PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: 18 MW Biomass Based Power Generation at GM Sugars and Energy Ltd by Energy Advisory Services Private Limited

Version 2.0

Date 05/07/2023

First CoU Issuance Period: 09 years, 09months

Crediting Period: 01/04/2013 to 31/12/2022[1]

[1] Crediting Period is considered referring to UCR CoU Standard August 2022, Version 6.0, Page no.6

Project Concept Note (PCN)
CARBON OFFSET UNIT (CoU) PROJECT

BASIC INFORMATION	
Title of the project activity	18 MW Biomass Based Power Generation at GM Sugars & Energy Ltd by Energy Advisory Services Private Limited
Scale of the project activity	Large scale
Completion date of the PCN	05/07/2023
Project participants	M/S GM Sugars and Energy Ltd.
Host Party	India
Applied methodologies and standardized baselines	CDM UNFCCC Methodology ACM0006: Grid connected renewable electricity generation, version 16.0 Standardized baselines: Not applicable
Sectoral scopes	01 Energy industries (Renewable/Non Renewable Sources)
Estimated amount of total GHG emission reductions per year	29,143 CoUs (29,143 tCO_2e)
Estimated total amount of average GHG emission reductions for the entire monitoring period (2013- 2022)	2,88,517 CoUs (2,88,517 tCO_2e)

SECTION A. Description of project activity

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

18 MW Capacity Biomass based Power Project of M/s. GM SUGARS & ENERGY LTD is located in Sangur Village of Haveri District in the state of Karnataka, India. GM Sugars has installed an 18 MW cogeneration power plant. Out of 18 MW, 4 MW is consumed for the factory use and remaining 14 MW is exported to the Indian electricity grid.

The details of the registered project are as follows:

Purpose of the project activity:

The purpose of the project activity is to generate electricity using renewable biomass and thereby reducing GHG emissions by displacing fossil fuel dominated grid-based electricity with biomass based renewable electricity. The commissioning date of this UCR project activity is 19/05/2012.

The project activity is a grid-connected biomass (bagasse based) cogeneration power plant with a high-pressure steam-turbine configuration. The high-pressure boilers are fired by bagasse, a biomass by-product from the sugar manufacturing process, to generate steam which in turn is fed to the steam turbine to generate power. The overall business is integrated with alcohol distillation and power generation. The power co-generation units generate biomass-based power for captive consumption of the sugar plant and the sale of surplus power to the Indian electricity grid.

The project activity involves the renewable biomass (bagasse) based electricity generation at GM Sugars & Energy Ltd. plant, located at Sangur village, District Haveri, State: Karnataka. This UCR project activity involves the installation of 18 MW and 80 TPH capacity boiler commissioned on 19/05/2012 (date of synchronization of the turbine with the Karnataka State grid)

Prior to the UCR project activity, the biomass was used for captive steam and power requirement of the M/S GM Sugars & Energy Ltd.

The UCR project activity is the construction and operation of a power plant/unit that uses renewable energy sources and supplies renewable electricity to the grid. The UCR project activity is thus the displacement of electricity that would be provided to the grid by more-GHG-intensive means and provides long-term benefits to the mitigation of climate change. The UCR project activity qualifies under the environmental additional positive list of pre-approved project types under the UCR carbon incentive model for issuance of voluntary carbon credits.

Assured supply of biomass fuel and other barriers to the UCR project activity

One of the major constraints associated with the project activity is the availability of sugarcane and there is often a diversion of cane from sugar mill to khandsaris and ghur manufactures when sugar prices are high (typically periods of low availability of cane). These manufacturers offer higher price as they operate in unorganised sector and have no quality assurance plans. These diversions put a further constraint on cane availability and hence bagasse which again may impact the viability of the project activity. The uncertainty in weather conditions also plays an important role in determining the cane availability in the region. There is a continuous weather-related risk for cane under rain fed cultivation conditions.

Along with that, there are often chances of diversion of cane by farmers to other sugar mills in the

nearby areas. The uncontrolled growth of sugar mills in Karnataka, has led to competition among the sugar mills for the natural resource utilisation i.e., agriculture farm produce, and leading to farmer option for getting varying prices among the sugar mills in the region. This diversion is an also important constraint faced by the project promoters and can significantly influence the cane crushing capacity and in turn the power generation capacity of the sugar mill.

