Monitoring Report

CARBON OFFSET UNIT (CoU) PROJECT

Title: 7.1MW Captive Power Plant
At M/S Prakash Sponge Iron & Power Private Ltd. (PSIPL)

Version - 01

Date 14/11/2023

First CoU Issuance Period: 01 year, 00 months (01.01.2022 to 31.12.2022)

Monitoring Period: 01/01/2022 to 31/11/2046

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

Monitoring Report	
Title of the project activity	7.1MW Captive Power Plant at M/s Prakash Sponge Iron & Power Private Ltd. (PSIPL)
UCR Project Registration Number	334
Version	01
Completion date of the MR	14/11/2023
Monitoring period number and duration of this monitoring period	Monitoring Period Number: 01 Duration of this monitoring Period: (first and last days included) 01/01/2022 to 31/12/2022
Project participants	**Project Participant and Aggregator:** M/s Prakash Sponge Iron & Power Private Ltd. (PSIPL) Bangalore, Karnataka Email: manjunathpsip@ermgroup.in **Project Consultant:** Energy Advisory Services Pvt. Ltd. Bangalore, Karnataka. Email: manoj@easpl.co.in
Host Party	INDIA
Applied methodologies and standardized baselines	**Applied Methodology:** CDM UNFCCC Methodology AMS-III.Q: Waste Energy Recovery, version 06.1 **Standardised Methodology:** Not Applicable
Sectoral scopes	4. Manufacturing Industries
Project commissioning date	15/04/2021
Estimated amount of GHG emission reductions for this monitoring period in the registered PCN	2021: 00 CoUs (00_ tCO2eq)
	2022: 30,741 CoUs (30,741 tCO2eq)
Total (for the first monitoring period)	**30,741 CoUs (30,741_ 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 project 7.1 MW Waste Heat Recovery Boiler (WHRB) based Captive Power Plant of M/s Prakash Sponge Iron & Power Pvt Ltd, is located in Village Heggere, Tehsil Challakere, District Chitradurga, State Karnataka, Country INDIA.

The details of the registered project are as follows:

This is a single project activity of 7.1 MW capacity, where the waste energy at the existing facility is utilised to generate electricity. The generated electricity is used for captive consumption and excess energy is exported to grid.

The promoter of this project is "M/s. Prakash Sponge Iron & Power Private Limited". This project is an operational activity with continuous reduction of GHGs, currently being applied under "Universal Carbon Registry" (UCR), which rewards reduction of GHG emissions by energy recovery programs, with carbon incentives as opposed to carbon finance in other international programs. It's now widely accepted that the world needs to ramp up clean technologies by 2030 to prevent permanent climate disaster, and carbon incentive policies, such as the UCR CoU program, will be key to such efforts.

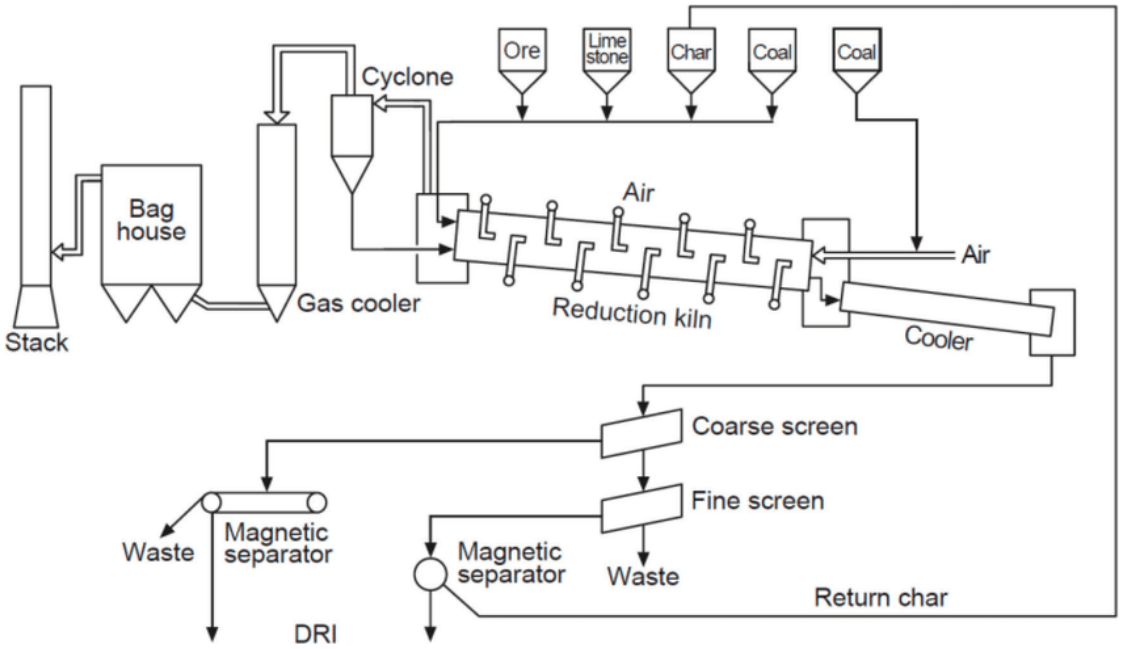
b) Brief description of the installed technology and equipment>>

PSIPL has installed three nos. each of 11.5 TPH Waste Energy Recovery Boiler (WHRB) to utilize sensible heat of flue gases coming from three Rotary Kiln along with one 7.1 MW turbo generator to fulfil the captive requirement of the plant. The minimum life of the plant is 25 to 30 years.

The 7.1 MW Captive Power Plant (CPP) have 3 boilers and one steam turbine arrangement. The condenser is air cooled condenser. Power generated from the generator at 11kV will be connected to the Iron & Steel plant electrical system, after meeting the CPP's auxiliary power requirements.

Besides the above, the plant has air cooled condenser, ash handling system, auxiliary cooling tower, pumps, water treatment plant, fire protection system, air compressors, air conditioning and ventilation system, electrical system and instrumentation & controls.

