Project Description Document for CCMP in Sectors Other Than Land Use (Doña Juana Landfill Gas to Energy Project)

Document prepared by	Biogás Colombia SAS ESP
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Contact	Nicolas Piñeros Amaya Calle 101 No 12-42 – Bogotá n.pineros@biogas.com.co +57 6015522520 www.biogas.com.co

Contents

Acronyms and abbreviations

CCMP	Climate Change Mitigation Programme or Project
GHG	Greenhouse Gases
NDCs	Nationally Determined Contribution
PDD	Project Description Document
VVB	Validation and Verification Body

1 Climate change mitigation programme or project (CCMP) information

1.1 CCMP holder information

Full name(s)	**Nicolas Piñeros Amaya**
Name of institution (if applicable)	BIOGÁS COLOMBIA S.A.S. E.S.P.
Roles or responsibilities	Owner
Identification	900.181.508-1
Location	Doña Juana Landfill site Bogotá- Colombia
Telephone number(s)	+57 6015522520
E-mail address	n.pineros@biogas.com.co

1.2 Information from other CCMP institutional stakeholders

Full name(s)	**Krishan Kapil**
Name of institution (if applicable)	EKI Energy Services Limited
Roles or responsibilities	Project Consultant
Identification	CIN - L74200MP2011PLC025904
Location	Plot No 48, Scheme 78, Part 2, Vijay Nagar, Indore-452010, Madhya Pradesh, India
Telephone number(s)	+91 99994 15645
E-mail address	krishan.kapil@enkingint.org

1.3 CCMP objective

The project involves landfill gas capture and use in reciprocating engines for electricity generation, and the flaring of any excess landfill gas at the Doña Juana Landfill site, which is located at District Capital of Bogota- Colombia.

Before the implementation of the project activity, the landfill gas from the landfill used to be vented to the atmosphere through passive wells. The combustion of the landfill gas avoids emissions which would otherwise occur from the anaerobic degradation of the waste in Doña Juana Landfill site

The Doña Juana Landfill, located in the District Capital of Bogotá – Colombia – is used for the disposal of the municipal solid waste generated by near of 8 million inhabitants of Bogotá, providing a solution to dispose of an average of 2.2 million tons of household waste per year. The Doña Juana Landfill is the biggest landfill site in Colombia and one of the biggest in Latin America.

The implementation of the project at the Doña Juana landfill also created additional environmental improvements and made a positive contribution to the global problem of climate change by reducing greenhouse gas emissions.

Combustion of landfill gas oxidizes methane into CO_2, mitigating the effects of emissions of said compound into the atmosphere. Burning collected landfill gas not only destroys methane, but also destroys some compounds in landfill gas, such as volatile organic compounds and ammonia.

The project is contributing to national environmental commitments within the framework of sustainable development objectives by reducing GHG emissions in the waste sector after the combustion of methane and in the mining and energy sector by producing electricity with non-conventional renewable sources.

Additionally, the project prevents the risks associated with gases in a landfill, such as:

- Risk of explosion
- Fire risk
- Elimination of offensive odors
- GHG emissions
- Potential air pollution
- Damage to vegetation

1.4 CCMP description

The project involves landfill gas capture and use in reciprocating engines for electricity generation, and the flaring of any excess landfill gas at the Doña Juana Landfill site, which is located at District Capital of Bogota- Colombia.

Before the implementation of the project activity, the landfill gas from the landfill used to be vented to the atmosphere through passive wells. The combustion of the landfill gas avoids emissions which would otherwise occur from the anaerobic degradation of the waste in Doña Juana Landfill site. The project is also exporting electricity to the Colombian National Grid, hence also avoiding emissions from electricity which would be generated from fossil fuel power plants connected to this same grid.

The baseline scenario is the same as the scenario existing before the start of the implementation of the project activity.

The type of GHGs covered by the CCMP are as follows.

GHG type	Activity that generates or reduces it
CH_4	Generated by the disposal of municipal solid waste in a landfill
CH_4	Reduced due to the effect of the implementation of the project through burning or combustion in high-efficiency flares or burners with hidden flames or by reciprocating engines for the generation of electrical energy, or through burners for the production of thermal energy.
CO_2	Displacement of energy from the grid by the energy generated by the project

1.4.1 Sectoral scope and type of CCMP

Sectoral scope:

- Number 13: Waste Management and Disposal.
- Number 1: Energy industries (renewable sources)

Large Scale Project, remove or reduce, on average 100,000 or more tons of CO2e per year.

Destruction of emissions / Renewable Energy

1.4.2 Location and limits of the CCMP

1.4.2.1 Spatial limits

Country: Colombia

City: Bogotá DC

Project located in the Doña Juana landfill site, located in the town of Usme, in the city of Bogotá, Capital District, at km 5 of Boyacá Av. "*via al llano"*. The G.P.S. (Global Positioning System) coordinates for the boundaries of the landfill are indicated below:

Limits	G.P.S. coordinates
North	4º 32' 03.23" N 74º 07' 46.08" W
South	4º 29' 17.68" N 74º 08' 15.92" W
East	4º 30' 41.19" N 74º 07' 37.39" W
West	4º 30' 21.84" N 74º 08' 50.47" W

The total project area and eligible area cartography is uploaded and updated on the Ecoregistry platform according to Cercarbono's Guideline for Mapping Presentation and Analysis.

1.4.2.2 Time limits

The project activity consists of the capture, destruction and use of landfill biogas produced by the anaerobic decomposition of urban solid waste disposed in the Doña Juana landfill site, it started in 22.09.2009. According to the results of studies carried out in 2019 by the Administrative Unit. Special for Public Services (UAESP) the sanitary landfill will be able to extend its useful life by up to 37 years, which projects operation until after the year 2050.

Biogás Colombia S.A.S. E.S.P. is responsible for all investments and operating costs necessary to perform the collection, flaring of landfill gas, and the electricity generation. The project has a useful life as per concession contract until 03.11.2041.

1.4.2.3 Total area, facilities, or processes

The total landfill area is 550 hectares (5,500,000 m^2), the biogas capture area is 36 hectares (360,000 m^2). The total construction land occupation of the entire project is 4.75 hectares (47,500 m^2).

1.5 Holdership or right to use the area, facility, or process

Biogás Colombia S.A.S. E.S.P. has the ownership and rights of use of the entire area required by the project in accordance with the established national regulations. In 2021, the owner of the project had a change in its corporate name, going from Biogás Doña Juana S.A.S. E.S.P. to Biogás Colombia S.A.S. E.S.P., maintaining its commercial registration, NIT and its administrative and organizational structure. This change was due to commercial reasons, as the different actors in the financial and industrial sector constantly confuse our organization with the concessionaire in charge of operating the landfill site.

The ownership of the project is documented and evidenced by an administrative act issued as resolution 235 of 2007 that resulted in the concession contract C-137 signed between the district of Bogotá, represented by the UAESP and the company Biogás Colombia SAS ESP Contract concession for the extraction, treatment and use of biogas produced in the Doña Juana landfill. As well as the Letter of Approval of the project by the Environmental authority and the project initiation document.

1.6 Characteristics and conditions before the start of the CCMP

The base scenario is the same as the conditions existing before the start of the project activity. Before the project was implemented, landfill gas from the operated areas used to be vented into the atmosphere through passive gas wells, not only posing environmental impacts but also creating the constant risks of landslides and fires during landfill operation.

This is due to the non-obligation of capturing and treating landfill biogas in Colombia, an activity that has never been considered to be remunerated through sanitary service rates. See section 2.4 for more information.

1.7 CCMP technologies, products, and services

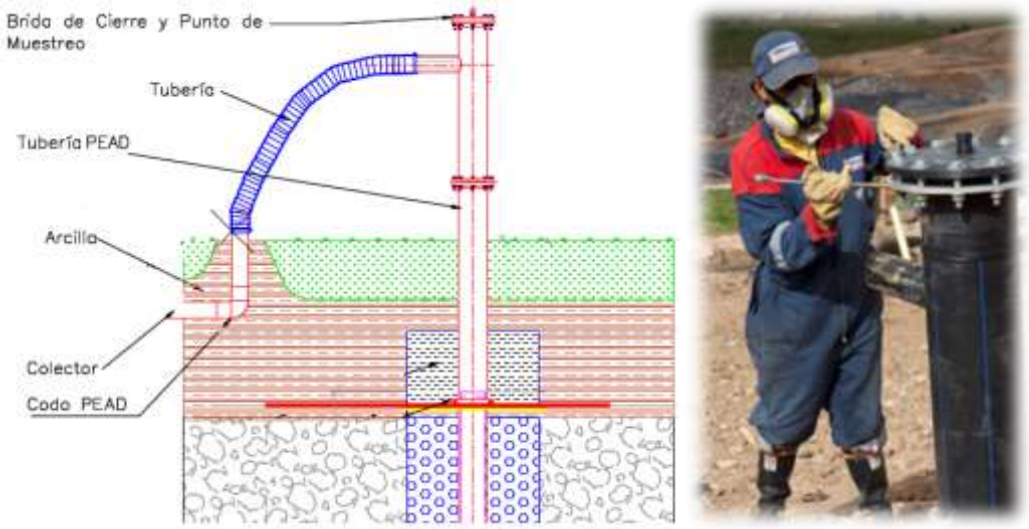
The project to use biogas from the Doña Juana landfill is the first projects of this type in Colombia and the first project in the country to generate electricity to connect to the national electrical grid through the use of biogas from the landfill.

