Monitoring Report

CARBON OFFSET UNIT (CoU) PROJECT

Title: 28.7 MW Bundled Bagasse Based Cogen Plant
by M/s CBKSSKN Chikkodi by Energy Advisory Services

Version: 1:0
Date 20/08/2023
First CoU Issuance Period: 10 years, 00 months
Monitoring Period: 01/01/2013 to 31/12/2022

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

Monitoring Report	
Title of the project activity	**Title: 28.7 MW Bundled Bagasse Based Cogen Plant** by M/s CBKSSKN Chikkodi by Energy Advisory Services
UCR Project Registration Number	322
Version	1.0
Completion date of the MR	20/08/2023
Monitoring period number and duration of this monitoring period	Monitoring Period Number:01 Duration of this monitoring Period: 10 years 01/01/2013 to 31/12/2022
Project participants	**Project Proponent:** M/s Chidanand Basaprabhu Kore Sahakari Sakkare Karkhane Niyamit Chikkodi **Aggregator:** Energy Advisory Services Pvt. Ltd.
Host Party	INDIA
Applied methodologies and standardized baselines	**ACM0006** - Large-scale Consolidated Methodology: Electricity and heat generation from biomass Version 16.0 and **UCR Standard** for Emission Factor **Standardized Methodology:** Not Applicable.
Sectoral scopes	01- Energy industries (Renewable/Non-Renewable Sources)
Estimated amount of GHG emission reductions for this monitoring period in the registered PCN	2013: 62957 CoUs (62957 tCO2eq)
	2014: 42287 CoUs (42287 tCO2eq)
	2015: 66822 CoUs (66822 tCO2eq)
	2016: 55065 CoUs (55065 tCO2eq)
	2017: 28691 CoUs (28691 tCO2eq)
	2018: 44609 CoUs (44609 tCO2eq)
	2019: 40021 CoUs (40021 tCO2eq)
	2020: 39924 CoUs (39924 tCO2eq)
	2021: 56676 CoUs (56676 tCO2eq)
	2022: 61665 CoUs (61665 tCO2eq)
Total:	**498,717 CoUs (498,717 tCO2eq)**

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 proposed project activity with title under UCR ""28.7 MW Bagasse Based Power Plant" by M/s Chidanand Basaprabhu Kore Sahakari Sakkare Karkhane Niyamit Chikodi, implemented a cogeneration power plant which operates on sugar mill bagasse for a period of 160 days in year. The Cogen power plant can generate around 320,581.15 MWh/y during crushing season. Surplus energy after auxiliary consumption and supply to sugar plant is supplied to grid.

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

1. The project activity is the construction and operation of a Cogen power plant/unit that uses bagasse as a renewable energy sources to generate electricity as well as steam and supplies electricity and steam to the 10,000 TCD sugar mill and 30 KLPD ethanol plant.

2. The integrated project comprises of a sugar mill for the manufacture of high-quality sugar and ethanol. The by-product from the sugar mill is used in the Cogen power plant during crushing season.

3. The Cogen power project of 28.7 MW capacity operates on bagasse for around 160 season days of the sugar mill operation. At designed level, it is expected that the project will generate 11 million kWh/y of clean energy and export about 56 million kWh/y through KPTCL grid for sale to KPTCL or to third party consumer as per the prevailing tariff.

   All the steam and energy requirements of the sugar mill and Cogen power plant will be met internally from the project itself. The project activity employs three boiler and two turbo-generators of the following capacity along with all auxiliaries.

   a. 1*150 TPH boiler with high pressure and temperature configuration (66kg/cm^2 and 495°C),
   b. 1*50 TPH boiler with medium pressure and temperature configuration (45kg/cm^2 and 495°C)
   c. 1*15 TPH boiler with low pressure and temperature configuration (10kg/cm^2 and 180°C)
   d. 1*20.7 MW Double extraction cum condensing Turbine Generator set, as well as ESP for emission control and DCE control system for efficient operation.
   e. 1*8 MW Double extraction cum condensing Turbine Generator set, as well as ESP for emission control and DCE control system for efficient operation.

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 is covered in this monitoring report.

UCR Project ID : 322

Start Date of Crediting Period: 01/01/2013
Project Commissioned: 20.7MW unit was commissioned on **25/03/2004** and the 8MW unit was commissioned on **20/02/2020.**

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	01/01/2013
Carbon credits claimed up to	31/12/2022
Total ERs generated (tCO_{2eq})	498,717 tCO2eq
Leakage	NIL

e) Baseline Scenario>>

As per the approved consolidated methodology CDM –ACM0006: "Electricity and heat generation from biomass" Version 16.0, the baseline scenario is the following:

"The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise, been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid".