The operation of bagasse-based power plants for captive steam and electricity generation for captive use / sale to grid is common amongst the sugar industry. It is therefore fair to say that these options are consistent with the applicable laws and regulations as demonstrated by existing practices. There is no policy in India that mandates the generation of electricity for grid supply from bagasse, hence this is a voluntary project activity. The policy frameworks for bagasse-based grid electricity supply are governed by the state electricity regulatory commissions which detail the terms of power purchase agreements for such investments.

The Indian sugarcane harvesting has been affected amid the COVID-19 pandemic situation prevailing in the country, and M/S GM Sugars & Energy Ltd. has focused on continuing to work closely with the thousands of farmers who rely on M/S GM Sugars & Energy Ltd. for their sustenance and livelihoods. M/S GM Sugars & Energy Ltd. has further stepped-up efforts towards better cane development and farm management, through adoption of techniques such as intercropping, conservation of energy and water resources through drip irrigation, waste-water management, and rain-water harvesting.

A.2 Do no harm or Impact test of the project activity>>

There are social, environmental, economic and technological benefits which contribute to sustainable development.

Social benefits:

- The project activity contributes to employment generation in the local area for both skilled & unskilled people for operation and maintenance of the equipments.
- It has created steady higher value jobs and skilled workers at the facility. The project activity is contributing to the national energy security by reducing consumption of fossil fuels.
- The technology being used in the project is proven and safe for power generation. An increase in such kind of projects shall enable all the technology suppliers to continuously innovate and modernize on the technology front. The local people will know the technological advancement and will help in capacity building.

Environmental benefits:

- The project activity is a renewable energy project, which utilizes biomass as a fuel for power generation, a move that is voluntary and not mandated under current environmental laws of India. Since this project activity generates green energy in the form of power, it has positively contributed towards the reduction in (demand) use of finite natural resources like coal and oil, minimizing depletion and in turn increasing its availability to other important purposes. Therefore, this project activity helps to environment sustainability by reducing GHG emission in the atmosphere.
- Avoids global and local environmental pollution, leading to reduction of GHG emissions.
- Enabling local electricity grid to divert the electricity displaced by the project activity to the nearby needy areas.
- Indirect capacity building by providing a case example to other sugar mills in the region for

switching to high-capacity cogeneration configuration, for electricity generation. In addition to the reduction in carbon dioxide (CO_2) emissions the project implementation will result in reduction of other harmful gases (NOx and SOx) that arise from the combustion of coal used in power generation. The project activity also leads to reduce ash generation since the ash content in bagasse is lower than that of Indian coal.

Economic benefits:

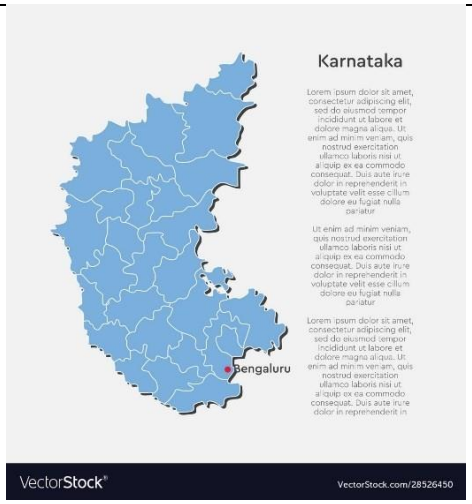
- The project activity creates employment opportunities during the project stage and operation and maintenance of the boiler and turbines.
- The project activity helps in conservation of fast depleting natural resources like coal and oil thereby contributing to the economic well being of country as a whole.
- The various other benefits due to the project activity ensure that the project is contributing to the sustainable development of the region by bringing in green technologies and processes to a backward region. The technology is indigenous and by implementing such projects the country is showcasing its GHG mitigation actions in its efforts to combat climate change.

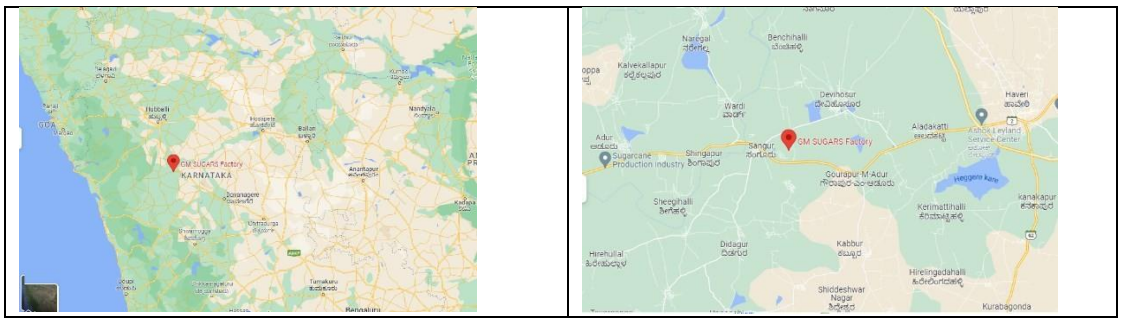
A.3. Location of project activity >>

Country: India
District: Haveri
Village: Sangur
Tehsil: Haveri
State: Karnataka
Code: 581148