Indicative process flow diagram of DRI Plant and of Waste Energy Recovery Boiler is presented below



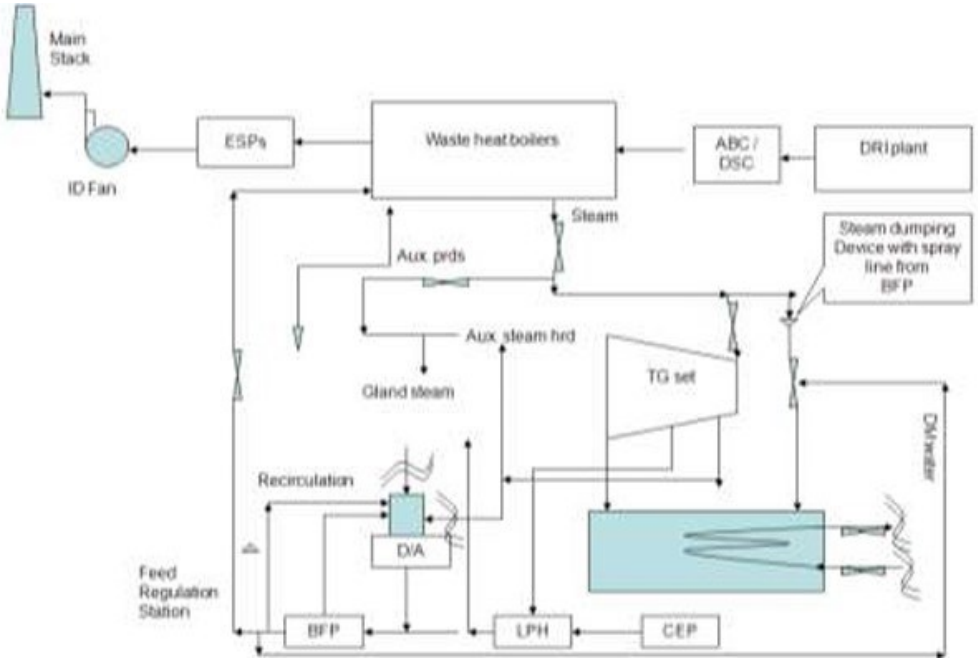


Figure 1 Process flow diagram of Sponge Iron Rotary Kiln &Waste Energy Recovery Boiler

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

	UCR Project ID or Date of Authorization:	
	Start Date of Crediting Period:	01/01/2022
	Project Commissioned:	15/04/2011

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	01/01/2022
Carbon Credits Claimed up to	12/12/2022
Total ERs Generated (tCO2eq)	30,741
Project Activity emissions	0
Leakage Emissions	0
Net ERs Generated (tCO2eq)	30,741

e) Baseline Scenario>>

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

- For the use of waste energy at the waste energy generation (WEG) facility the plausible baseline scenario shall be; waste energy carrying medium (WECM) was flared, vented or released into the atmosphere in the absence of the project activity.

BASELINE SCENARIO

Energy is obtained from GHG-intensive energy sources (e.g. electricity is obtained from a specific existing power plant or from the grid, mechanical energy is obtained by electric motors and heat from a fossil-fuel-based element process) and some energy is wasted in the production process and released.

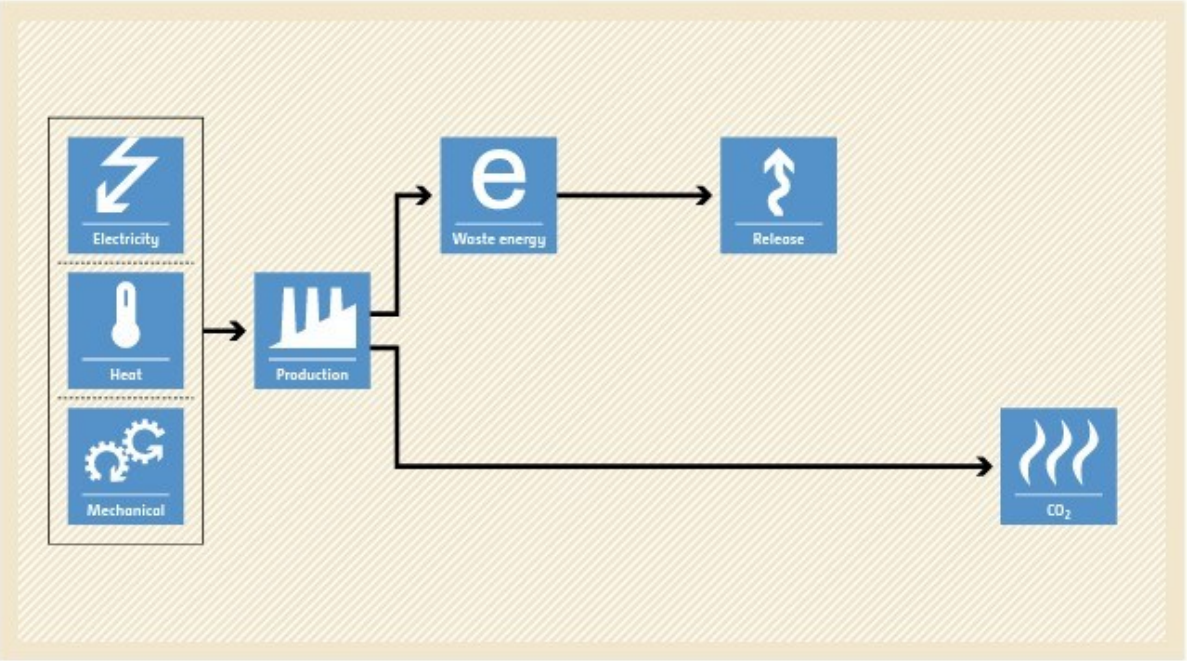


Figure 2-Baseline scenario

A.2. Location of project activity>>

Country:	*INDIA*
Village:	*Heggere*
Tehsil:	*Challakere*
District:	*Chitradurga*
State:	*Karnataka*
Pin code	*577522*
Coordinates	*Latitude – 14°09'09.60"N* *Longitude – 76°39'55.43"E*