Schematic diagram showing the baseline scenario is given below:

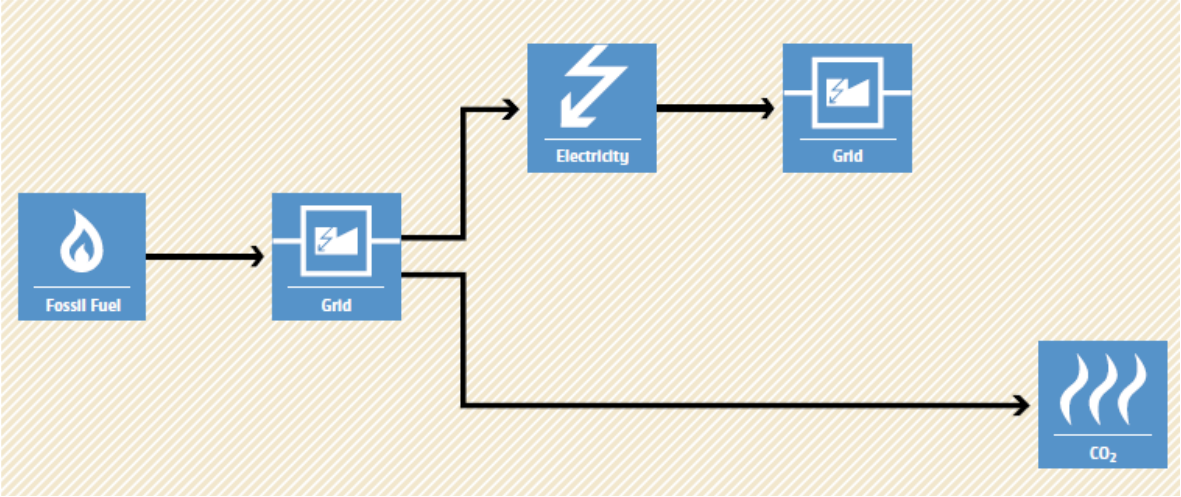

Figure 1-Baseline Scenario

A.2. Location of project activity>>

1	Country	India
2	State	Karnataka
3	District	Belagavi
4	Tehsil	Chikodi
5	Village	Nanadi
6	Coordinates	Latitude : $16^0$30'26" N
		Longitude : $74^0$36'51" E