The project is located at Sangur village and is located in Haveri district of Karnataka state, India. The nearest major town Hubli which is at a distance of 80 km and railway station is Haveri Railway Station, which is at a distance of 8 km from the project location. The geographical coordinates of the project site are 75.31219°E and 14.77593°N that is 75°18'43.884"E and 14°46'33.348"N. The location of the site is shown in the following maps.

Physical location address of the project:
M/S GM Sugars & Energy Ltd.
Village Sangur – 581148
Taluka – Haveri, District Haveri, State – Karnataka, India.





A.4. Technologies/measures >>

The UCR project activity is a grid-connected bagasse-based cogeneration power plant with a high-pressure steam-turbine configuration. The UCR project activity is the electricity generation capacity and the installation of facilities for allowing captive use and export of electricity to the electricity grid.

The UCR project activity involves the installation of a 18 MW turbo generator along with high pressure (86 kg/cm^2) 80 TPH capacity boiler commissioned on 19/05/2012. The high-pressure boiler is fired by bagasse, a by-product from the sugar manufacturing process to generate steam, which in turn powers the steam turbine to generate power.

The technology of biomass residue based high steam pressure power generation itself is known and in use in India. The use of high-pressure system allows for increased efficiency levels for electricity generation.

The project is a green field renewable energy power generation project connected to the grid and supplies electricity to the grid and use for captive purpose. The project activity is generating electricity using biomass (sugar factory residues) with 1x80 TPH Bi-Drum, Travelling Grate boiler using a 18743 KW, 8 HP turbine whose capacity will be governed at MW.

On an annual average basis, the project exports around 126.14 GWh to the Indian electricity grid.

The primary technology for the project activity is direct combustion of biomass residues, and power generation using the Rankine cycle technology. Power generation through this method involves combustion of biomass residues directly in the boiler, which is capable of taking multi fuel composition to generate high-pressure high-temperature steam, which is fed to a steam turbine that drives a generator.

The main elements of the power plant are as follows.
- A boiler unit which converts the energy available in the fuels into thermal energy;
- A steam turbine unit which converts thermal energy into mechanical energy;
- An alternator unit, which converts mechanical energy into electrical power.

A number of other equipment components, as listed below, also form part of the biomass power plant.
- Fuel and ash handling equipment
- Water cooled condenser system for cooling the exhaust steam
- DM Water system and Air Compressor Plant
- Electrical systems and Automation system

Technical details of the project activity

Boiler	
Manufacturer	ISGEC John Thompson
Type	1x80 TPH Bi-Drum, Travelling Grate boiler
Boiler capacity (100 % load) / Steam Flow rate	80 TPH
Steam pressure at super heater outlet	86 kg/cm^2 (g)
Steam temperature at super heater outlet	515±5°C
Turbine	
Make	Siemens
Type	SST300VE404
Capacity	18000 Kw
Steam pressure at the TG inlet	85 ATA
Steam temperature at the TG inlet	3.3 ATA
Exhaust steam pressure	0.105 ATA
Steam inlet quantity	80 TPH for 18 MW
Gear box	
Make	Triveni
Rated power	18,743 kW
Energy Production	
Gross power	18 MW
Auxiliary consumption	4 MW
Net power for export after auxiliary consumption	14 MW

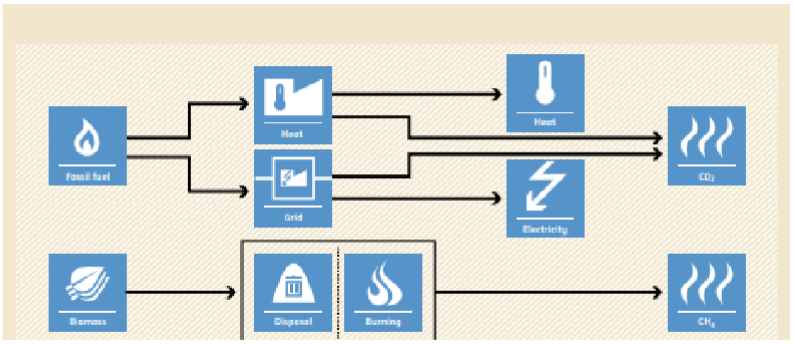
A.5. Parties and project participants >>