In addition to improving the general management of the landfill, the project is contributing toward facilitating the design and improving the operational experience obtained in the Doña Juana landfill, a project that may strengthen its use for its possible massification throughout the region or country. The generation of renewable energy from landfill gas for the needs of the site and to export energy to the National electrical grid will allow the transfer of technology and knowledge on a small scale. This will create reference data for the future sustainable development of a renewable energy scheme in Colombia through the use of landfill gases.

The disposal of waste in Doña Juana has been carried out in various and large areas licensed for this purpose, the various areas of old operation and the recent ones such as: Biosolids, Zone II area 3, Zone VII, Zone VIII, Optimization Zone Phase I and Optimization Zone Phase II, are part of the disposal areas that have technically developed adequate systems and with high engineering development from the previous design to the operation for the disposal of urban solid waste, avoiding the filtration of leachate to soil and groundwater, designs, development and adequate operation to enhance the waste, guaranteeing stability through mechanical compaction of the waste with compaction measurement, construction by terraces with limited heights, construction of filters and wells and finally covering the waste with impermeable clay layers preventing water leaks, gas leaks and improving vector control.

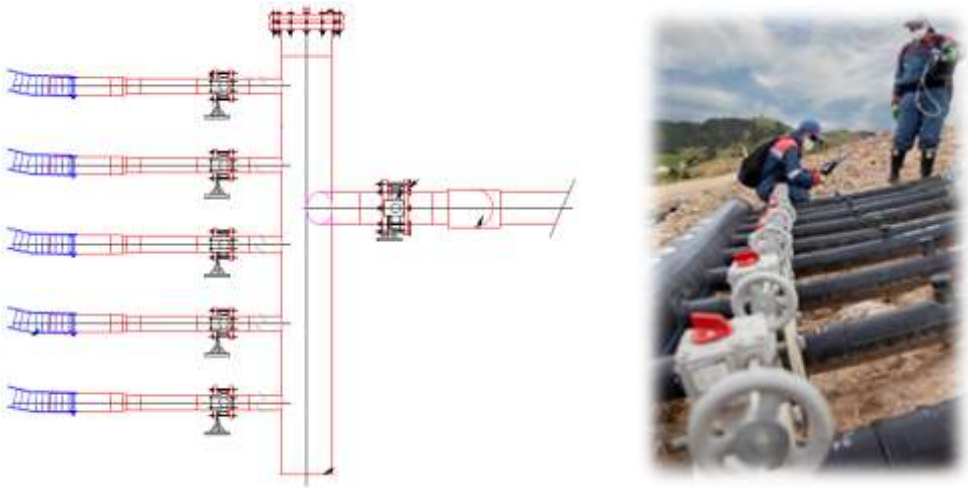
Prior to the implementation of the project, the evacuation of gases resulting from the anaerobic decomposition of waste with organic content was done through passive evacuation through ventilation wells.

In the project scenario, biogas capture and conduction systems is implemented based on theoretical developments and projects installed around the world with technology principles from France and Germany, guaranteeing the implementation of cutting-edge technology for Biogas extraction. In this way, the wells built by the landfill operator are intervened for the assembly of well heads and biogas conduction lines with condensate and leachate traps made of High Density Polyethylene (HDPE).



Biogas Capture System – wellheads.

The conduction system is made up of line concentrators (manifold's) that transport the biogas from the chimneys to the main collectors. This entire infrastructure is built using HDPE pipes and accessories that, in addition to grouping several chimneys, allow the regulation and maintenance of the gas conditions chimney gas.



Manifolds and conduction system.

The suction system is made up of rotating equipment that, using negative pressure, transports the biogas from the wells in the landfill to the biogas destruction and use plant. In the plant it is controlled with precision instrumentation and automatic control systems for the entire process, the most important equipment in these adaptations corresponds to pressure and temperature transmitters that, according to the applications, they are selected in order to obtain precise, repeatable measurements, on appropriate and very reliable scales. Recognized manufacturers with a global presence are selected.

Suction and process control system

For the measurement of biogas, both for quantification of input gas, fraction of the components in volumetric part, combustion efficiency and exhaust gases, various technologies are selected to guarantee the reliability, consistency, transparency and repeatability of the measurements. Therefore, for the measurement of temperature and pressure of Biogas, equipment installed meet international standards, in principle of measurement according to the level of certainty of the process, which may well be for temperature using a sensor with continuous variation of resistance or electromotive force, for pressure using a sensor of piezoelectric, ceramic or similar type.

The measurement of the volumetric fraction of the gas, whether entering the system or emissions, is done with a chromatographic system or electrochemical probes, the volumetric or flow rate is carried out using Venturi type transmitters with pressure differential, orifice plate type system, infrared, ultrasound or other suitable. The energy is measured by equipment that complies with the country's current legislation. All instrumentation have calibration certificates and/or product conformity certificates, as well as inspection and maintenance routines according to the manufacturer's recommendations. The technology in the future may be changed according to advances in measurement equipment developed by manufacturers.

Process measurement and quantification equipment.

The combustion of biogas for the destruction or use of methane is carried out in high efficiency equipment. On one hand in enclosed flares with automatic emissions control and regulation of combustion, equipment that is monitored with the instrumentation described above. On the other hand, in internal combustion engines for power generation, reciprocating equipment from recognized brands in the sector.

Combustion and utilization equipment.

The project is a CCMP project in the CERCARBONO standard with the following infrastructure:

- Biogas extraction, capture and conduction system from the landfill, system installed in HDPE and also vertical wells, horizontal wells, filters drillings, filters, trenches, etc., with the necessary quantities to capture the gas from the landfill, according to progress in the operation areas and final disposal.

- Pumping platform with capacity to extract 20,000 Nm3/h of Biogas through high efficiency blower-type rotary equipment.
- Closed-type methane destruction torches (enclosed flare) with a nominal capacity each of up to 5,000 Nm3/h or an equivalent thermal power of 25,000 kW.
- Doña Juana I biogas power generation plant of 1.7MW using 2 reciprocating engines, plant connected to the local distribution system.

The plant will have expanded use in the following way:

- Biogas Doña Juana I of 1.7MW will be expanded to 5MW, commissioning will take place in the second half of 2024.
- Installation and commissioning of the 9.88 MW Doña Juana II Biogas plant starting in 2025 or sooner if possible – Power Generation plant with the use of biogas through the use of reciprocating engines.
- Installation and commissioning of the 9.88 MW Doña Juana III Biogas plant starting in 2025 or sooner if possible – Power Generation plant with the use of biogas through the use of reciprocating engines.
- Installation and commissioning of the 2.5 MW Doña Juana IV Biogas plant starting in 2026 – Power Generation plant with the use of biogas through the use of reciprocating engines.

The possible implementation of the sale of gas or its thermal use for future expansions will be evaluated, as well as the possibility of carrying out the treatment of leachate inside the Landfill.

All equipment installed has a useful life of more than 25 years as long as the maintenance activities scheduled by the manufacturers are carried out and the equipment operation criteria are met.

Assessment of technical life of the project

As per Para 5.2 of M/MLF-DE_RE01 (version 2.1), Installed technology useful life or lifetime, which must be demonstrated when the requested accreditation period is greater than the default remaining life as per in the current version of CDM's Methodological Tool 10 , corresponds to the period during which the main power generation system, and the biogas gathering, treatment, compression or destruction systems can comply with its function under adequate operational cost-efficiency and safety.

As per Tool 10- Tool to determine the remaining lifetime of equipment (Version 01), Option (a): Use manufacturer’s information for the technical lifetime of equipment and compare to the date of first commissioning, is used to demonstrate remaining lifetime equipment. The installed equipment records maintenance are provided, as well as the manufacturer and supplier life equipment technical information. In section 2.5 detailed information is provided about.