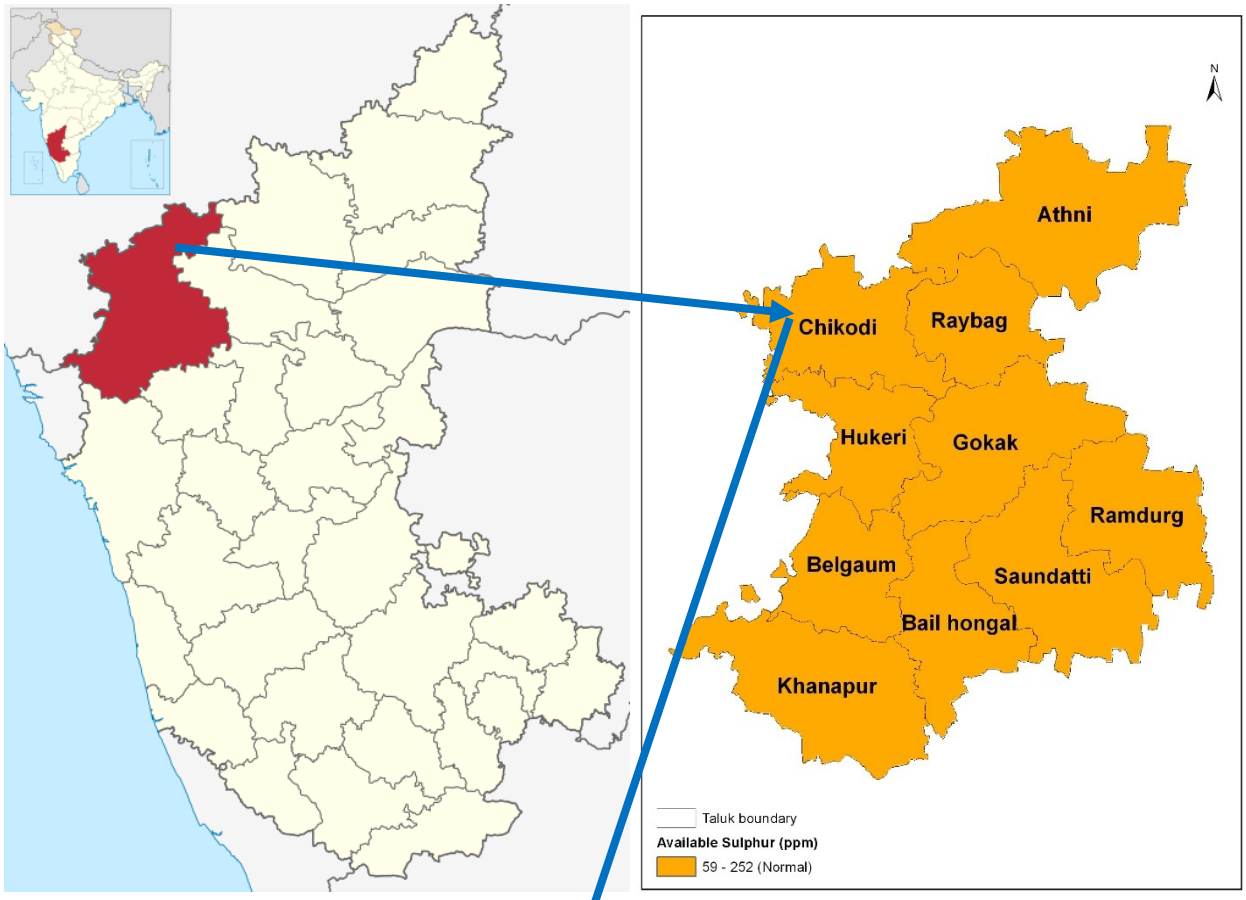

Figure 2-Location of the project site in Chikodi Taluk

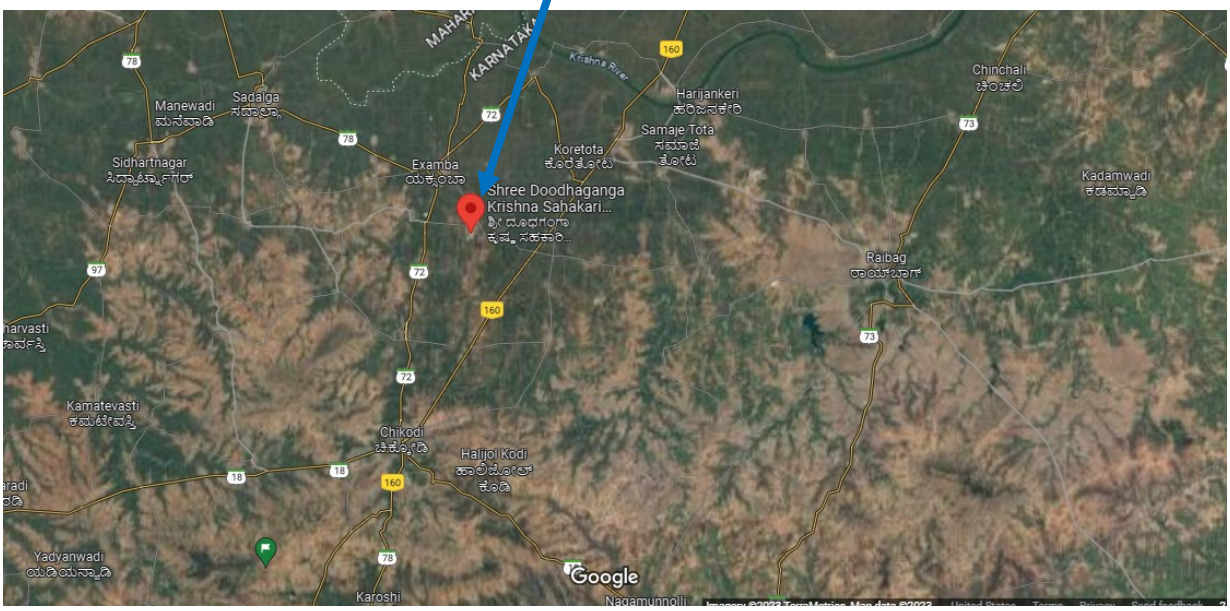

Figure 3- Location and coordinates of the plant in Chikodi Taluk

A.3. Parties and project participants >>

Party (Host)	Participants
India	**Project Owner:** M/s Chidanand Basaprabhu Kore Sahakari Sakkare Karkhane Niyamit Chikkodi **Project Aggregator:** Energy Advisory Services Pvt Limited, Bangalore, Karnataka. Email: manoj@easpl.co.in