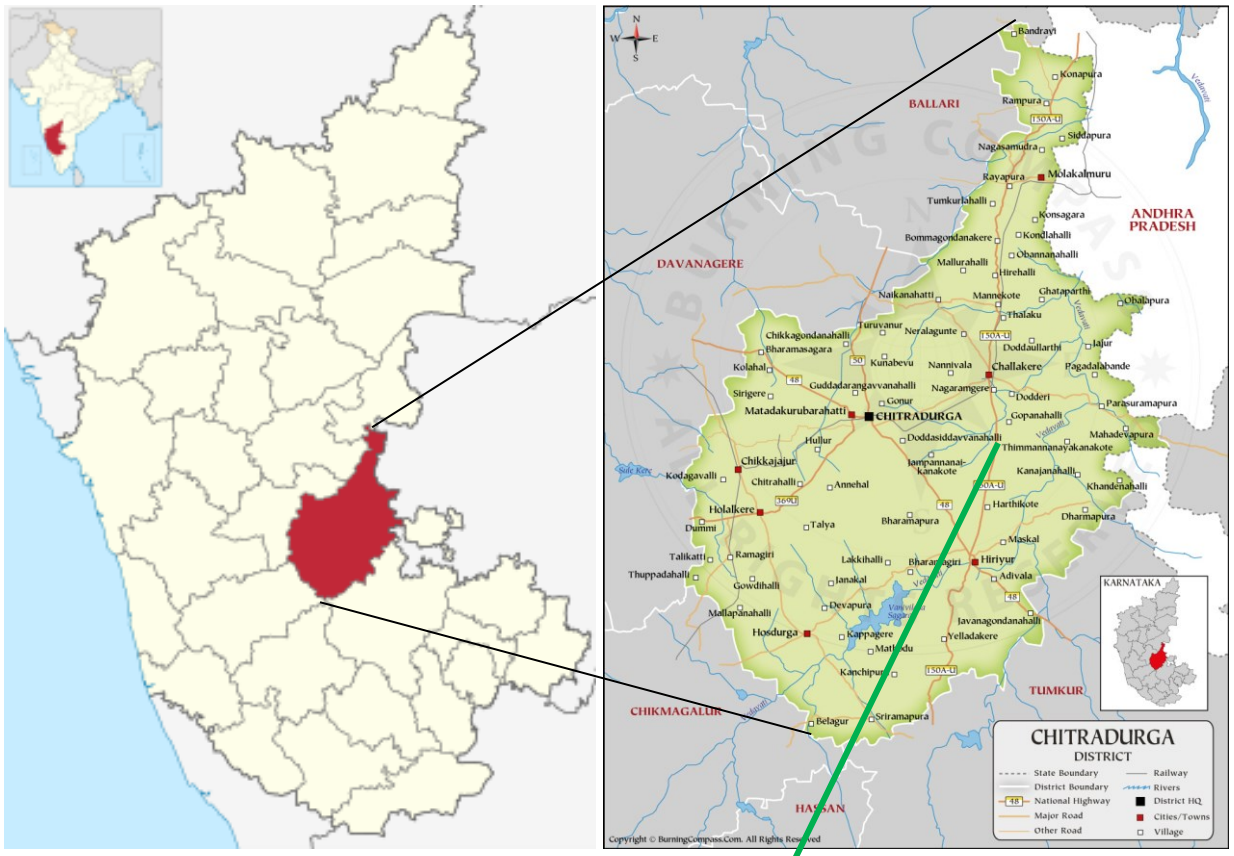


Figure 3- Location of the plant with co-ordinates

A.3. Parties and project participants >>

Party (Host)	Participants
INDIA	**Project Participant or Aggregator:** M/s Prakash Sponge Iron & Private Ltd. (PSIPL) Bangalore, Karnataka Email: manjunathpsip@ermgroup.in **Project Consultant:** Energy Advisory Services Pvt. Ltd. Bangalore, Karnataka. Email: manoj@easpl.co.in

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

SECTORAL SCOPE	04, Manufacturing industries
TYPE	III – Other project activities that result in emission reductions of less than or equal to 60,000 tCO_2 equivalent per year.
CATEGORY	AMS-III.Q. - Small scale methodology - Waste energy recovery Version 06.1

A.5. Crediting period of project activity >>

Length of the crediting period corresponding to this monitoring period: 01-year 00-month (first and last days included) 01/01/2022 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 project consists of waste heat recovery boilers installed in the flue gas path of the sponge iron rotary kiln. There are three 100 tph sponge iron rotary kilns in the plant premises and one boiler for each kiln is installed to recover the heat from the flue gases and to use the heat energy to generate steam.

Waste Heat carried away by the flue gases is being recovered by the Waste Heat recovery Boilers and gainfully used for Steam and hence power generation. The steam is used in one 7.1 MW steam turbo-generator to generate electrical energy.

Gases from DR kiln after "After Burning Chamber (ABC)The waste Heat Boiler will be installed behind the ABC of DR kilns. The flue gases after ABC will be taken to unfired furnace chamber and they flow over banks of super heater, convective evaporator and economizer before being discharged to atmosphere through ESP, ID Fan and chimney of DR Kiln. In case of outage of Waste Heat Boiler, Flue gases will pass through

ESP ID Fan and Chimney. The flue gases will pass over various heat transfer surfaces to ESP and then finally discharges in to chimney by ID Fans. The boiler will have its own ESP, ID fans and Chimney