Party (Host)	Participants
India	M/S GM Sugars & Energy Ltd. Village Sangur – 581148 Taluka – Haveri District Haveri State – Karnataka, India

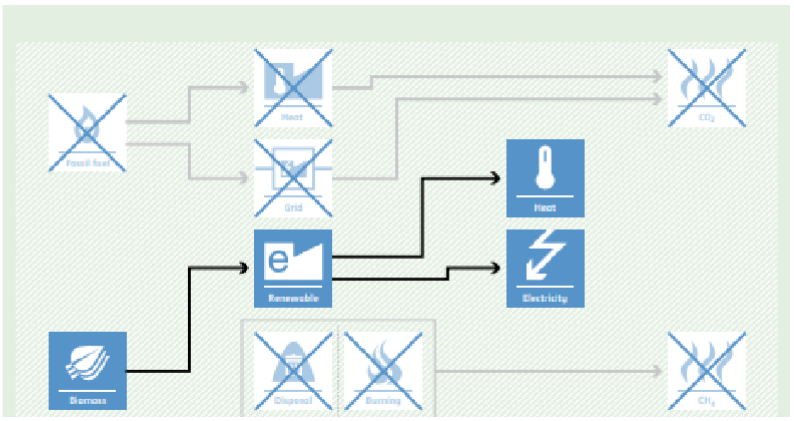
A.6. Baseline Emissions>>

ACM0006 Electricity and heat generation from biomass

BASELINE SCENARIO
Electricity and heat would be produced by more-carbon-intensive technologies based on fossil fuel or less-efficient biomass power and heat plants. Biomass could partly decay under anaerobic conditions, bringing about methane emissions.



PROJECT SCENARIO
Use of biomass for power and heat generation instead of fossil fuel or increase of the efficiency of biomass-fuelled power and heat plants. Biomass is used as fuel and decay of biomass is avoided.



The approved baseline methodology has been referred from the indicative simplified baseline and monitoring methodologies for selected large scale UNFCCC CDM project activities that involve generation of power and heat in thermal power plants, including cogeneration plants using biomass.

Typical activities under ACM0006 are new plants, capacity expansions, energy efficiency improvements or fuel switch projects.

A.7. Debundling>>

This "18 MW Biomass Based Power Generation At GM Sugars & Energy Ltd." project is not a debundled component of a larger registered carbon offset project activity.

SECTION B. Application of methodologies and standardized baselines

B.1. References to methodologies and standardized baselines >>

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

TYPE I - Renewable Energy Projects (Large Scale)

CATEGORY- ACM0006 Electricity and heat generation from biomass, Version 16.0

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

The project activity is a power generation project using a biomass (bagasse) and displaces CO_2 emissions from electricity generation in power plants that are displaced due to the project activity. Since the project activity utilises biomass (bagasse) for the generation of power and supplies it to the local grid, it displaces fossil fuel (coal), and hence it meets the primary applicability criteria of the methodology.
The project activity is a power-and-heat plant that encompasses cogeneration plants, i.e. power-and-heat plant in which at least one heat engine simultaneously generates both process heat and power. The total installed capacity of project activity is 18MW which is acceptable as per the applied large scale methodology.
The installation of a new biomass residue fired power generation unit, which replaces existing power generation capacity fired with fossil fuel as in the project plant (power capacity expansion projects) is also included in this methodology.
For the purposes of this methodology, heat does not include waste heat, i.e., heat that is transferred to the environment without utilization, for example, heat in flue gas, heat transferred to cooling towers or any other heat losses.
The biomass used by the project plant is not stored for more than one year. The biomass used by the project plant is not processed chemically or biologically (e.g., through esterification, fermentation, hydrolysis, pyrolysis, bio- or chemical degradation, etc.) prior to combustion.
The Project Activity uses biomass residues from a production process (e.g., production of sugar), and 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) or in other substantial changes (e.g. product change) in this process.
The project activity unit does not co-fire fossil fuel and/or does not exceed the limit of 25% co-firing fossil fuel criteria as per the UCR Protocol for such projects.
Biomass generated power is used for direct grid supply and for meeting the captive needs at the facility. The project activity is involved the grid-connected bagasse-based electricity generation capacity involving the installation of facilities for allowing the export of electricity to the regional grid.
Biomass is not sourced from dedicated plantations. The existing installed turbo-generators are fired by bagasse, a by-product of the sugarcane processing and a biomass residue
Bagasse is burnt in boilers as generated form the sugar mill and does not require any specific technology for its preparation before combustion. No fuel preparation equipment has been installed at site for preparation of bagasse. Hence no significant energy quantities are required to prepare the biomass residues for fuel combustion.
The project activity also does not include any GHG emissions related to the decomposition or burning of biomass. The baseline heat emissions for the project activity are not included in the project boundary nor does it claim for emission reductions from heat.