A.4. 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" Version 16.0

A.5. Crediting period of project activity >>

Length of the crediting period corresponding to this monitoring period: 09 years 0 months
From 01/01/2013 to 31/12/2022

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

Name : Nikhil Vedprakash
Contact No : +91 7303201778
E-Mail : nikhil@easpl.co.in

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 Cogen power project of 28.7 MW capacity operates on bagasse for around 160 season days of the sugar mill operation. At designed level, it is expected that the project will generate 110 million kWh/y of clean energy and export about 56 million kWh/y through KPTCL grid for sale to KPTCL or to third party consumer as per the prevailing tariff.

All the steam and power requirements of the sugar mill and Cogen power plant will be met internally from the project itself. The project activity employs three boiler and two turbo-generators of the following capacity along with all auxiliaries.

a. 1*150 TPH boiler with high pressure and temperature configuration (66kg/cm^2 and 495°C),
b. 1*50 TPH boiler with medium pressure and temperature configuration (45kg/cm^2 and 495°C)
c. 1*15 TPH boiler with low pressure and temperature configuration (10kg/cm^2 and 180°C)
d. 1*20.7 MW Double extraction cum condensing Turbine Generator set, as well as ESP for emission control and DCE control system for efficient operation.
e. 1*8 MW Double extraction cum condensing Turbine Generator set, as well as ESP for emission control and DCE control system for efficient operation.

The 20.7 MW unit was successfully commissioned by Karnataka Power Transmission Corporation Limited (KPTCL) on **25/03/2004** and 8.0 MW was commissioned KPTCL on **20/02/2020**.

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

Boiler Technical Details

Description	UoM	Value		
		150 tph	50 tph	15 tph
Make		Walchandnagar	Walchandnagar	Industrial Boiler
Commissioning year		2004	1995	
Fuel		Bagasse	Bagasse with 50% moisture	Bagasse
Furnace type		Travelling grate with continuous font ash discharge	Travelling grate	Packaged

Steam Turbo-Generator Technical Details

Description	UoM	Value	
		20.7 Mwe	8 MWe
Make		BHEL	Arani Power Systems (P) Limited
Commissioning year		2004	
Type		Extraction cum condensing	Back pressure