1.8 Chronological plan

- Duration or lifetime of the CCMP (in years): 32 years, 22/09/2009 to 03/11/2041
- The accreditation period of the CCMP: 22/09/2023 to 21/09/2033
- Minute-by-minute for recorded data information, and daily and monthly for some operation variables.
- The frequency of verification events: At least annually
- Commissioning of Doña Juana I biogas plant by end of 2024.
- Commissioning of Doña Juana II biogas plant by 2025.
- Commissioning of Doña Juana III biogas plant by end of 2025.
- Commissioning of Doña Juana IV biogas plant by 2026.

2 Methodology

Name of methodology or tool	Justification of applicability for the CCMP (full or partial)	Version
M/MLF-DE_RE01: For Projects for the Destruction and Utilisation of Biogas from Landfill Sites	Refer Section 2.1	2.1
TOOL08: Tool to determine the mass flow of a greenhouse gas in a gaseous stream	Refer Section 2.1	03.0
TOOL06: Project emissions from flaring	Refer Section 2.1	04.0
TOOL07: Tool to calculate the emission factor for an electricity system	Refer Section 2.1	07.0
TOOL10: Tool to determine the remaining lifetime of equipment	Refer Section 1.7	01.0

2.1 Applicability of the selected methodology to the CCMP

M/MLF-DE_RE01 (versión 2.1) is applicable to the project activity as

M/MLF-DE_RE01 (versión 2.1)		
Technology/measure	**In the case of the project**	**Applicability**
Prior to CCMP implementation, there is no biogas collection system or, if any in operation, it shall be demonstrated such system was not designed for biogas destruction or use, or such system has been optimised or upgraded to enable required capture conditions	Before the implementation of the PRR-GHG there was no system for capturing or using biogas	Aplicable
CCMP implementation shall not impact the amount of recycled organic waste that would be processed in absence of such CCMP.	The project consists solely of capturing the Biogas produced in the landfill by the waste disposed there without affecting the operation or intervening in the disposal processes or waste projects of the city of Bogotá. Contract C137 clearly establishes that the project will operate under the current legislation of the city of Bogotá and does not	Aplicable

	affect the solid waste management and management	
The amount of methane produced in the landfill from the mass and characteristics of the solid waste shall not deliberately being increased through the implementation of new operation strategies, as compared with identified baseline conditions	The project consists solely of capturing the Biogas produced in the landfill by the waste disposed there without affecting the operation or intervening in the disposal processes. The company in charge of the disposal is a private company with no direct relationship with the owner of the project. Any intervention on the operation will affect the environmental license of the landfill and therefore cannot intervene in the final disposal process.	Aplicable
Baseline scenario for the CCMP shall enable concluding that in absence of the activity, the biogas: (i) would have been released to the atmosphere, (ii) would have been destroyed to avoid odours or for safety reasons, (iii) generated electric or thermal energy would have been exclusively produced based on the use of fossil fuels, or (iv) biogas users would have used fossil fuels for the same purpose.	Before the implementation of the project activity, the landfill gas from the landfill used to be vented to the atmosphere through passive wells.	Aplicable
CCMPs shall comply with the requirements of the Measuring/Monitoring, Reporting, and Verification (MRV), or similar, systems in force in the jurisdiction governing its operation, in addition to all relevant	CCMPs Will comply with the requirements of the and criteria of • M/MLF-DE_RE01: For Projects for the Destruction and	Aplicable

requirements and criteria of the ***Cercarbono's Protocol***, the ***Procedures of Cercarbono's Certification Programme*** document, and the related and relevant complementary methodological tools used, in their current versions, available at www.cer-carbono.com, section: Documentation.	Utilisation of Biogas from Landfill Sites, Ver 2.1 • Cercarbono's Protocol for Voluntary Carbon Certification – Version 4.4	

TOOL 07 (Ver 07.0) is applicable to the project activity as

TOOL07: Tool to calculate the emission factor for an electricity system (Ver 07.0)		
Technology/measure	**In the case of the project**	**Applicability**
This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a Project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects).	Applicable because the project activity substitutes grid electricity	Aplicable

TOOL06: (Ver 04.0) is applicable to the project activity as

TOOL06: Project emissions from flaring (Ver 04.0)		
Technology/measure	**In the case of the project**	**Applicability**
This tool provides procedures to calculate project emissions from flaring of a residual gas. The tool is applicable to enclosed or open flares and project participants should document in the CDM-PDD the type of flare used in the project activity.	The project activity includes enclosed flares and the Project participants document this in the PDD.	Applicable

This tool is applicable to the flaring of flammable greenhouse gases where: (a) Methane is the component with the highest concentration in the flammable residual gas; and (b) The source of the residual gas is coal mine methane or a gas from a biogenic source (e.g. biogas, landfill gas or wastewater treatment gas).	According to LFG analyses from the 3rd accreditation period made available to the DOE during validation it is evidenced that methane is the component with the highest concentration in the flammable residual gas and the source of the residual gas is landfill gas	Applicable
The tool is not applicable to the use of auxiliary fuels and therefore the residual gas must have sufficient flammable gas present to sustain combustion. In the case of an enclosed flare, there shall be operating specifications provided by the manufacturer of the flare and these shall be followed by the project participant	No auxiliary fuels are used for the operation of the enclosed flares, and operating specifications were provided by the manufacturer of the flares.	Applicable

TOOL 08 (Ver 03.0) is applicable to the project activity as

TOOL 08: Tool to determine the mass flow of a greenhouse gas in a gaseous stream (Ver 03.0)		
Technology/measure	**In the case of the project**	**Applicability**
Typical applications of this tool are methodologies where the flow and composition of residual or flared gases or exhaust gases are measured for the determination of baseline or project emissions.	The project activity includes residual gases that are measured for the determination of baseline emissions	Aplicable

TOOL 10 (Ver 01.0) is applicable to the project activity as

TOOL 10: Tool to determine the remaining lifetime of equipment (Ver 01.0)		
Technology/measure	**In the case of the project**	**Applicability**
The tool provides guidance to determine the remaining lifetime of baseline or project equipment. The tool may, for example, be used for project activities which involve the replacement of existing equipment with new equipment or which retrofit existing equipment as part of energy efficiency improvement activities.	Applicable to demonstrate technical lifetime remaining of installed equipment, according to the operational information and manufacturer specification.	Aplicable

2.2 Additionality

2.2.1 Legal framework analysis

As per section 4.3.13 of Cercarbono Certification Program Procedures V 2.2, In the case of projects requesting renewal of their crediting periods, Additionality shall only be revalidated in case there are legal provisions in place with potential effects on additionality assessment, i.e., by complying with such legal provisions, the project activity would form part of the baseline scenario.

Also, as per section 5.5 of Cercarbono Certification Program Procedures V 2.2, for crediting period renewal, only Legal additionality analysis (*Review required for provisions or regulations that might make it non-additional*) to be conducted.

As the project activity consists of the capture, conduction, destruction and use in the electricity generation of the methane contained in the biogas produced in the Doña Juana landfill. There is no obligation to treat landfill biogas in the country; therefore, in the absence of the project, GHG emissions would be emitted through passive venting into the atmosphere (Resolution 0330 – Ministry of Housing, City and Territory).

Thus, the project activity is fully in accordance with article 37 of MADS Resolution 1447/2018, in which those reductions in GHG emissions or removals that would not have occurred in the absence of the project activity are considered additional, and that generate a net benefit to the atmosphere with respect to its baseline.

Furthermore, there is no change in legal provisions or regulations of the host country which might make this project non-additional. In this way, the project remains additional as there is no modification in the legal scope.

Additionally, according to *Chapter 5. Specific cases of additionality*, of *Cercarbono´s Tool to Demonstrate Additionality of Climate Change Mitigation Initiatives v.2.0.1*, if a climate change mitigation initiative complies with the regulatory framework and is not the product of a legal requirement, it can be considered directly additional if it has at least one of the characteristics listed there.

The CCMP is the first of its kind in terms of capture methodologies, biogas extraction quantities and technology for controlled burning in enclosed flame flares in the host country. Prior to the implementation of the project, in Colombian landfills biogas was passively vented to the atmosphere or its combustion was carried out with flares on site for each gas well, having a risky operation and health risks. The CCMP was the first in Colombia to implement a plant for the treatment and use of biogas with a level of safety, technology and automation in accordance with the best practices in the sector to date.