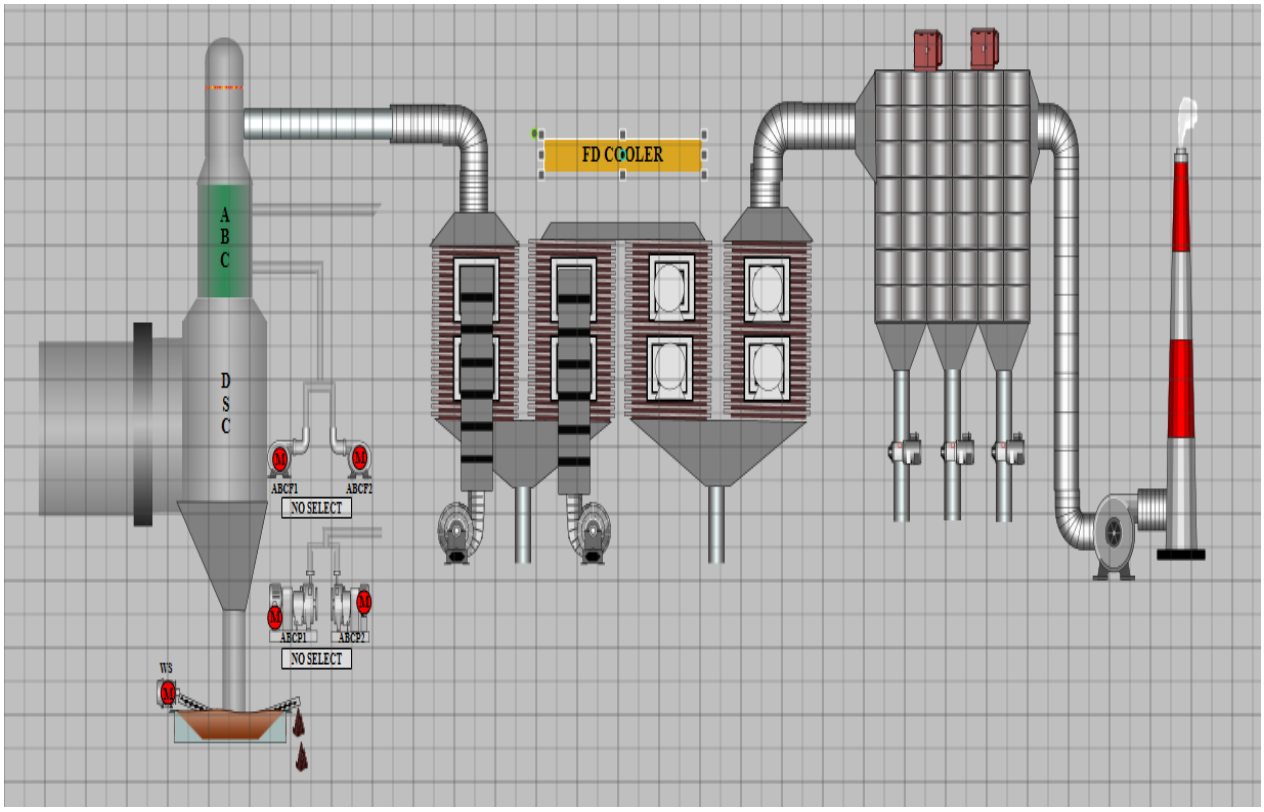


Figure 4- Waste energy recovery boiler technology for Rotary Kiln

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

The proposed 7.1 MW Captive Power Plant (CPP) will be of 3 WEG boilers – one steam turbine arrangement. The condenser shall be Air cooled condenser. Power generated from the generator at 11kV will be connected to the Iron & Steel plant, after drawl for the CPP's auxiliary power requirements.

The plant will have three numbers of 11.5TPH WHR boiler and one 7.1MW turbo generator. Besides the above, the plant will have Air cooled condenser, Ash handling system, auxiliary Cooling tower, Pumps, Water treatment plant, Fire protection system, Air compressors, Air conditioning and Ventilation system, Electrical system. and instrumentation & controls.

The power rating of the generator is 7100kW at the generator terminals with 10% overload capacity. The speed of the generator is 1500 rpm and the generator is designed to generate electrical power at 11kV, 50 Hz, 0.8 Power factor.

The generating voltage at generator terminals is considered as 11kV. This will be fed to the Sponge Iron & Steel plant and the Induction furnace at 11kV level. The CPP will also operate in parallel with the KPTCL grid at 66kV level through existing 66/11kV Substation (2 nos. of Power Transformers) within plant premises.

Waste Energy Recovery Boiler:

The Waste Energy Recovery (WHR) based Captive Power Plant is installed at PSIPL site, to utilize the heat content of flue gases coming out of Rotary Kilns. There are three 11.5 TPH WHR Boiler and One 7.1 MW power generation. Each boiler will be a vertical, 3 pass, natural circulation, fully drainable, gas tight membrane casing, water tube boiler for continuous operation and outdoor installation.

Table 1: Technical specifications of waste energy recovery boiler

S. No.	Specifications	UNIT	Data
1	Design Pressure	Kg/cm2	67
2	Design Temperature	oC	490±5
3	Hydro Test Pressure	Kg/cm2	112.5
4	Type		Vertical
5	Type of Tubes		Bare
6	Tube Outer Diameter	Mm	38.1
7	Tube Thickness	Mm	4.06
8	Fin Thickness	Mm	6
9	MOC of Tubes		BS 3059 Seamless
10	MOC of Fins		IS 2062
11	MOC of Headers		SA 106 Gr B

Steam Turbine:

The proposed CPP will have one no. 6MW turbo generator. The turbine will be a bleed cum condensing type and running at high speed. The generator speed will be 1500 rpm. Hence, the turbine will be coupled with the generator through a reduction gear unit.

Table 2: Technical specifications of steam turbine

S. No.	Specifications	UNIT	Data
1	Make	SIEMENS	
2	Turbine Rating	MW	7.1
3	Inlet Steam Pressure	Kg/cm2	64
4	Inlet Steam Temperature	^{0}C	485
5	Inlet Steam Flow	TPH	30.15
6	Bleed Steam	TPH	3.13
7	Exhaust Steam Pressure	Bar	0.180
8	Steam flow to Condenser	TPH	27.29
9	Power Generated (MAX)	MW	7.1

Air Cooler Condenser:

The turbine exhausts the steam into an air-cooled condenser. The pressure of the turbine exhaust will be 0.18 ata at 35 ^{0}C of ambient temperature. Air-cooled condenser shall be designed with adequate heating

surface area to account for the highest ambient temperatures. The tube bundles shall be preferably of steel tubes with aluminium fins construction and the entire assembly shall be supported on steel structures.

Table 3: Technical specifications of air-cooled condenser

S. No.	Specifications	UNIT	Data
1	Design Back Pressure	Kg/cm2	670.18
2	Temperature of Exhaust Steam	^{0}C	57.40
3	Exhaust Steam Flow	TPH	30
4	Enthalpy of Exhaust Steam	Kcal/Kg	590.01
5	Condensate Temperature	^{0}C	55.54
6	Condensate Enthalpy	Kcal/Kg	56.26
7	Number of Condensing bundles		20
8	Working Pressure		0.18
9	Construction of Tube		As per EENXIO std
10	Construction of Fins		Aluminum
11	Header Material & Tube Sheet		As per EENXIO std

Table4: Technical specifications of electrical generator

Sl. No.	Parameters	Generator
1	Rating (MW)	7.1MW @ 0.8Pf
2	Applicable Standard	IEC-34
3	Rated power factor	0.8
4	Rated frequency (Hz)	50
5	Rated speed (rpm)	1500
6	Excitation system	Brushless
7	Cooling	Air cooled
8	Voltage	11 kV
9	Insulation class	F
10.	Enclosure	IP-54
11.	Efficiency @ rated output, voltage and pf. 0.8	97.5%