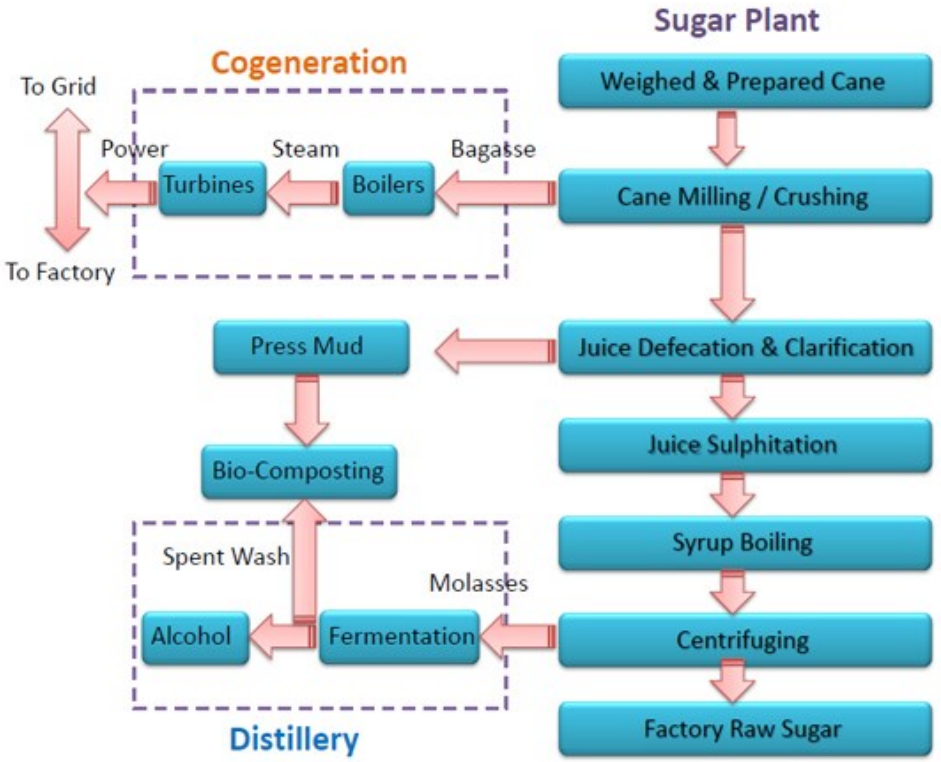

Figure 4-Sugar & Co-gen power plant process flow chart

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

There was no harm identified from the project and hence no mitigation measures are applicable.

Rational: As per 'Central Pollution Control Board (Ministry of Environment & Forests, Govt. of India)', the final document on the revised classification of Industrial Sectors under Red, Orange, Green and White Categories (07/03/2016), has been declared that wind project activity falls under the "White category".

White Category projects/industries do not require any Environmental Clearance such as 'Consent to Operate' from PCB as such project does not lead to any negative environmental impacts. Additionally, as per Indian Regulations, Environmental and Social Impact Assessment is not required for wind projects.

The Government of India has stipulated the following indicators for sustainable development in the interim approval guidelines for such projects which are contributing to GHG mitigations. The Ministry

of Environment, Forests & Climate Change has stipulated economic, social, environmental, and technological well-being as the four indicators of sustainable development. It has been envisaged that the project shall contribute to sustainable development using the following ways:

Social well-being: The project would help in generating direct and indirect employment benefits accruing out of ancillary units for manufacturing towers for the erection of the wind turbine generator and for maintenance during the operation of the project activity. It will lead to the development of infrastructure around the project area in terms of improved road network etc. and will also directly contribute to the development of renewable infrastructure in the region.

Environmental well-being: The project utilizes wind energy for generating electricity which is a clean source of energy. The project activity will not generate any air pollution, wind pollution or solid waste to the environment which otherwise would have been generated through fossil fuels. Also, it will contribute to the reduction of GHG emissions. Thus, the project causes no negative impact on the surrounding environment contributing to environmental well-being.

Economic well-being: Being a renewable resource, using wind energy to generate electricity contributes to the conservation of precious natural resources. The project contributes to economic sustainability through the promotion of decentralization of economic power, leading to the diversification of the national energy supply, which is dominated by conventional fuel-based generating units. Locally, improvement in infrastructure will provide new opportunities for industries and economic activities to be set up in the area. Apart from getting better employment opportunities, the local people will get better prices for their land, thereby resulting in overall economic development.

Technological well-being: The project activity leads to the promotion of this technology in the region and will promote practice for small-scale industries to reduce the dependence on carbon intensive grid supply to meet the captive requirement of electrical energy and increase energy availability and improve quality of power under the service area. Hence, the project leads to technological well-being.

	• The project activity has generated 55,300 MWh (average of clean energy per year, which with increased shared will increase the affordability at a cheaper rate to end user. • The project activity will utilize the biomass (bagasse -renewal resource) to generate power. The project activity will increase the share of renewable resource-based electricity in global mix of energy consumption.
	• Decent work and economic growth. The project activity generates additional employment for skilled and unskilled, also the project situated in a remote area will provide employment opportunities to unskilled people from villages. • Training on various aspects including safety, operational issues, and developing skill sets will also be provided to employees.
	• This wind power project meets the SDG 13 goal by saving fossil fuel and producing clean energy. • This project has avoided 49,800 tons of CO_2eq emissions per year and 4,98,717 tons of CO_2eq during this monitoring period. In a greenfield project, electricity delivered to the grid by the project would reduce the dependence on fossil fuel-based generation units and as there are no associated emissions with this project it contributes to the reduction of greenhouse gases (GHG) emissions.

B.3. Baseline Emissions>>

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

- Grid connected renewable energy generation (small scale wind power project)

In the absence of the project activity, the equivalent amount of electricity would have been imported from the grid (which is connected to the unified Indian Grid system), which is carbon intensive due to being predominantly sourced from fossil fuel-based power plants. Hence, the baseline scenario of the project activity is the grid-based electricity system, which is also the pre-project scenario.

Schematic diagram showing the baseline and project scenario are given below:

Baseline Scenario: Electricity would be produced by more GHG intensive means like coal, oil and gas.