In terms of biogas use, the CCMP is the only waste-to-energy project in the landfill sector that is in commercial operation delivering renewable energy to the grid. In addition, once its expansion stages are completed, it will be the largest of its kind in Colombia using this type of technology to harness biogas, being a model to follow in terms of energy efficiency and circular economy.

2.3 No double counting

The project activity is not registered or seeking registration in other carbon registries. The project was deregistered from the Clean Development Mechanism (CDM) in order to avoid double counting. Hence, the carbon credits issued by this project should not be double counted.

2.4 Baseline scenario

As per Para 6 of M/MLF-DE_RE01 (version 2.1), *Possible baseline scenarios associated to landfill-generated biogas management can be the following:*

A. Prior to CCMP development, landfill-produced biogas, or a major portion thereof, is released directly to the atmosphere. In this case, project alternatives might lead to following situations in project scenario (thus requiring related information to build the baseline scenario):

- *Biogas is captured and destroyed in a controlled way by flaring.*
- *Biogas is captured and used for electric power generation.*
- *Biogas is captured and used for thermal energy generation.*
- *Biogas is captured and used through injection into a natural gas network.*
- *Biogas is captured and used through distribution using biogas dedicated networks of by means of tank trucks.*

B. Prior to CCMP development, landfill-produced biogas, or a portion thereof, is captured and through combustion in a flare, without any use. In this case, project alternatives might lead to following situations in project scenario (thus requiring related information to build the baseline scenario)

- *Captured biogas is used for electric power generation or efficiency associated to such process is improved.*
- *Captured biogas is used for thermal energy generation or efficiency associated to such*
- *process is improved.*
- *Captured biogas is used by injecting it to a natural gas distribution network or efficiency associated to such process is improved.*
- *Captured biogas is used by injecting it to a natural gas distribution network using biogas dedicated networks of by means of tank trucks or efficiency associated to such process is improved.*

Prior to the development of the project, the biogas produced in the landfill was being released into the atmosphere directly. Currently in Colombia there is no regulation that requires the treatment or use of Biogas in Landfills, so most projects release all the biogas into the atmosphere through passive venting.

Furthermore, as per registered PDD, the chosen baseline scenario associated with the management of biogas in the landfill is following:

Prior to the development of the project, the biogas produced in the landfill, or a greater proportion of it, is being released into the atmosphere directly. Therefore, in the execution of the project, the following alternatives are established:

a) Biogas is captured and destroyed in a controlled manner through combustion.
b) Biogas is captured and used to generate electricity.

The baseline scenario is the same as the scenario existing prior to the start of the implementation of the project activity. As the project is applying for renewal of crediting period, and there is:

- Currently, there are no new national and/or sectoral policies that could affect the baseline scenario. The current baseline complies with all relevant mandatory national and/or sectoral policies.
- The technical characteristics and circumstances do not affect the current baseline emissions as they would remain unchanged throughout the third accreditation period.
- The baseline scenario does not significantly change from the first crediting period to the second.

Hence, the above assessment indicates that confirmed that baseline defined in the registered PDD is valid for the third accreditation period as well. Nevertheless, data and parameters need to be updated.

2.5 Project scenario

The acquisition and installation of the operation, monitoring and recording equipment is done through strict compliance to carry out the project activity with the most recognized

equipment manufacturers worldwide for the control and automatic recording of data and operation of a plant such as was described in section 1 – Technologies, products, services and/or measures implemented by the project activity.

The specifications and manuals for each of the equipment used are found in the platform's operation and maintenance manual.

Description of the torch or equivalent burner:

- Biogas thermal destruction station with maximum capacity of 5,000 to 25,000 Kw each unit @50% CH_4

Combustion Flares	
Nominal power	*25,000 kW*
Nominal capacity	*5,000 Nm3/h of biogas at 50% CH4*
Operating range	*20 to 60% CH4*
Operating tolerance	*20 to 100% of nominal power*
Flame temperature	*800°C to 1100°C modifiable Hidden flame*
Retention time	*> 0.6 s*
Emission at nominal (T°>800°C)	*CO < 150 mg/Nm3*
Emission at nominal (T°>800°C)	*NOx < 350 mg/Nm3*
Emission at nominal (T°>800°C)	*NOx < 350 mg/Nm3*
Combustion efficiency	*99% under normal operating conditions and at steady state*

Flaring combustion for the destruction of methane is done using an enclosed flare:

Enclosed flares are mainly composed of:

- Burner in refractory stainless steel with internal protection of elements in refractory bricks + ceramic fiber.

- Stainless flame tube with internal ceramic fiber protection.

- Low noise stainless burner, composed of injectors, operating pressure from 5 to 40 mbar. Temperature regulation by controlling the combustion air flow by the 230V single-phase 35 W electric servomotor; final safety contacts, 4-20 mA positioner manual emergency command.

- Temperature control by type N thermocouple coated in 16 mm and regulation by the programmable controller with value display on the touch screen.

- Flame control by the UV ray detection cell.

- Ignition by 2 electrodes under voltage (7,500 volts).

This equipment has a maintenance plan in accordance with the manufacturer's specifications and the plant's training and operation manual, which specifies everything from periodic visual inspections to the replacement requirements of the elements that cloud require a

replacement. The equipment was designed to achieve a useful life of at least 21 years or 180,000 hours of operation, as long as the maintenance steps are met.

Currently the flares have the following hours of operation BG1: 77,530 h, BG2: 119,580 h, 113,195 h. It is guaranteed that the installed equipment will have a useful life greater than the duration proposed for the activity by the CCMP, taking into account that by 2026 more than 85% of the gas will be used for electricity generation in the gensets, and the enclosed flares will no longer be used gradually with the commisioning of new gensets.

With rigorous execution of the recommendations issued by the equipment manufacturer, it is possible to maintain optimal operation of the burners of each of the flares, and guarantee an effective destruction process. Each of the flares has its equipment resume and operation logbooks which is attached as support.

The unit described below corresponds to the regulations regarding the destruction of biogas, in accordance with the CE (European Community) requirements regarding electromagnetic compatibility and ATEX 94/9/ CE (zone 2) for material operating in an environment with risk of explosion: zone 2=1 meter and to the EC Machine Directive 89/37/EEC.

Blowers	
Type of industry Continental:	*Type 151.64 – turbine 6501*
Coating	*Cast aluminium*
Tightness	*Es*
Relative suction depression	*-100 mbar*
Relative back pressure	*200 mbar*
Turbine speed	*3440 tr/mn*

The equipment and instrumentation meet the automation and safety criteria, guaranteeing the reliability of the data and the safety of the operating personnel.

Measurement of the fraction of CH_4, CO_2 and O_2 in the inlet gas and exhaust gas

Gas Analyzer	
1 ABB gas analyzer (%CH4, %CO2, %O2) with display:	• *CH4+CO2 (INFRARED sensor): 0 to 100% vol*
	• *O2 (electrochemical sensor): 0 to 25% vol.*
	• *PROFIBUS PA connection*
1 ABB exhaust gas analyzer (ppmCH4, %O2) with display:	• *CH4 - ppm (INFRARED sensor): Dual scale (1: 0-300 ppm / 2: 0-3000 ppm)*
	• *O2 (electrochemical sensor): 0 to 25% vol.*
	• *PROFIBUS PA connection*

Description of the genset units:

Genset units	
Engine reference	*TCG2020 V20*

Cylinder arrangement	*In "V" at 60°*
Cylinder number	*20*
Power at Cosine Phi=1	*1,813 kW*
Electrical Engine efficiency	*41.9 %*

The gensets used for the project have an initial useful life of at least 48,000 for the GE1 and GE2 engines, and at least 64,000 hours of operation for the engines next to be installed. However; Once these operating hours are reached or due to the equipment requirement, according to the maintenance schedule, a full maintenance program should be performed, once again returning the initial capacity in hours of each unit. This means that, following the technical maintenance circulars of the manufacturer of the equipment used for energy generation, it is guaranteed that the installed equipment will have a useful life greater than the duration proposed for the activity by the CCMP.

The GE2 engine -TBG2016V16- is close to 13,000 hours. The GE1 engine -TCG2016V16 - is close to 3,500 hours of operation. All this information is supported by the attached information such as: Manufacturer declaration of lifetime gensets, Declaration technical sheets, maintenance circulars, and maintenance records such as equipment record form and operation logbooks.