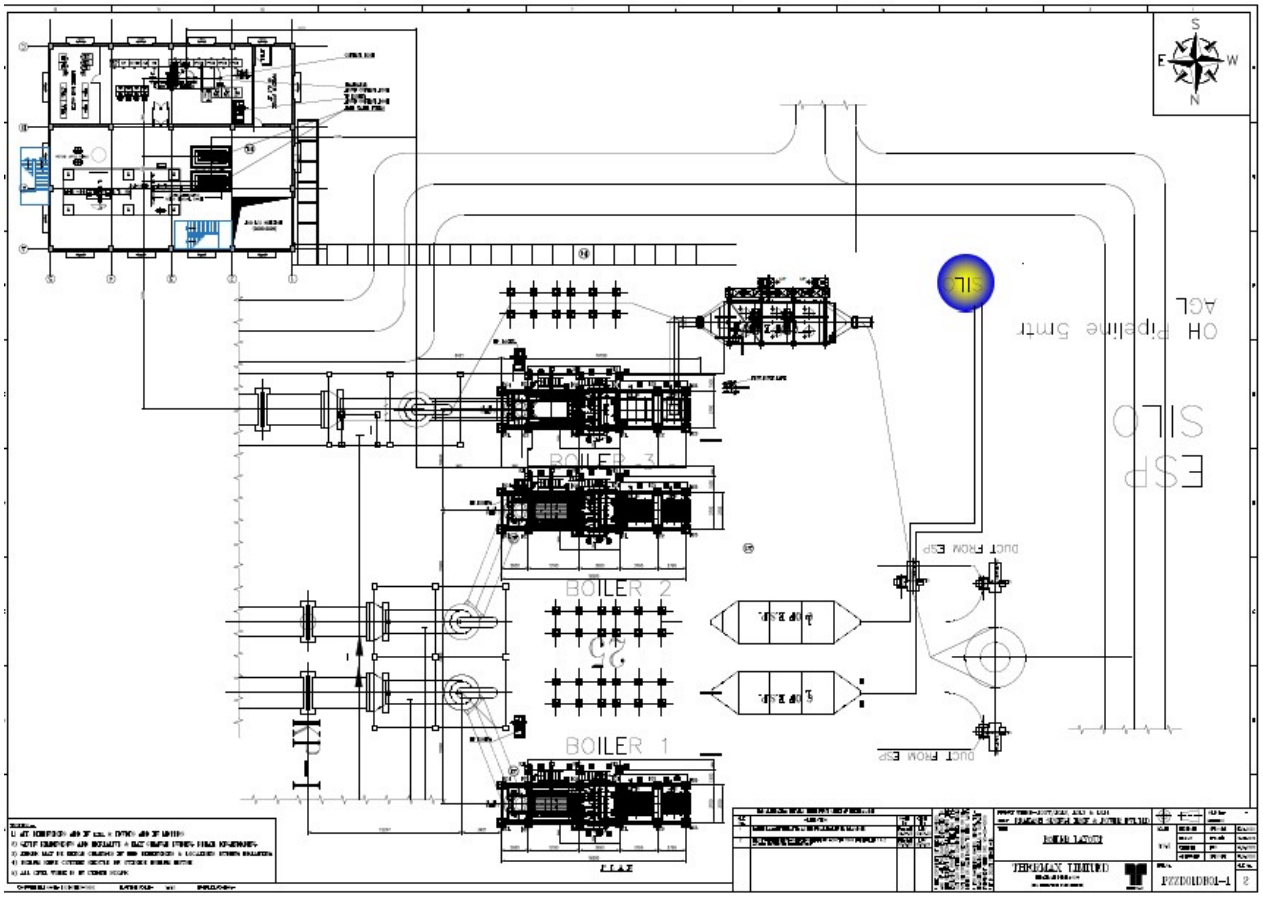


Figure 5- Plant layout

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

This project is a power generation plant utilising waste energy from rotary kiln flue gases, where grid power is the baseline. Indian grid system has been predominantly dependent on power from fossil fuel powered plants. The power generation by utilising waste energy is gradually contributing to the share of clean & green power in the grid; however, grid emission factor is still on higher side which defines grid as distinct baseline.

The Government of India has stipulated 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, environment 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:

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

- **Social benefits:**
  - There have been good employment opportunities created for the local workforce during the project construction phase.
  - The project after implementation has also continued to provide employment opportunities for the local populace in a sustained manner and the same would be continued over the project life time.
  - The employment opportunities created will contribute towards alleviation of poverty in the surrounding area throughout the lifetime of the project activity.
  - Reduces the thermal pollution in the surrounding area thus improving the comfort level of the residents living in the surrounding villages
  - The project provides security of energy supply to the plant

- **Environmental benefits:**
  - The project activity will generate power using waste heat-based power generation facility, which helps to reduce GHG emissions. Also, being a waste energy resource, use of waste energy to generate electricity contributes to resource conservation.
  - It reduces the dependence on fossil fuels and conserves natural resources which are on the verge of depletion. The impact on land, water, air and soil is negligible. Thus, the project causes no negative impact on the surrounding environment contributing to environmental well- being.
  - Improves the local environment by reducing uncontrolled thermal emission in the project area.
  - Avoided global and local environmental pollution and environmental degradation by replacing the non-renewable energy sources to waste energy recovery, leading to reduction of GHG emissions
- **Economic benefits:**
  - The project is a clean technology investment decided based on carbon revenue support, which signifies flows of clean energy investments into the host country.
  - The project activity requires temporary and permanent, skilled and semi-skilled manpower at the project location; this will create additional employment opportunities in the region.
  - The electricity replaced in grid will be available for nearby area which directly and indirectly improves the economy and life style of the area.
  - Success of these kind of project will provide new opportunities for industries and economic activities to be setup 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.
  - Reduction in energy cost
  - Lower operation cost of the plant
- **Technological benefits:**
  - The successful operation of project activity would lead to promotion of waste energy-based power generation and would encourage other entrepreneurs to participate in similar projects.
  - Increased interest in low grade waste energy projects will further push R&D efforts by technology providers to develop more efficient and better machinery in future.
  - The project activity leads to the promotion and demonstrates the success of waste energy-based projects in the region which further motivate more investors to invest in such power projects.

The project activity also contributes to the following sustainable development goals (SDGs):

Table5: Sustainability development goals

SDG Goals	Description
	• The project activity will generate clean energy, which with increased shared will increase the affordability at a cheaper rate to end user. • The project activity will utilize waste energy to generate power. The project activity will increase the share of waste energy resource-based electricity to global mix of energy consumption Improvement in energy efficiency
	• Decent work and economic growth. • This project activity generates additional employment for skilled and unskilled, also the project situated in remote area will provide employment opportunities to unskilled people from villages. • The training on various aspect including safety, operational issues and developing skill set will also be provided to employees • This project will 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

	• Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities • Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries • upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes.
	• Waste energy from the rotary kiln flue gases is used in the project activity, unless otherwise channelized into projects like the one discussed in this document, do not find any major use elsewhere- and hence become waste products. • Using waste thermal energy helps in repurposing of waste and contributes to the share of energy efficiency and reduction in GHG emissions.
	• Waste energy recovery-based power generation systems reduce the GHG emissions. • This project is expected to reduce CO2e emission 33,400 ton per year. • This project meets the SDG 13 goal by saving fossil fuel and produce clean energy.