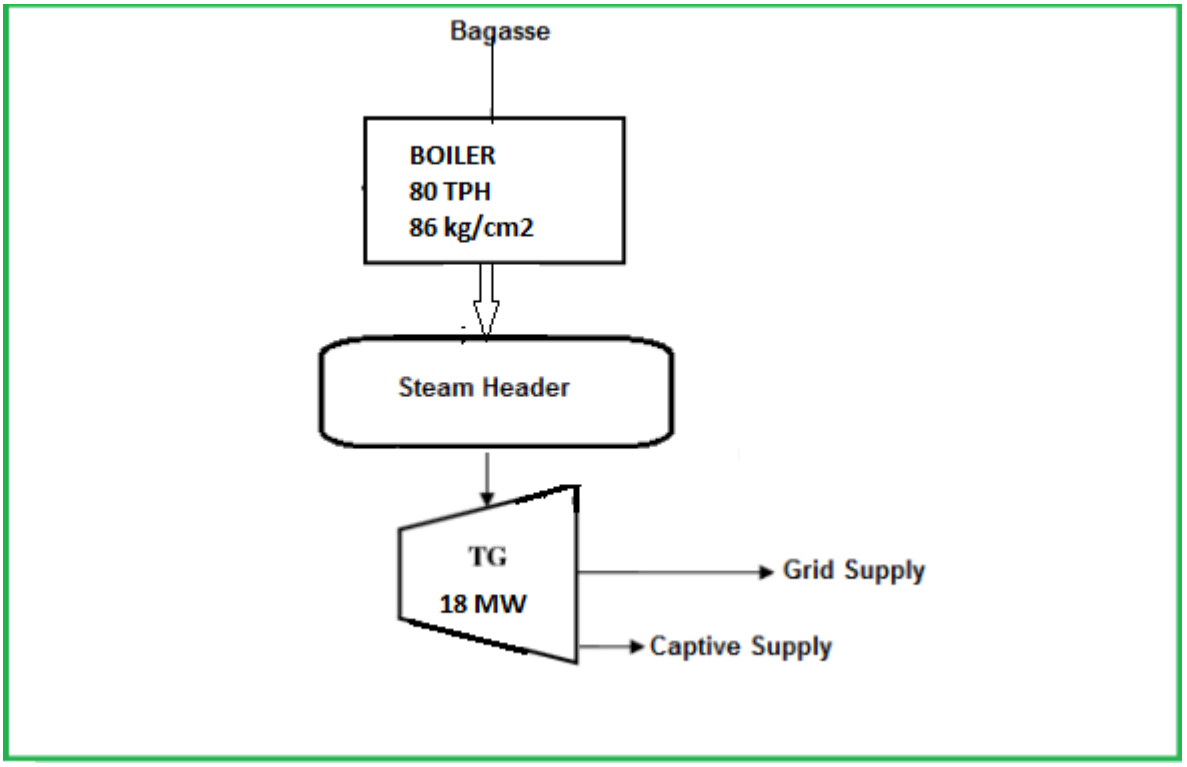
B.3. Applicability of double counting emission reductions >>

The biomass-based boiler and turbine are within the project boundary i. e. GM Sugar and Energy Ltd. plant. The biomass-based boiler and turbine have unique serial numbers which are visible on the units. The generated electricity is measured using energy meters who also has unique serial numbers. The Monitoring Report will have the details of the same and will be provided to the UCR verifier during the verification process.

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

The project boundary includes the physical, geographical site(s) of:

(a) the project power plant and all power plants connected physically to the electricity system that the project activity is connected to.



Leakage Emissions (LE_y)

Leakage emissions is not applicable as the project activity does not use technology or equipment transferred from another activity.