Biogas flow calculation

- Atmospheric pressure transmitter
- Operating range from 0 to 1000 mbar
- Direct communication with the data recording system
- RTD type Temperature Transmitter
- Operating range from 0 to 100°C tzool
- Direct communication with the data recording system
- Venturi type volumetric flow meter or Ultrasonic type or Orifice Plate type
- Recording of flows from 0 to 20,000 m3/h of gas
- In the case of Venturi Type and Orifice Plate Type, differential measurement of pressure ranges 0- 25 0 -100 mbar

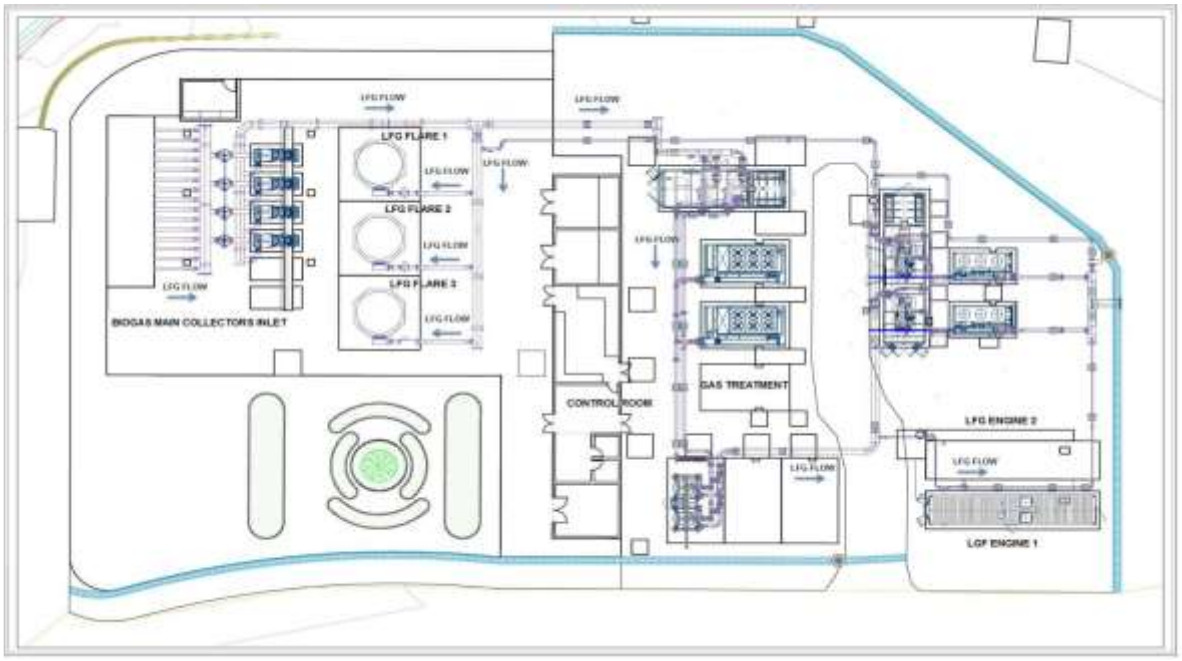
Combustion temperature measurement

- Type N thermocouple
- Operation from 0 to 1200°C
- Located at 80% of the flare height

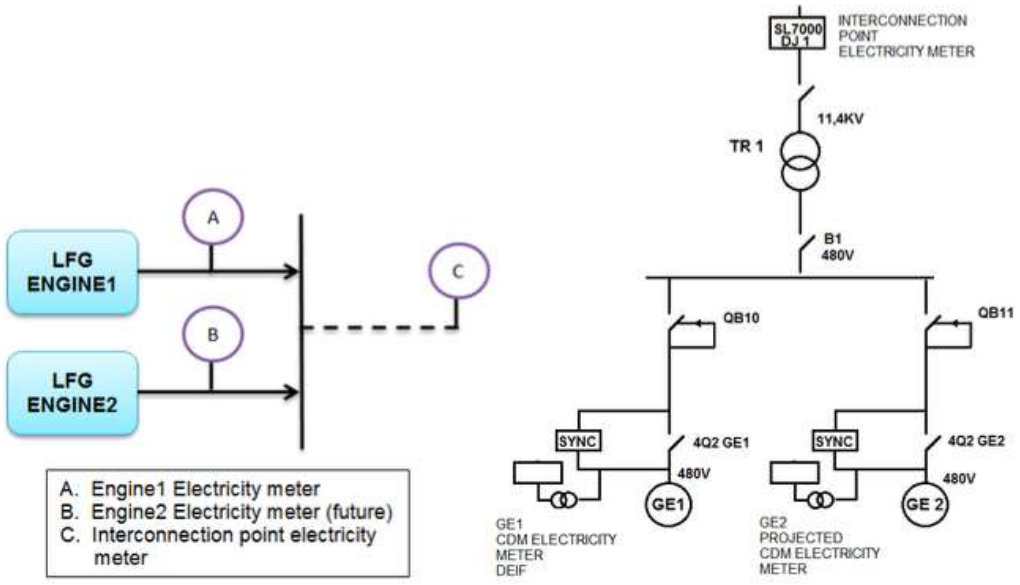
Measurement of Energy Consumed – Generated

- Class 0.5S or 0.2S bidirectional meter
- Cumulative energy measurement in kWh
- Calibrated equipment and compliance with national measurement regulations

All instrumentation and measuring equipment are from recognized brands and guarantee reliability, precision and accuracy in the recorded measurements. All equipment will be calibrated in accordance with the manufacturer's specifications or at least once a year.



Current plan of the extraction and exploitation platform



General diagram of electrical energy generation

2.6 GHG emission sources

The emission sources to be considered in the baseline and project scenarios are described below

Activity	Baseline scenario			Project scenario			Leakage		
	CO_2	CH_4	N_2O	CO_2	CH_4	N_2O	CO_2	CH_4	N_2O
Landfill methane generation sanitary	No	**Yes**	No	No	No	No	No	No	No
Destruction by combustion of methane from landfill biogas in a flare	No	No	No	No	**Yes**	No	No	No	No
Electricity generation on the grid with fossil fuels	**Yes**	No	No	No	No	No	No	No	No
Electrical consumption of systems control and auxiliaries.	No	No	No	**Yes**	No	No	No	No	No

2.7 Methodological deviations

Not Applicable

2.8 Accreditation period

The crediting period starts from 22/09/2023 to 21/09/2033.

3 Quantification of GHG emissions and GHG emission reductions

3.1 Quantification of GHG emissions in the baseline scenario

As per Paar 6.2 of M/MLF-DE_RE01 (version 2.1), Calculation of baseline GHG emissions is related with management alternatives for the methane contained in landfill-captured biogas. Accordingly, emissions in baseline scenario are estimated as per below equation

$$\mathbf{BLE}_t = \mathbf{LBBLE}_t + \mathbf{PGBLE}_t + \mathbf{TEBLE}_t + \mathbf{NPBLE}_t + \mathbf{BTBLE}_t$$

Where,

Variable	Units	Description
$\mathbf{BLE}_t$	tCO_2e	Baseline GHG emissions during period ***t*** of baseline scenario.
$\mathbf{LBBLE}_t$	tCO_2e	GHG emissions from landfill-produced biogas in the baseline scenario in period ***t***, expected to be captured for its destruction or use.
$\mathbf{PGBLE}_t$	tCO_2e	GHG emissions from fossil fuel-based electric power generation in the baseline scenario in period ***t***, expected to be displaced by the project.
$\mathbf{TEBLE}_t$	tCO_2e	GHG emissions from fossil fuel-based thermal energy generation in the baseline scenario in period ***t***, expected to be displaced by the project.

$\mathbf{NPBLE_t}$	tCO_2e	GHG emissions from natural gas consumption in the baseline scenario in period ***t***, expected to be displaced due to the use of biogas through injection into natural gas pipelines by the project.
$\mathbf{BTBLE_t}$	tCO_2e	GHG emissions from fossil fuel consumption in the baseline scenario in period ***t***, expected to be displaced due to the use of biogas through injection into dedicated biogas pipelines or through bio-gas distribution using tank trucks by the project.

In the project scenario, Variable ($\mathbf{TEBLE_t}$, $\mathbf{NPBLE_t}$ and $\mathbf{BTBLE_t}$) are set to **ZERO** because before the project and during the project in the Doña Juana landfill due to:

- There is no thermal energy generation with fossil fuels,
- There is no consumption of natural gas, and
- There is no fossil fuel consumption in the use of biogas through injection into dedicated biogas pipelines or through bio-gas distribution using tank trucks by the project.