B.3. Baseline Emissions>>

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

- For the use of waste energy at the waste energy generation (WEG) facility the plausible baseline scenario shall be; waste energy carrying medium (WECM) was flared, vented or released into the atmosphere in the absence of the project activity.

BASELINE SCENARIO

Energy is obtained from GHG-intensive energy sources (e.g. electricity is obtained from a specific existing power plant or from the grid, mechanical energy is obtained by electric motors and heat from a fossil-fuel-based element process) and some energy is wasted in the production process and released.

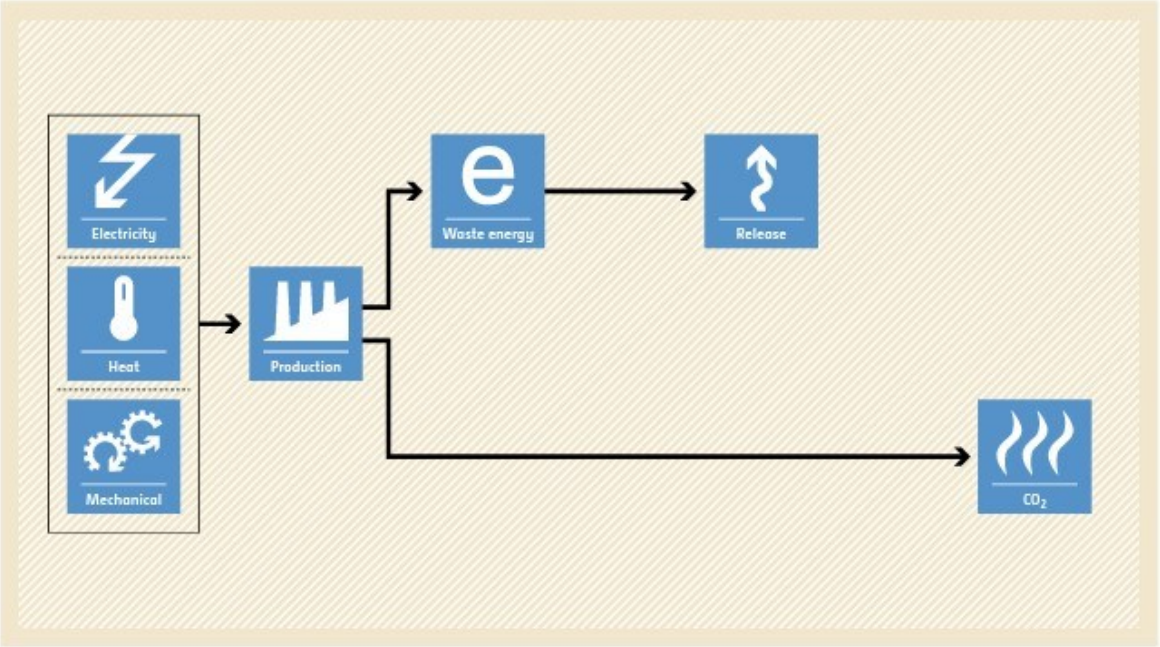


Figure 6 Baseline scenario

PROJECT SCENARIO

Waste energy is utilized to produce electrical/thermal/ mechanical energy to displace GHG-intensive energy sources.

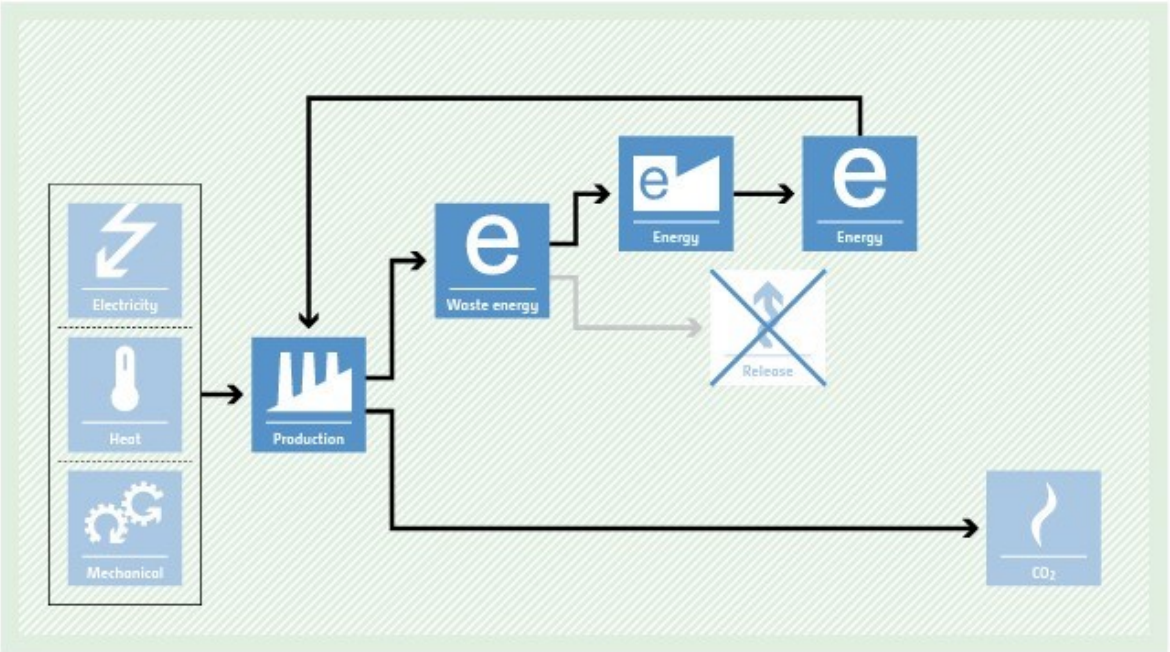


Figure 7 Project scenario

B.4. De-bundling>>

This 7.1 MW waste energy recovery based captive power plant project is not a de-bundled component of a larger project activity.