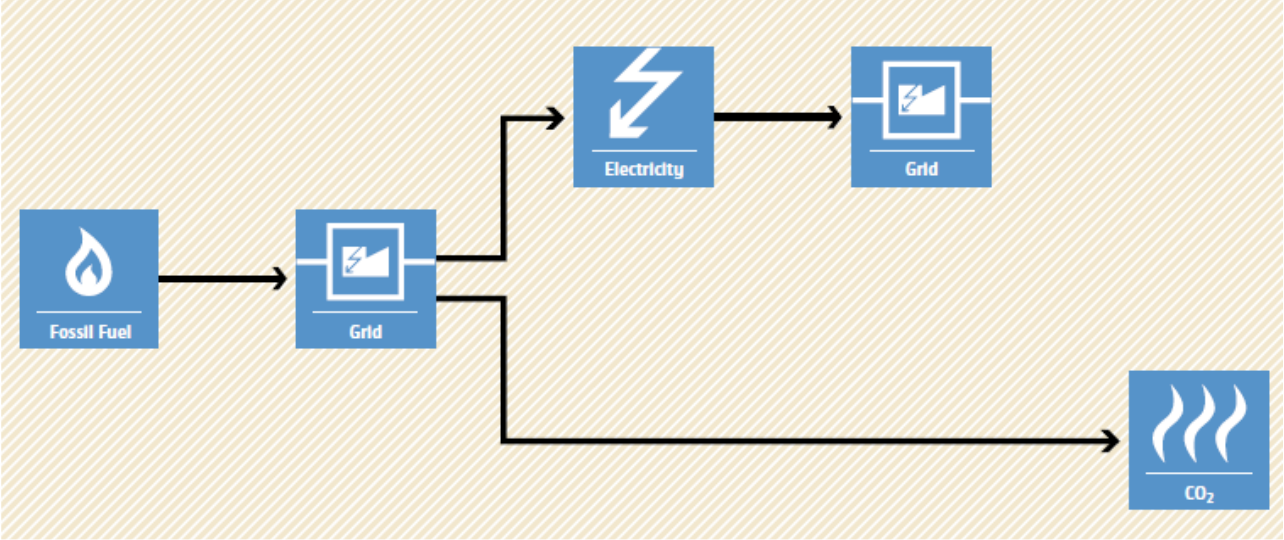

Figure 6-Baseline scenario

Project Scenario: Use of renewable energy technologies for electricity generation, displacing the non-renewable sources

