2020
19/10/2020 – 18/10/2021
16/10/2021 – 15/10/2022
20/10/2022 – 19/10/2023</td></tr>
<tr><td>Reference No. of Calibration Certificate</td><td>Would be provided during verification</td></tr>
<tr><td>Calibration Status</td><td>Calibrated yearly and the last calibration of weighbridge done for the period 2022 to 2023</td></tr>
</table>
</td></tr>
<tr><td>Measuring/reading/ recording frequency</td><td>Yearly</td></tr>
<tr><td>Calculation method (if applicable)</td><td>Net biomass consumption can be calculated by subtracting closing stock of biomass from opening stock of biomass.</td></tr>
<tr><td>QA/QC procedures</td><td>Consumption of biomass can be cross checked from plant records</td></tr>
<tr><td>Purpose of data</td><td>For records only</td></tr>
<tr><td>Additional comments</td><td>Data would be archiving electronically up to 2 years from the end of crediting period.</td></tr>
</table>

Data / Parameter:	Moisture Content
Methodology reference	ACM0006
Data unit	%
Description	Moisture content of the biomass
Measured/calculated/default	Measured
Data source	Test Report/ Plant Data
Value(s) of monitored parameter	46.30%
Measurement/ Monitoring equipment	Test Method: IS: 1350 (P-1)
Measuring/reading/ recording frequency	Monitoring procedure: Measurement would be carried out for each batch of biomass.
Calculation method (if applicable)	Value can be obtained by testing the biomass sample in lab for each batch of biomass entered into the project boundary.
QA/QC procedures	Lab test reports are considered
Purpose of data	For records only
Additional comments	Data would be archiving electronically up to 2 years from the end of crediting

	period.

Data / Parameter:	P_x
Methodology reference	ACM0006
Data unit	KL/Yr
Description	Quantity of the Alcohol produced in year x from plant operated at the project site.
Measured/calculated/default	Measured
Data source	Production Record
Value(s) of monitored parameter	<table><tr><th>Financial Year</th><th>Production in KL</th></tr><tr><td>2017-18</td><td>6,985</td></tr><tr><td>2018-19</td><td>44,955</td></tr><tr><td>2019-20</td><td>49,771</td></tr><tr><td>2020-21</td><td>51,756</td></tr><tr><td>2021-22</td><td>54,490</td></tr></table>
Measurement/ Monitoring equipment	Flow meter
Measuring/reading/ recording frequency	Monitoring procedure: Measurement would be carried out for each batch of alcohol generated.
Calculation method (if applicable)	Not Applicable
QA/QC procedures	Regular calibration has been done.
Purpose of data	For records only
Additional comments	Data would be archiving electronically up to 2 years from the end of crediting period.