SECTION C. Application of methodologies and standardized baselines

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

SECTORAL SCOPE	04 – Manufacturing Industries
TYPE	III – Other project activities that result in emission reductions of less than or equal to 60,000 tCO_2 equivalent per year.
CATEGORY	AMS-III.Q. - Small scale methodology - Waste energy recovery Version 06.1

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

Applicability Criterion	Project Case
• *The methodology is applicable under the following conditions:* *(a) The recovery of waste energy shall be a new initiative (i.e. WECM was flared, vented or released into the atmosphere in the absence of the project activity).*	This project meets the condition (a), as it is a new initiative.
(b) The project shall confirm that no equipment for waste energy recovery and utilisation had been installed on the specific WECM stream(s) (that is recovered under the project activity) prior to the implementation of the project activity	There was no equipment was installed in the waste energy gas path prior to the implementation of this project activity
(c) A WECM stream that is released under abnormal operations (for example: emergencies, shutdown etc.) of the WEG facility shall not be included in the emission reduction calculations;	The waste gases that will be released under abnormal operation of the plant (emergencies) will not be accounted as emission reduction, as there will not be any electricity generation during this condition.
(d) Energy (i.e. electricity or thermal heat) produced in the project activity may be exported to a grid or other industrial facilities (included in the project boundary), a contractual agreement exists between the owners of the WEG facility and the recipient facility(ies) to avoid the potential double counting of emission reductions. These procedures shall be described in the CDM Project Design Document;	In this project generated electricity is for captive use and there is no double counting of emission reductions.
(e) For project activities that use waste pressure to generate electricity the electricity generated from waste pressure shall be measurable.	This condition is not applicable, as waste pressure is not used to generate electricity
Project activities that recover a small amount of waste energy in the baseline may apply this methodology provided that the current practice of recovering small amount of waste energy continues during the crediting period and there is no diversion of the baseline waste energy use, i.e. only energy that was otherwise flared, vented or released to atmosphere is utilized in the project activity. The project proponents may demonstrate this condition following appendix 3 "Conservative baseline emissions if multiple waste gas stream(s) with potential for interchangeable application exist in the WEG facility" of the recent version of "AMS-III.Q. Small scale methodology - Waste energy	This project meets this condition

recovery Version 06.1".	
The methodology is for project activities implemented in an existing or greenfield waste energy generation (WEG) facility converting waste energy carried in the identified waste energy carrying medium (WECM) stream(s) into useful energy (i.e. electricity, mechanical or thermal) that is consumed in an existing and/or greenfield recipient facility(ies).	The WEG facility converting waste energy carried in the identified WECM into electricity
Utilization of waste energy at existing facilities which may be for cogeneration, generation of electricity, direct use as process heat, generation of heat in an element process or generation of mechanical energy.	This project is for the generation of electricity only
The methodology is applicable to both Greenfield and existing waste energy generation facilities. If the production capacity of the project facility is expanded as a result of the project activity, the added production capacity must be treated as a Greenfield facility	This project activity is a Green-Field power generation facility.
If multiple waste gas streams are available in the project facility and can be used interchangeably for various applications as part of the energy sources in the facility, the recovery of any waste gas stream, which would be totally or partially recovered in the absence of the project activity, shall not be reduced due to the implementation of CDM project activity. For such situations, the guidance provided in Annex 3shall be followed.	The project activity will utilise the sensible heat content of the waste gas to generate electricity.
The methodology is not applicable to the cases where a WECM stream is partially recovered in the absence of the CDM project activity to supply the heat of reaction, and the recovery of this WECM stream is increased under the project activity to replace fossil fuels used for the purpose of supplying heat of reaction.	The project activity a Green-Field power generation facility. And this condition is not applicable to this project
This methodology is also not applicable to project activities where the waste gas/heat recovery project is implemented in a single-cycle power plant (e.g. gas turbine or diesel generator) to generate power. However, the projects recovering waste energy from single cycle and/or combined cycle power plants for the purpose of generation of heat only can apply this methodology.	This condition is not applicable to this project, as the project activity utilises waste heat for generation of electricity only.

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.

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

The geographical extent of the project boundary shall include the relevant waste energy carrying medium (WECM) stream(s), equipment and energy distribution system in following facilities:
(a) Waste energy generation (WEG) facility;
(b) Recipient facility(ies), which may be the same as the "WEG facility".

The spatial extent of the grid is as defined in the "Tool to calculate the emission factor for an electricity system", as applicable.

The relevant equipment and energy distribution system covers:
(a) In a WEG facility, the WECM stream(s), waste energy recovery and useful energy generation equipment, and distribution system(s) for useful energy;
(b) In a recipient facility, the equipment which receives useful energy supplied by the project and distribution system(s) for useful energy.

Table: Summary of gases and sources included in the project boundary, and justification explanation where gases and sources are not included

	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 generation using waste heat energy*	*CO_2*	*Included*	*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*

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

In case of project activities involving greenfield WEG facilities the baseline scenario shall be determined in accordance with the procedure prescribed in most recent version of "AMS-III.Q. Small scale methodology - Waste energy recovery Version 06.1" or as per the relevant requirements related to determination of baseline scenario provided in the "General guidelines for SSC CDM methodologies" for Type-II and Type-III Greenfield/capacity expansion project activities.

Procedure to determine baseline scenario for Type II and III Greenfield projects

Type II and III Greenfield projects (new facilities) may use a Type II and Type III small scale methodology provided that they can demonstrate that the most plausible baseline scenario for this project activity is the baseline provided in the respective Type II and Type III small-scale methodologies. The demonstration shall include an assessment of the alternatives of the project activity using the following steps

Step 1: Identify the various alternatives available to the project proponent that deliver comparable levels of service, including the proposed project activity undertaken without being registered as a CDM project activity.

Step 2: List the alternatives identified in Step 1 that are in compliance with local regulations. If any of the identified baselines is not in compliance with local regulations, then exclude that alternative from further consideration.

Step 3: Eliminate and rank the alternatives identified in Step 2 taking into account barrier tests specified in the "Guidelines on the demonstration of additionality of small-scale project activities".

Step 4: The project activity is eligible under the methodology if only one alternative remains that:
(a) Is not the proposed project activity without being undertaken as registered CDM project activity and
(b) Corresponds to one of the baseline scenarios provided in the methodology.

If more than one alternative remains that correspond to a baseline scenario provided in the methodology, choose the alternative with the lowest emissions as the baseline.

Approved consolidated baseline and monitoring methodology AMS-III.Q. Small scale methodology - Waste energy recovery Version 06.1 is considered for this project.