Hence, for the project the equation will be as follows:

$$\mathbf{BLE_t = LBBLE_t + PGBLE_t}$$

Landfill-generated biogas captured for its destruction or use ($\mathbf{LBBLE_t}$)

As per Paar 6.2.1 of M/MLF-DE_RE01 (version 2.1), Biogas generation at landfill is calculated using below equation

$$\mathbf{LBBLE_t} = \left(\left(\mathbf{MLGP_t} \times (\mathbf{1} - \boldsymbol{OX_t})\right) - \mathbf{MFUBL_t}\right) \times \mathbf{GWP_{CH4}}$$

Wherein,

Variable	Units	Description
$\mathbf{LBBLE_t}$	tCO_2e	GHG emissions from landfill-produced biogas in the baseline scenario in period t, expected to be captured for its destruction or use.
$\mathbf{MLGP_t}$	tCH_4	Methane in landfill-produced biogas in project scenario, flared or used by the CCMP in period t.
$\mathbf{OX_t}$	NA	Oxidated methane fraction in period t.
$\mathbf{MFUBL_t}$	tCH_4	Methane in landfill-produced biogas, flared or used in baseline scenario in period t. This value is applicable if methane destruction was carried out prior to project development. Otherwise MPLBt = 0. For determination of mass flow from volume flow data, the use of CDM's Methodological Tool 08 is recommended.
$\mathbf{GWP_{CH4}}$	tCO_2e/tCH_4	Methane Global Warming Potential.

In the project scenario,

- Oxidation Value ($\boldsymbol{OX_t}$) is considered as 0.1, Since as per IPCC (2019), the use of the oxidation value of 0.1 will be justified for well-managed landfills. In the case of the project, the oxidation factor of 0.1 will be used as recommended by the IPCC and in a conservative manner, taking into account that the Doña Juana landfill is considered an Administered or managed landfill.
- Value of ($\mathbf{MFUBL_t}$) is considered as **ZERO**, since before the execution of the project as there is no combustion or use of methane.
- Value of ($\mathbf{GWP_{CH4}}$) will be considered as 27 (As per last version IPCC_AR6_Table 7.15)

Furthermore, the $\mathbf{MLGP_t}$ value corresponds to the amount of methane contained in the captured biogas for purposes of being employed in the project scenario, either to be destroyed or totally/partially used. To obtain such value two scenarios may be present, first is $\mathbf{MLGP_t}$ estimation after the project development (ex-post scenario), and second is $\mathbf{MLGP_t}$ determination before project development (ex-ante scenario).

a. In the ex-post scenario, it is calculated by means of following equation:

$$\mathbf{MLGP_t = MDFP_t + MPGP_t + MTEP_t + MGNP_t + MIDP_t}$$

Wherein,

Variable	Units	Description
$\mathbf{MLGP_t}$	tCH_4	Methane in landfill-produced biogas in project scenario, flared or used by the CCMP in period $\boldsymbol{t}$.
$\mathbf{MDFP_t}$	tCH_4	Methane in biogas destroyed by flaring in the project in period
$\mathbf{MPGP_t}$	tCH_4	Methane in biogas used for electric power generation in period
$\mathbf{MTEP_t}$	tCH_4	Methane in biogas used for thermal energy generation in period
$\mathbf{MGNP_t}$	tCH_4	Methane in biogas used for injection in natural gas systems in the project in period
$\mathbf{MIDP_t}$	tCH_4	Methane in biogas injected in biofuel-dedicated systems or distributed by means of tank trucks in period

In the project scenario, Variable ($\mathbf{MTEP_t}$, $\mathbf{MGNP_t}$and $\mathbf{MIDP_t}$) are set to **ZERO** because there is no biogas used for thermal energy generation, or injected in natural gas systems or injected in biofuel-dedicated systems or distributed by means of tank trucks. Hence the equation will be for the project as follows:

$$\mathbf{MLGP_t = MDFP_t + MPGP_t}$$

In the project scenario,

- $\mathbf{MDFP_t}$ shall be measured by project managers in volumetric terms
- $\mathbf{MPGP_t}$ shall be estimated by using CDM's Methodological Tool 08 (Tool to determine the mass flow of a greenhouse gas in a gaseous stream)

b. In the ex-ante scenario, it is calculated by means of following equation:

$$\mathbf{MLGP_t = MLGB_t + \eta SC}$$

Wherein,

Variable	Units	Description
$\mathbf{MLGP_t}$	tCH_4	Methane in landfill-produced biogas in project scenario, flared or used by the CCMP in period $\boldsymbol{t}$.
$\mathbf{MLGB_t}$	tCH_4	Methane in biogas expected to be generated in the landfill in baseline scenario in period $\boldsymbol{t}$.
$\boldsymbol{\eta SC}$	*NA*	Biogas capture system efficiency (or that of the system to be installed in the landfill).

Furthermore, $\mathbf{MLGB_t}$ is calculated using below equation which is based in the method described by IPCC (2019).

$$\mathbf{MLGP_t = DCBL_t \times MVF \times 16/12}$$

Wherein,

Variable	Units	Description
$\mathbf{MLGP_t}$	tCH_4	Methane in biogas expected to be generated in the landfill in baseline scenario in period $\boldsymbol{t}$.
$\mathbf{DCBL_t}$	*tC*	Degradable organic carbon available in degraded solid waste in baseline scenario in period $\boldsymbol{t}$.
$\mathbf{MVF}$	*NA*	Methane volume fraction in landfill gas.
$\mathbf{16/12}$	*NA*	Molecular mass ratio CH_4/C.

In the project scenario, A default value of 0.5 for methane content in landfill ($\mathbf{MVF}$) will be considered. This is as per IPCC (2019)

Furthermore, $\mathbf{DCBL_t}$ is calculated with Equation 6 (IPCC, 2019).

$$\mathbf{DCBL_t = BCBL_{t-1} \times (1 - e^{k})}$$

Wherein,

Variable	Units	Description
$\mathbf{DCBL_t}$	*tC*	Degradable organic carbon available in degraded solid waste inbaseline scenario in period $\boldsymbol{t}$.

$\mathbf{BCBL_{t-1}}$	*tC*	Biodegradable organic carbon mass accumulated in solid wastein the baseline scenario at the end of ***t-1*** period.
$\mathbf{k}$	*year*	Reaction constant for ***t-1*** period.

$$k = \frac{\ln(2)}{LML}$$

Variable	Units	Description
$\mathbf{k}$	*year*	Reaction constant for ***t-1*** period.
$\mathbf{LML}$	*year*	Landfill mean lifetime.

Furthermore, $\mathbf{BCBL_t}$ is calculated as per below equation

$$\mathbf{BCBL_t} = \mathbf{TCBL_t} + (\mathbf{BCBL_{t-1}} \times \mathbf{e^{-k}})$$

Furthermore, the total mass of biodegradable organic carbon available in solid waste sent to the landfill ($\mathbf{TCBL_t}$) is calculated using below equation (IPCC, 2019).

$$\mathbf{TCBL_t} = \mathbf{WBL_t} \times \mathbf{DOCF_t} \times \mathbf{DOCF_{r,t}} \times \mathbf{MCF}$$

Wherein,

Variable	Units	Description
$\mathbf{TCBL_t}$	*tC*	Total mass of biodegradable organic carbon available in solidwaste expected to be received in the landfill in baseline scenario at the end of period ***t***.
$\mathbf{WBL_t}$	*t*	Amount of waste expected to be received in the landfill in the base-line scenario in period ***t***.
$\mathbf{DOCF_t}$	*tC/t waste*	Degradable organic carbon fraction in waste expected to be sent to the landfill in period ***t***.
$\mathbf{DOCF_{r,t}}$	*NA*	Degradable organic carbon fraction decomposed in anaerobic con-ditions in period ***t***.
$\mathbf{MCF}$	*NA*	Methane correction factor for anaerobic degradation in year it is de-posited.

In the project scenario,

- A default value of 1.0 for $\mathbf{MCF}$ will be considered. This is as per IPCC (2019)
- $\mathbf{DOCF_t}$ is calculated using below equation

$$\mathbf{DOCF_t} = \sum_{r=1}^{R} (\mathbf{DOCF_{r,t}} \times \mathbf{F_{r,t}})$$

Wherein,

Variable	Units	Description
$\mathbf{DOCF_t}$	*tC/t waste*	Degradable organic carbon fraction in waste expected to be sent to the landfill in period ***t***.
$\mathbf{DOCF_{r,t}}$	*tC/t waste*	Degradable organic carbon fraction decomposing in anaerobic conditions for ***r*** waste types in period ***t*** of baseline scenario.
$\mathbf{F_{r,t}}$	*NA*	Proportion of ***r*** waste type as compared to the total ***r*** waste in period
$\boldsymbol{r}$	*NA*	Waste type index.
$\boldsymbol{R}$	*NA*	Total count of considered waste types.