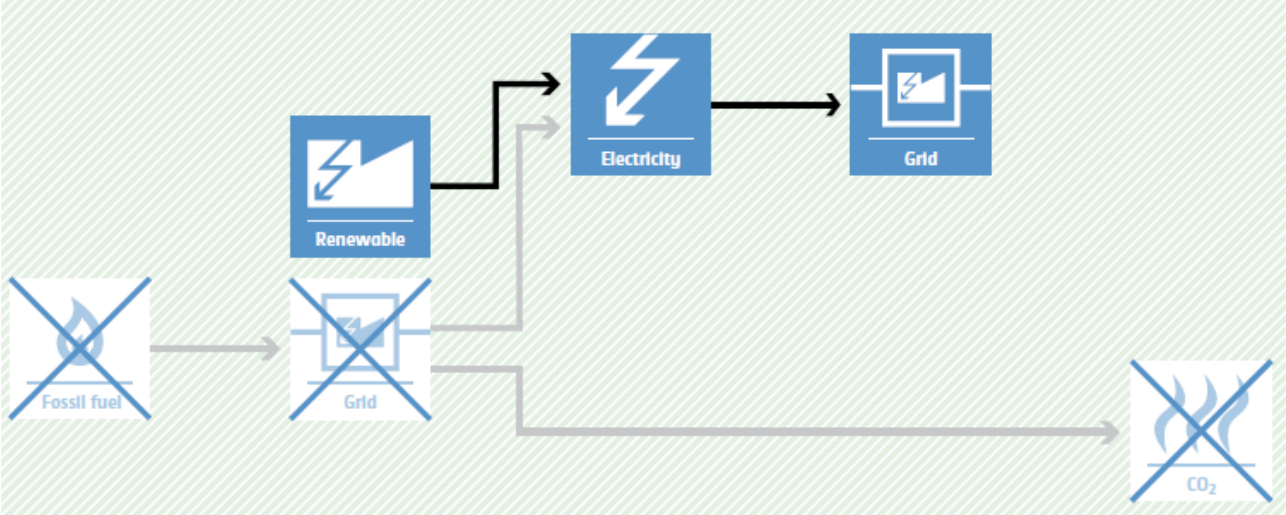

Figure 7-Project scenario

Thus, this project activity was a voluntary investment which replaced equivalent amount of electricity from grid connected power plants. The project proponent was not bound to incur this investment as it was not mandatory by national and sectoral policies. Thus, the continued operation of the project activity would continue to replace thermal energy from non-renewable fuel (coal/oil/gas) and fight the impacts of climate change. The Project Proponent hopes that carbon revenues from 2019-2022 accumulated because of carbon credits generated will help repay the loans and in the continued maintenance of this project activity

B.4. De-bundling>>

Please provide information if the project activity is either a part or not of a de-bundled component of a larger project activity.

SECTION C. Application of methodologies and standardized baselines

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

SECTORAL SCOPE – Energy industries (renewable - / non-renewable sources)

PROJECT TYPE: Type I: Biomass energy project activities with a maxim

CATEGORY- ACM0006: "Electricity and heat generation from biomass" Version 16.0

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

This methodology is applicable to project activities that operate biomass (co-)fired power-and-heat plants. The Cogen plant can be considered as per the below applicability:

Applicable 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- or chemical-degradation, etc.) prior to combustion. Drying and mechanical processing, such as shredding and palletisation, are allowed.	The project is implemented to use 100% of the bagasse generated in the cane crushing season, hence the criteria points (c), (d) and (e) are applicable.
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	The project is a new greenfield/brownfield project and hence this criterion is not applicable.

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 project (e.g. collecting and cleaning contaminated new sources of biomass residues that could otherwise not be used for energy purposes); or (d) Equipment for preparation and feeding of biomass.	
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; (b) 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 criterion 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.	The bagasse generated as a waste from the sugar mill is being used for the generation of steam & power and hence this criterion is also not applicable.
The methodology is only applicable if the baseline scenario, as identified per the "Selection of the baseline scenario and demonstration of additionality" section hereunder, is: (a) For power generation: scenarios P2 to P7, or a combination of any of those scenarios; and (b) For heat generation: scenarios H2 to H7, or a combination of any of those scenarios; (c) If some of the heat generated by the CDM project activity is converted to mechanical power through steam turbines, for mechanical power generation: scenarios M2 to M5:	As per the UCR list of eligible projects and methodologies found in the UCR Program Manual Ver. 4, this criterion is not applicable.

a. In cases M2 and M3, if the steam turbine(s) are used for mechanical power in the project, the turbine(s) used in the baseline shall be at least as efficient as the steam turbine(s) used for mechanical power in the project; b. In cases M4 and M5, steam turbine(s) generating mechanical power to be used for the same purpose as in the baseline are not allowed; (d) For the use of biomass residues: scenarios B1 to B5, or a combination of any of those scenarios; (e) For the use of biogas: scenarios BG1 to BG3, or a combination of any of those scenarios.	

C.3 Applicability of double counting emission reductions >>

The project was not applied under any other GHG mechanism. Hence project will not cause double accounting of carbon credits (i.e., COUs), due to the following reasons:

- Project is uniquely identifiable based on its location coordinates,
- Project has a dedicated commissioning certificate and connection point,
- Project is associated with energy meters which are dedicated to the consumption point for the project developer.

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

The spatial extent of the project boundary encompasses:

1. All plants generating power and/or heat located at the project site, fired with biomass (bagasse).
2. All power plants connected physically to the electricity system (grid) that the project plant is connected to.
3. The means of transportation of biomass (bagasse) to the project site.

If the feedstock biomass (bagasse), is left thein site, where the biomass residues would have been left for decay or dumped.

If the biomass (bagasse) is not used for electricity generation, then the same amount of electricity is required to be generated by the operation of grid-connected power plants which would result in equivalent CO2 emissions to the atmosphere.

	Source	*GHG*	*Included?*	*Justification/Explanation*
Baseline	*Emissions from grid connected power plants using non-renewable energy sources as fuel*	*CO_2*	*Included*	*Major source of emission*
		CH_4	*Excluded*	*Negligible source of emission*
		NO_2	*Excluded*	*Minor source of emissions*
		Others	*Excluded*	*No other GHG emissions were*

				emitted from the project
Project Activity	*Emissions from on-site electricity use*	CO_2	*Excluded*	*Project activity does not emit CO2*
		CH_4	*Excluded*	*Project activity does not emit CH4*
		NO_2	*Excluded*	*Project activity does not emit NO2*
		Others	*Excluded*	*Project activity does not emit any other GHG gases*

Leakage Emissions is not applicable as the project as biomass (bagasse) is used as fuel.