Hence $LE_y = 0$

	Source	GHG	Included?	Justification/Explanation
Baseline	GHG Emissions from fossil fuel in Grid Baseline Power Generation Uncontrolled burning or decay of surplus biomass residue	CO_2	Included	Major source of GHG emissions
		CH_4	Excluded	Excluded for simplification. This is conservative
		N_2O	Excluded	Excluded for simplification. This is conservative
		CO_2	Excluded	Excluded for simplification. This is conservative
		CH_4	Excluded	Excluded for simplification. This is conservative

		N_2O	Excluded	Excluded for simplification. This is conservative
Project Activity	Emissions from Biomass Project Activity On-site fossil fuel and electricity consumption due to the project activity (stationary or mobile) Off-site transportation of biomass residue Combustion of biomass residue for electricity and / or heat generation Storage of biomass residue	CO_2	Excluded	No fossil fuel / electricity is consumed at the project site due to the project activity. No biomass residue from off-site will be used for the project activity. Excluded for simplification. This is conservative
		CH_4	Excluded	No fossil fuel / electricity is consumed at the project site due to the project activity. No biomass residue from off-site will be used for the project activity Excluded for simplification. This is conservative
		N_2O	Excluded	Excluded for simplification. This is conservative

Project Emissions (PE_y)

The project emissions (PEy) under the methodology may include;

- CO_2 emissions from transportation of biomass residue to the project site
- CO_2 emissions from on-site consumption of fossil fuels due to project activity
- CO_2 emissions from electricity consumption at the project site that is attributable to the project activity and
- CH_4 emissions from combustion of biomass.

Where,
PET_y = are the CO_2 emissions during the year y due to transport of the biomass to the project plant in tons of CO_2,

$PEFF_{CO2,y}$ = are the CO_2 emissions during the year y due to fossil fuels co-fired by the generation facility in tons of CO_2,

$PE_{EC,y}$ = are the CO_2 emissions during the year y due to electricity consumption at the project site that

is attributable to the project activity in tons of CO_2,

GWP_{CH4} = is the Global Warming Potential for methane valid for the relevant commitment period and,

$PE_{Biomass,CH4,y}$ = are the CH_4 emissions from the combustion of biomass during the year y.
The proposed project activity does not have any CO_2 emissions due to off-site transportation of biomass, or from fossil fuel co-firing and from electricity consumption at site. The project activity also doesn't include CH_4 emissions from the combustion of biomass.

Hence,
$PET_y = 0$,
$PEFF_{CO2}$, y = 0,
$PE_{EC,y} = 0$
and,
$PE_{Biomass,CH4,y} = 0$.

Therefore, $PE_y = 0$.

B.5. Establishment and description of baseline scenario (UCR Standard or Methodology) >>

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

Renewable energy technology that displaces technology using fossil fuels, wherein the simplified baseline is the fuel consumption of the technology that would have been used in the absence of the project activity, times an emission factor for the fossil fuel displaced.

The baseline emissions due to displacement of electricity are determined by net quantity of electricity generation as a result of the project activity (incremental to baseline generation) during the year y in MWh times the CO_2 emission factor for the electricity displaced due to the project activity during the year y in tCO_2/MWh.

Given that power generation for internal consumption is part of the present project activity, emission reductions are only claimed from on-site incremental power generation that is injected to the grid. Therefore, the baseline scenario is the emission of GHG from the present electricity generation mix of the electricity grid.

Emission Reductions (ER_y): The emission reductions due to the project activity are calculated as the difference between the baseline emissions and the sum of the project emissions and the leakage:

$ER_y = BE_y - (PE_y + LE_y)$

BE_y = Baseline emissions in year y (t CO_2e)

As mentioned in the methodology the baseline emissions are calculated as follows:

$BE_y = EG_{PJ,y} * EF_{grid,y}$

Where:

$EG_{grid,y}$ = Quantity of net electricity generation that is fed into the electricity grid as a result of the

implementation of the project activity in year y (MWh)

$EF_{grid,y}$ = The CO_2 emission factor for grid connected power generation in year y calculated using UCR Standard emission factor (0.9 tCO_2/MWh).

PE_y = Project activity emissions = 0 tCO_2

LE_y = Leakage emissions = 0 tCO_2

For this methodology, it is assumed that transmission and distribution losses in the electricity grid are not influenced significantly by the project activity and are therefore not accounted for.