In the project scenario, A default value of 0.5 for $\mathbf{DOCF_{r,t}}$ will be considered. This is as per IPCC (2019)

For values included in all above equation, as well as for those employed in its calculation (co-efficients, factors or heating values used in methodology), the IPCC Good Practice Guidance shall be used, conservatively considering the uncertainty for such values (IPCC, 2019).

During the present crediting period

Year	Methane in the biogas expected to be produced by the total waste deposited in the landfill (tCH_4)	Methane in landfill-produced biogas in project scenario, flared or used by the CCMP ($\boldsymbol{MLGPt}$) (tCH_4)	GHG emissions from landfill-produced biogas in the baseline scenario, expected to be captured for its destruction or use ($\boldsymbol{LBBLEt}$) (tCO_2e)
2023	99,381	49,691	1,207,485
2024	101,899	50,949	1,238,070
2025	104,432	52,216	1,268,853
2026	106,795	53,397	1,297,554
2027	109,082	54,541	1,325,343
2028	111,295	55,648	1,352,239
2029	113,531	56,766	1,379,407
2030	115,602	57,801	1,404,559
2031	117,605	58,802	1,428,898
2032	119,544	59,772	1,452,454
2033	121,430	60,715	1,475,376
Total	**1,220,596**	**610,298**	**14,830,236**

GHG emissions from fossil fuel-based electric power generation in the baseline scenario ($\boldsymbol{PGBLE_t}$)

As per Paar 6.2.2 of M/MLF-DE_RE01 (version 2.1), Baseline scenario for fossil fuel-based electric power generation depends on if such fuels are used (or not) in an interconnected grid.

In the project case, electric power generation depends on in an interconnected grid, hence As per Paar 6.2.3 of M/MLF-DE_RE01 (version 2.1), **Electric power generation in an interconnected grid**

Projects baseline scenario shall be related to GHG emissions that would have been generated for an equivalent electricity block to that produced by the project, supplied by the interconnected grid with its associated emissions.

$$\mathbf{PGBLE_t} = \sum_{\mathbf{j=1}}^{\mathbf{J}} \mathbf{ECBL_{j,t}} \times \mathbf{EFIG_t} \times (\mathbf{1} + \mathbf{TDTL_{j,t}})$$

Wherein,

Variable	Units	Description
$\mathbf{PGBLE_t}$	*tCO_2e*	GHG emissions from fossil fuel-based electric power generation in the baseline scenario in period ***t***, expected to be displaced by the project.
$\mathbf{ECBL_{j,t}}$	*MWh*	Electricity that would be consumed by user ***j*** in the baseline scenario in period ***t***, expected to be displaced by the project.
$\boldsymbol{EFIG_t}$	*tCO_2e/MWh*	CO_2 emission factor of interconnected grid for period ***t***.
$\mathbf{TDTL_{j,t}}$	*%*	Average technical losses for electricity transmission and distribution to grid user ***j*** in period ***t***.
$\boldsymbol{j}$	*NA*	Index for electricity user to be supplied in project scenario.
$\boldsymbol{J}$	*NA*	Total user count.

CO_2 emission factor of interconnected grid $\mathbf{EFIG_t}$ in the case of Colombia, is calculated by the grid operator - XM SA ESP, available in the application Sinergox as **0.289** tCO_2e/MWh[1]. The same shall be reviewed annually.

For the Average technical losses for electricity transmission and distribution to grid the average value for the Enel Colombia distribution grid is considered, due to the CCMP deliver and take the energy from the distribution grids of this Operator. The value used, **7.51%,** is calculated by Enel Colombia S.A ESP – Distribution Grid Operator for Cundinamarca and Bogotá, and published in its Technical and financial results report for 2023.

In the project scenario, the installed power projection of generation plants are as follows:

Plant Generation Installed Capacity (MW)

[1] https://sinergox.xm.com.co/oferta/Paginas/Historicos/Historicos.aspx?RootFolder=%2Foferta%2FHistricos%2FEmisionesCO2%2FSoportesCalculoMDL&FolderCTID=0x012000B3FC86CB37661147B52CAE93637C1249&View=%7B946210C0-4071-4173-964C-ED5BCCE4E66C%7D

Year	BDJ I	BDJ II	BDJ III	BDJ IV	TOTAL
2023	1.70				1.70
2024	5.00				5.00
2025	5.00	9.88	9.88		24.76
2026	5.00	9.88	9.88	2.50	27.26
2027	5.00	9.88	9.88	2.50	27.26
2028	5.00	9.88	9.88	2.50	27.26
2029	5.00	9.88	9.88	2.50	27.26
2030	5.00	9.88	9.88	2.50	27.26
2031	5.00	9.88	9.88	2.50	27.26
2032	5.00	9.88	9.88	2.50	27.26
2033	5.00	9.88	9.88	2.50	27.26

During the present crediting period

Year	Installed Generation Capacity (MW)	Annual generation (MWh)	GHG emissions from fossil fuel-based electric power generation in the baseline scenario ($\boldsymbol{PGBLEt}$) (tCO2e)
2023	1.70	12,658	3,933
2024	5.00	37,230	11,568
2025	24.76	184,363	57,282
2026	27.26	202,978	63,066
2027	27.26	202,978	63,066
2028	27.26	202,978	63,066
2029	27.26	202,978	63,066
2030	27.26	202,978	63,066
2031	27.26	202,978	63,066
2032	27.26	202,978	63,066
2033	27.26	202,978	63,066
Total		**1,858,075**	**577,311**

Based on above, the baseline emission ($\boldsymbol{BLEt}$) for the project activity

Year	Baseline Emissions		
	GHG emissions from landfill-produced biogas in the baseline scenario, expected to be captured for its destruction or use ($\boldsymbol{LBBLEt}$)	GHG emissions from fossil fuel-based electric power generation in the baseline scenario ($\boldsymbol{PGBLEt}$)	Total Baseline Emission $\boldsymbol{BLEt}$ ($\boldsymbol{LBBLEt}$ + $\boldsymbol{PGBLEt}$)

	tCO_2e	tCO_2e	tCO_2e
2023	1,207,485	3,933	1,211,417
2024	1,238,070	11,568	1,249,638
2025	1,268,853	57,282	1,326,135
2026	1,297,554	63,066	1,360,620
2027	1,325,343	63,066	1,388,409
2028	1,352,239	63,066	1,415,305
2029	1,379,407	63,066	1,442,473
2030	1,404,559	63,066	1,467,625
2031	1,428,898	63,066	1,491,964
2032	1,452,454	63,066	1,515,520
2033	1,475,376	63,066	1,538,442
Total	**14,830,236**	**577,311**	**15,407,548**

3.2 Quantification of GHG emissions and reductions of GHG emissions in the project scenario

As per Paar 7.1 of M/MLF-DE_RE01 (version 2.1), GHG emissions to be considered in project scenario are described.

In the project scenario, there is no

- Fossil fuel consumption for ancillary processes (electric or thermal power generation)
- Methane emissions from distribution in pipeline networks or through tank-trucks.

Hence,

Source	GHG	Included	Explanation
Biogas generation in landfill.	CO_2	No	Organic solid waste decay in landfills gen-erates biogas with these three types of GHG. CO_2 is not included due to its bio- genic origin, whereas produced amounts of N_2O is considered as negligible. Biogas capture may be present or not in baseline scenario.
	CH_4	Yes	
	N_2O	No	
Fossil fuel consumption for electric power generation.	CO_2	Yes	All fossil fuels used for electric power gen-eration produce these three types of GHGs when combusted. Neither CH_4 nor N_2O are considered as the producedamounts of these GHGs are negligible.
	CH_4	No	
	N_2O	No	

As per Paar 7.3 of M/MLF-DE_RE01 (version 2.1), Project scenario GHG emissions (PEt) can be calculated using

$$\mathbf{PE}_t = \mathbf{LMDPE}_t + \mathbf{FFCPE}_t + \mathbf{ECAPE}_t + \mathbf{MLPPE}_t + \mathbf{MLTPE}_t$$

Variable	Units	Description
$\mathbf{PE}_t$	tCO_2e	Project scenario GHG emissions during period ***t***.
$\mathbf{LMDPE}_t$	tCO_2e	GHG emissions from methane contained in landfill biogas destruction in fres in period ***t*** of project scenario.
$\mathbf{FFCPE}_t$	tCO_2e	GHG emissions from fossil fuel use in ancillary processes (biogas treatment and purification systems, ancillary electricity generation, thermal equipment start-up, tank-truck distribution of methane contained in biogas, among others), in period ***t*** of project scenario.
$\mathbf{ECAPE}_t$	tCO_2e	GHG emissions from electricity consumption in ancillary and control systems in period ***t*** in the project scenario, including biogas treatment and purification systems.
$\mathbf{MLPPE}_t$	tCO_2e	GHG emissions from methane losses in pipeline distribution networks and systems in period ***t*** of project scenario.
$\mathbf{MLTPE}_t$	tCO_2e	GHG emissions from methane transport and losses in tank-truck distribution systems in period ***t*** of project scenario.