Identification of the baseline scenario
The most plausible baseline scenario among all realistic and credible alternative(s) baseline scenario is identified as:
• Power generation in the absence of the project activity for each recipient facility;

For the use of waste energy, the realistic and credible alternative(s) include
W1: WECM is directly vented to the atmosphere without incineration; **or**
W2: WECM is released to the atmosphere (for example after incineration) or waste heat is released (or vented) to the atmosphere or waste pressure energy is not utilized;

Description of project activity:
Situation-1 • Independent generation of heat, electricity and mechanical energy at project facility;

Baseline Emissions:

1. Baseline emissions from energy generated by the project activity (BE_En,y)

1.1. No recovery on the WECM stream(s) in the absence of CDM project activity

1.1.1. Baseline emissions for baseline Scenarios 1 and 2

Baseline scenarios 1 and 2 represent the situation where the waste energy of WECM stream(s) used in the projects is released to atmosphere/ flared/ unutilised, the electricity is obtained from an identified existing or new power plant or from the grid

The baseline emissions for the year y shall be determined as follows:

$BE_{y} = BE_{En, y} + BE_{Flst, y}$

Where:
BE_{y} = The total baseline emissions during the year y in tCO_2

$BE_{En, y}$ = The baseline emissions from energy generated by the project activity during the year y in tCO_2

$BE_{Flst, y}$ = Baseline emissions from fossil fuel combustion, if any, either directly for flaring of waste gas or for steam generation that would have been used for flaring the waste gas in the absence of the project activity (tCO_2)

If the project activity uses the waste pressure to generate electricity, then only section (a) below is used.

$BE_{E, ny} = BE_{Elec, y} + BE_{Ther, y}$

Where:
$BE_{Elec, y}$ = Baseline emissions from electricity during the year y in tCO_2
$BE_{Ther, y}$ = Baseline emissions from thermal energy (due to heat generation by elemental processes) during the year y (tCO_2)

(a) Baseline emissions from electricity ($BE_{Elec, y}$) generation

$BE_{Elec, y} = f_{cap} * f_{wcm} * \sum j \sum i (BE_{EL, j, y} * BE_{ME, j, y})$

Where:

f_{cap} = The ratio of waste energy generated at a historical level, expressed as a fraction of the total waste energy used in the project activity for producing useful in year y. The ratio is 1 if the waste energy generated in project year y is the same or less than that generated at a historical level.

f_{wcm} = Fraction of total electricity generated by the project activity using waste energy. This fraction is 1 if the electricity generation is purely from use of waste energy.

$BE_{EL, j, y}$ = Baseline emissions corresponding to the electricity supplied in year y by the project activity to the recipient facility j during the year y (tCO_2)

$BE_{ME, j, y}$ = Baseline emissions corresponding to the supply of mechanical energy by the project activity to the recipient facility j as per case (2a) and case (2b) described below during the year y ($t CO_2$)

Case 1: The baseline emissions corresponding to electricity supplied by the project activity to recipient facilities shall be estimated for each recipient facility in accordance with the case it belongs to as follows:

$BE_{EL,j,y} = EG_{i,j,y} * EF_{NEW,EL,j}$

Where:

$EG_{i,j,y}$ = The power supplied by the project activity to recipient facility j during the year y (MWh)

$EF_{NEW,EL,j}$ = The CO_2 emission factor for the grid electricity or new standalone power plant that would have been built in the baseline scenario by the recipient facility j (tCO_2/MWh) – UCR recommended emission factor of 0.9 tCO2/MWh has been considered. (Reference: General Project Eligibility Criteria and Guidance, UCR Standard, page 4)

For the identified existing source of electricity, the proportion of electricity that would have been sourced from the i^{th} source to the j^{th} recipient facility (EG i,j,y) should be estimated based on historical data of the proportion received during the three most recent years.

Baseline Emissions:

The baseline emissions are to be calculated as follows: (for the year 2022)

$BE_{EL,j,y} = EG_{i,j,y} * EF_{NEW,EL,j}$

= 34,157 * 0.9 = 30,741 tCO_2

Baseline Emissions Calculation

Sr No	Year	$EG_{i,j,y}$ (MWh)	$EF_{NEW,EL,j}$	$BE_{EL,j,}$
1	2021	0.00	0.9	0.00
2	2022	34,157	0.9	30,741
	tCO2 for the period January 2022 to December 2022			**30,741**

C.6. Prior History>>

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

C.7. Monitoring period number and duration>>

First Issuance Period: 0 1years, 00 months – 01/01/2022 to 31/12/2022

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

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

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

There are changes from registered PCN monitoring plan and applied methodology from ACM 0012 to AMS IIIQ

C.10. Monitoring plan>>

All data collected as part of monitoring plan should be archived electronically and be kept at least for 2 years after the end of the last crediting period. 100% of the data should be monitored if not indicated otherwise in the comments in the tables below.

THE FOLLOWING TABLES SHALL BE USED FOR PARAMETERS BEING MONITORED OR USED IN EMISSION REDUCTIONS DETERMINATION.

Parameter	
Data unit	MWh
Description	Quantity of electricity supplied to the recipient j by the generator, which in the absence of the project activity would have sourced from i-th source (i can be either grid or identified source) during the year y in MWh
Source of data Value(s) applied	Recipient facility(ies) and generation plant measurement records
Procedures	The Net electricity generation and export the recipient plant by the power plant is recorded at the sub-station. At the end of every month company notes down the meter readings and generate the joint meter reading (JMR) report based on the monthly electricity exported to the grid or consumed by the recipient plant.
Monitoring frequency	Monthly
QA/QC procedures	The energy meters will undergo maintenance/ calibration as per the industry standards. Calibration certificates, sales records and purchase receipts are used to ensure the consistency
Purpose of data	To calculate the baseline emission
	Data shall be measured at the recipient facility(ies) and at the project facility for cross check. Sales receipts shall be used for verification. Concerned departments shall verify that total energy supplied by the generator is equal to total electricity received by recipient facility(ies)

Parameter	
Data and Parameters available at validation (ex-ante values)	**UCR recommended emission factor**
Data unit	tCO_2 /MWh

Description	A "grid emission factor" refers to a CO_2 emission factor (tCO_2/MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO_2/MWh for the 2013 - 2021 years as a conservative estimate for Indian projects not previously verified under any GHG program. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach.
Source of data	https://cea.nic.in/wp-content/uploads/baseline/2023/01/Approved_report_emission__2021_22.pdf and **UCR Document**
Value applied	0.9
Measurement methods and procedures	-
Monitoring frequency	Ex-ante fixed parameter
Purpose of Data	For the calculation of Emission Factor of the grid
Additional Comment	The combined margin emission factor as per CEA database (current version 18, Year 2022) results into higher emission factor. Hence for 2022 vintage UCR default emission factor remains conservative.

Data/Parameter	**Date of commissioning of the units**
Data unit	Date
Description	Actual date of commissioning of the project unit
Source of data Value(s) applied	Commissioning report issued by State grid transmission corporation or State electricity board
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 baseline emissions