Estimated annual MWh grid supply = 126,144 MWh

Estimated annual ERs = 29,143 CoU

Estimated Annual baseline emission reductions (BE_y) = 29,143 CoUs /year (29,143 tCO_2eq/yr)

Estimated total baseline emission reductions (BE_y) = 2,88,517 CoUs /year (2,88,517 tCO_2eq/yr)

B.6. Prior History>>

The project activity has not applied to any other GHG program for generation or issuance of carbon offsets or credits for the current crediting period.

B.7. Changes to start date of crediting period >>

There is no change in the start date of the crediting period.

B.8. Permanent changes from PCN monitoring plan, applied methodology or applied standardized baseline >>

There are no permanent changes from registered PCN monitoring plan and applied methodology.

B.9. Monitoring period number and duration>>

First Issuance Period: 09 years, 09 months – 01/04/2013 to 31/12/2022

B.8. Monitoring plan>>

The monitoring of electricity data revolves around the power generation from the turbine generators and the auxiliary consumption of the power plant. All auxiliary units at the power plant is metered and there are also main meters attached to each turbine generator to determine their total generation.

The total amount of bagasse generated by the sugar plant and consumed in the power generation unit is available based on plant records in tonnes.

The management of the plant has designated one person to be responsible for the collation of data as per the monitoring methodology. The designated person collects all data to be monitored as mentioned in this project concept note document (PCN) and reports to the head of the plant. The overall project management responsibility remains with the Plant Head. The electricity generation from turbines and

auxiliary consumption is recorded continuously on an hourly basis by the operators in the shift. At the end of the day this data is collated by the engineer in charge and signed off by the power plant manager. The steam data is also manually recorded on an hourly basis from the meters. The data Is recorded in logbooks by the operators and the engineer in charge collates the data from these log books and stores them electronically. This data is used by engineer in charge to prepare a monthly report and send it to Plant Head for verification. The monthly reports become a part of the Management Information System (MIS) and are reviewed by the management during the quarterly review meeting.

The monthly reports can be made available during the verification of the project activity, to estimate the monthly emission reductions, which are also, included in the MIS. The monitoring personnel are familiar with the process of monitoring and documentation. They have been maintaining and reviewing the factory records pertaining to the sugar manufacturing.

All the meters are checked and calibrated every 5 years by an independent agency and they are maintained as per the instructions provided by their suppliers. Hence there are no uncertainties or adjustments associated with data to be monitored. An internal audit team, comprising of personnel from the factory but from a department other than utility, reviews the daily reports, monthly reports, procedure for data recording and maintenance reports of the meters. This team checks whether all records are being maintained as per the details provided in the PCN. The audit team also enlists the modifications/corrective actions required, if any, in more accurate monitoring and reporting. All the data and reports will be kept at the office of the sugar mill until 2 years after the end of the crediting period or the last issuance of CoUs for the project activity, whichever occurs later.

Emergency preparedness plans have been laid out to meet with situations leading to unintended emissions. These emergency situations have been identified as:

1. Fire in the fuel yard
2. Fuel spoilage due to water.

These emergency situations haven been taken care by putting up a fire safety system and a water drainage system in the fuel yard. The proposed project activity has also taken under the ISO on operation. The monitoring process is also been covered under the ISO.

Parameters	Description
$Q_{S,y}$	Quantity of steam supplied per year measured at recipient's end
$T_{steam,y}$	Temperature of steam at the recipient's end
$P_{steam,y}$	Pressure of steam
$E_{steam,y}$	Enthalpy of the saturated steam supplied to the recipient
$T_{Feedwater}$	Temperature of boiler feed water
$E_{Feedwater}$	Enthalpy of feed water
$E_{Gthermal,y}$	Net quantity of thermal energy supplied by the project activity during the year y
$B_{Biomass,y}$	Net quantity of biomass consumed in year y (on dry basis)
$MC_{biomass}$	Moisture content of the biomass

Data/Parameter:	Date of commissioning of biomass boilers

Data unit:	Date as per boiler test report.
Description:	Actual date of commissioning of the project device
Source of data Value(s) applied:	Monitoring Report As and when commissioned
Measurement methods and procedures:	The construction processes are maintained from its initiation to completion dates for the biogas unit. Thus, the start date of each of the unit installed is recorded in the monitoring report.
Monitoring frequency:	As and when commissioned and fixed and recorded in the monitoring report
Purpose of data:	To estimate project eligibility

Data / Parameter:	**NCV_k**
Data unit:	GJ/t
Description:	Net Calorific Value of Biomass Residue Type K
Source of data value(s) applied:	Measurements will be carried out by reputed labs and reported in dry biomass basis.
Measurement methods & procedures:	On site and in labs
Monitoring frequency:	Every 6 months
Purpose of date:	Quality control