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

As per para 20 of the approved consolidated methodology ACM0006 Version 16, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:
"All plants generating power and/or heat located at the project site, whether fired with biomass, fossil fuels or a combination of both".

Net GHG Emission Reductions and Removals

❖ Emission reductions are calculated as follows:
(Sample calculation for year 2013)

$ER_y = BE_y – PE_y – LE_y$ ……………………………………………(Eq. 1)

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 CO2)

❖ The Baseline emissions in year y can be calculated as follows:

$BE_y = EL_{MWhy} X \ EF_{Grid}$ ………………………………………………(Eq. 2)

Where,

EL_{MWh} = Quantity of net electricity supplied to the grid because of the implementation of the project activity in year y (MWh) – Quantity of electricity imported from the grid in MWh in year y
= 71,068 MWh – 1,115 MWh
= 69,953 MWh

EF_{Grid} = Grid emission factor in year y (t CO2/MWh) = 0.9

BE_y = 69,953 x 0.9 = 62,957 (Rounded down)

❖ The electricity import from the grid is subtracted from the baseline scenario, hence there is no separate project emissions.

PE_y = 0.0 ………………………………………………………………(Eq. 3)

- ❖ It is an integrated Cogen plant. The biomass (bagasse) is the by-product of the sugar mill and which is being consumed hence there is no leakage emissions being generated.

$$LEy = 0 \quad \text{.....(Eq. 4)}$$

Total Emission reduction by the project for the current monitoring period is calculated as below:

ERy = 498717 – 0 – 0 = 498717 CoUs

Note: The energy exported and imported during the Co-gen operation period is only considered during the cane crushing season.

C.6. Prior History>>

The project activity is a small-scale Cogen power project and was not applied under any other GHG mechanism prior to this registration with UCR. Also, project has not been applied for any other environmental crediting or certification mechanism. Hence project will not cause double accounting of carbon credits (i.e., CoUs).

C.7. Monitoring period number and duration>>

First Monitoring/issuance Period : 10 Years 0 months
From 01/01/2013 to 31/12/2022 (inclusive of both dates)

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

Crediting period start date is 01/01/2013.

C.9. 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.

C.10. Monitoring plan>>

Data / Parameter:	EL_{MWh}
Data unit:	MWh/year
Description:	Quantity of net electricity supplied to the grid because of the implementation of the project activity in year y (MWh)
Source of data:	Monthly Joint Meter Readings (JMRs)
Measurement procedures (if any):	Data Type: Measured Monitoring equipment: Energy Meters are used for monitoring Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually Archiving Policy: Paper & Electronic Calibration frequency of meters: 5 years (as per CEA provision) Generally, the calculation is done by the Authority/Discom and the project proponent has no control over the authority for the calculation. Therefore, based on the joint meter reading certificates/credit notes, the project shall raise the invoice for monthly payments.

	EL = E(export)- E(import)
Monitoring frequency:	Monthly
Values applied	To be applied as per actual data
QA/QC procedures:	Calibration of the Main meters will be carried out once in five (5) years as per National Standards (as per the provision of CEA, India) and faulty meters will be duly replaced immediately as per the provision of power purchase agreement. **Cross Checking:** Quantity of net electricity supplied to the grid will be cross checked from the invoices raised by the project participant to the grid.
Purpose of data	To calculate the baseline CO_2 emissions.
Any comment:	All the data will be archived till a period of two years from the end of the crediting periods.

Data/Parameter	Date of commissioning of Cogen plant
Data unit	Day/month/year
Description	Actual date of commissioning of the project device
Source of data Value(s) applied	Commissioning certificated from KPTCL
Measurement methods and procedures	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 baseline emissions

Data/Parameter	$EF_{Grid,y}$
Data unit	0.90 tCO2/MW
Description	Grid emission factor
Value(s) applied	Most conservative value from UCR Standard and CO2 baseline database for the Indian power sector, Version 16.0 dated December 2022.
Measurement methods and procedures	Conservative Estimate. Ex-ante fixed parameter
Monitoring frequency	Once in a year
Purpose of data	To estimate baseline emissions