Data / Parameter:	**$Q_{biomass,yr}$**
Data unit:	MT/yr
Description:	The quantity of bagasse used to generate steam in the boilers each year
Source of data value(s) applied:	Plant records and log books receipts
Measurement methods & procedures:	Monitoring: The quantity of biomass fed into the boiler is controlled. Data type: Measured Responsibility: Boiler Operator
Monitoring frequency:	Daily
QA/QC procedures:	The amount of biomass used can be cross checked by the purchase orders and stock inventory

Data / Parameter:	$EG_{project\ plant,\ y}$
Data unit:	MW_h
Description:	Net quantity of electricity generated in the project plant during the year y
Source:	M/S GM Sugars & Energy records
Measurement methods & procedures:	This value will be determined annually from the records maintained at the factory. All auxiliary units at the power plant are metered and there is also a main meter attached to turbine generator to determine total generation.
Monitoring frequency:	The hourly recordings of data is to be taken from energy meters located at the project activity site. This data is to be recorded hourly by the shift attendant and

	entered into logbooks on site. This hourly data is to be signed off at the end of every shift by an engineer in charge of the shift and again at the end of each day and signed off by the power plant manager. The energy meters are calibrated every 5 years by an independent third party
QA/QC procedures:	The parameter is monitored and logged in log sheets.

Data / Parameter:	**$EF_{grid,y}$**
Data unit:	Grid emission factor
Description:	tCO_2/MW_h
Source of data value(s) applied:	UCR CoU Standard Default for Indian grid 0.9 tCO_2/MW_h for the period 2013-2021 and same is used for the period post 2021 as it is found conservative.
Measurement methods & procedures:	NA
Monitoring frequency:	NA
QA/QC procedures:	The parameter is conservative.
Purpose of data:	To estimate baseline emissions

Data / Parameter:	**$EG_{grid,y}$**
Data unit:	MW_h
Description:	Net quantity of electricity supplied to the grid
Source of data value(s) applied:	JMR and/or Monthly Meter Readings
Measurement methods & procedures:	Type: Calculated Data type: Monitored This parameter may be checked with the necessary invoices or JMR (issued by the state grid) each month
Monitoring frequency:	Daily
QA/QC procedures:	The parameter is monitored by on site energy meters that are calibrated on every 5 years. The hourly recordings of data is to be taken from energy meters located at the project activity site. This data is to be recorded hourly by the shift attendant and entered into logbooks on site. This hourly data is to be signed off at the end of every shift by an engineer in charge of the shift and again at the end of each day and signed off by the power plant manager. The energy meters are calibrated by an independent third party.
Purpose of data:	To estimate baseline emissions

United Nations Sustainable Development Goals:

The project activity generates electrical power using Biomass, there by displacing non-renewable fossil resources resulting to sustainable, economic and environmental development. In the absence of the project activity equivalent amount of power generation would have taken place through fossil fuel dominated power generating stations. Thus, the renewable energy generation from project activity will result in reduction of the greenhouse gas emissions.

Positive contribution of the project to the following Sustainable Development Goals

1. **SDG13: Climate Action:** The project would lead to reduction of approx. 288517 tCO2 per annum due to implementation of project activity.

2. **SDG 7: Affordable and Clean Energy:** The project is generating approx. 126,144 MWh of clean energy per annum.

3. **SDG 8: Decent Work and Economic Growth:** The project is providing direct employment to around 05 persons. The project leads to Trainings & workshops which are conducted for the O&M staff of the PP.

Sustainable Development Goals (SDG) outcomes

Development Goals Targeted	SDG Target	Indicator (SDG Indicator)
SDG 7: Affordable and Clean Energy	**7.2**: By 2030, increase substantially the share of renewable energy in the global energy mix **Target**: 126,144 MWh per annum	**7.2.1**: Renewable energy share in the total final energy consumption
SDG 8: Decent Work and Economic Growth	**8.5**: By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value **Target**: • Training: 1 no. annually • Employment of 05 staff	**8.5.1**: Average hourly earnings of female and male employees, by occupation, age and persons with disabilities
SDG 13: Climate Action	13.2: Integrate climate change measures into national policies, strategies and planning **Target**: 29,143 tCO_2per	**13.2.1**: Number of countries that have communicated establishment or operationalization of an integrated policy/ strategy/

	Annum	plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)