In the project case,

$$\mathbf{PE}_t = \mathbf{LMDPE}_t + \mathbf{ECAPE}_t$$

Project Emission from destruction of methane from landfill biogas in a flare $\mathbf{(LMDPE}_t\mathbf{)}$

As per Paar 7.3.1 of M/MLF-DE_RE01 (version 2.1), In cases where methane in landfill-captured biogas is flared, this part of project scenario GHG emissions shall be determined using following equation:

$$\mathbf{LMDPE_t} = \sum_{\mathbf{m=1}}^{\mathbf{MT}} (\mathbf{MBFP_{m,t}} \times \left(\mathbf{1} - \boldsymbol{\eta}\mathbf{MDP_{j,t}}\right) \times \mathbf{GWP_{CH4}})$$

Wherein,

Variable	Units	Description
$\mathbf{LMDPE_t}$	tCO_2e	GHG emissions from methane contained in landfill biogas destruction in flares in period ***t*** of project scenario.
$\mathbf{MBFP_{m,t}}$	tCH_4	Methane in biogas flared during minute ***m*** in period ***t*** in project scenario.
$\boldsymbol{\eta}\mathbf{MDP_{j,t}}$	%	Flare methane destruction efficiency in minute ***m*** in period ***t*** in project scenario.
$\mathbf{GWP_{CH4}}$	tCO_2e/tCH_4	Methane Global Warming Potential.
$\mathbf{m}$	NA	Index of the minute where flared methane is monitored.
$\mathbf{MT}$	NA	Total minute count in period ***t***.

Furthermore, as per Para 7.3.1 of M/MLF-DE_RE01 (version 2.1), $\boldsymbol{\eta MDP_{j,t}}$ is defined by the CDM TOOL06: Project emissions from flaring, Version 04.0.

As per Para 17, TOOL06 (Ver 04.0.), To determine the efficiency of enclosed flares project participants shall choose to determine the efficiency based on monitored data or the option to apply a default value.

Determination of flare efficiency

As per Para 18, TOOL06 (Ver 04.0.), In the case of enclosed flares, project participants may choose between the following two options to determine the flare efficiency for minute m ($\eta_{\mathrm{flare,m}}$) and shall document in the CDM-PDD which option is selected:

(a) Option A: Apply a default value for flare efficiency;

(b) Option B: Measure the flare efficiency.

In the project scenario, flare efficiency based on monitored data would be used

Furthermore, as per as per Para 24, TOOL06 (Ver 04.0.), The flare efficiency in the minute m is a measured value ($\eta_{\mathrm{flare,m}} = \eta_{\mathrm{flare,calc,m}}$) when the following conditions are met to demonstrate that the flare is operating according to the manufacturer's operating specifications:

(a) The temperature of the flare ($T_{EG.m}$) and the flow rate of the residual gas to the flare ($F_{RG,m}$) is within the manufacturer's operating specification for the flare ($SPEC_{flare}$) in the minute m; and

(b) The flame is detected in the minute m (Fl_{amem}).

Furthermore, as per as per Para 26, TOOL06 (Ver 04.0.), For the measurement of the flare efficiency, the project participants may choose one of the options below:

a) Option B.1: The measurement is conducted by an accredited entity at least on a biannual basis;

b) Option B.2: The flare efficiency is measured in each minute.

The project participant selects Option B.2. The project activity applies a continuous monitoring system. In case of the continuous system is unavailable for maintenance, or failure, Option A "Default value" will be applied.

Option B.2: Measurement of flare efficiency in each minute

Furthermore, As per Para 29, TOOL06 (Ver 04.0.), The flare efficiency ($\eta_{\mathrm{flare,calc,m}}$) is determined based on monitoring the methane content in the exhaust gas, the residual gas, and the air used in the combustion process during the minute m in year y, as follows:

$$\eta_{flare,calc,m} = 1 - \frac{F_{CH4,EG,m}}{F_{CH4,RG,m}}$$

Where:

$\eta_{flare,calc,m}$= Flare efficiency in the minute m

$F_{CH4,EG,m}$ = Mass flow of methane in the exhaust gas of the flare on a dry basis at reference conditions in the minute m (kg)

$F_{CH4,RG,m}$ = Mass flow of methane in the residual gas on a dry basis at reference conditions in the minute m (kg)

$F_{CH4,RG,m}$ is calculated according to Step 1.

$F_{CH4,EG,m}$ is determined according to Steps 2.1 - 2.4 below:

Step 2.1 of methodological tool (d) "Determine the methane mass flow in the exhaust gas on a dry basis":

The mass flow of methane in the exhaust gas is determined based on the volumetric flow of the exhaust gas and the measured concentration of methane in the exhaust gas, as follows:

$$F_{CH4,EG,m} = V_{EG,m} \times fc_{CH4,EG,m} \times 10^{-6}$$

Where:

$F_{CH4,EG,m}$ = Mass flow of methane in the exhaust gas of the flare on a dry basis at reference conditions in the minute m (kg)

$V_{EG,m}$ = Volumetric flow of the exhaust gas of the flare on a dry basis at reference conditions in minute m (m^3)

$fc_{CH4,EG,m}$ = Concentration of methane in the exhaust gas of the flare on a dry basis at reference conditions in minute m (mg/m^3)

Step 2.2 of methodological tool (d) "Determine the volumetric flow of the exhaust gas ($V_{EG,m}$)":

$$V_{EG,m} = Q_{EG,m} \times M_{RG,m}$$

Where:

$V_{EG,m}$ = Volumetric flow of the exhaust gas on a dry basis at reference conditions in minute m (m^3)

$Q_{EG,m}$ = Volume of the exhaust gas on a dry basis at reference conditions per kilogram of residual gas on a dry basis at reference conditions in minute m (m^3 exhaust gas/kg residual gas)

$M_{RG,m}$ = Mass flow of the residual gas on a dry basis at reference conditions in the minute m (kg)

Step 2.3 of methodological tool (d) "Determine the mass flow of the residual gas ($M_{RG,m}$)":

$$M_{RG,m} = \rho_{RG,ref,m} \times V_{RG,m}$$

Where:

$M_{RG,m}$ = Mass flow of the residual gas on a dry basis at reference conditions in minute m (kg)

$\rho_{RG,ref,m}$ = Density of residual gas at reference conditions in minute m (kg/m³)

$V_{RG,m}$ = Volumetric flow of the residual gas on a dry basis at reference conditions in the minute m (m³)

And

$$\rho_{RGref,m} = \frac{P_{ref}}{\frac{R_u}{MM_{RG,m}} \times T_{ref}}$$

Where:

$\rho_{RGrefn,m}$ = Density of the residual gas at reference conditions in minute m (kg/m³)

P_{ref} = Atmospheric pressure at reference conditions (Pa)

Ru = Universal ideal gas constant (Pa.m³/kmol.K)

$MM_{RG,m}$ = Molecular mass of the residual gas in hour m (kg/kmol)

T_{ref} = Temperature at reference conditions (K)

The equation below is used to calculate $MM_{RG,m.}$ The project participants use simplification b) offered by tool (d), which is to measure the volumetric fraction of methane and consider the difference to 100% as being nitrogen (N2).

$$MM_{RG,m} = \sum_i (v_{i,RG,m} \times MM_i)$$

Where:

$MM_{RG,m}$ = Molecular mass of the residual gas in in minute m (kg/kmol)

MM_i = Molecular mass of residual gas component i (kg/kmol)

$vi_{,RG,m}$ = Volumetric fraction of component i in the residual gas on a dry basis at reference conditions in minute m

i = The components in the residual gas i = CH_4 and N_2

Step 2.4 of methodological tool (d) "Determine the volume of the exhaust gas on a dry basis at reference conditions per kilogram of residual gas ($Q_{EG,m}$)

$Q_{EG,m}$ shall be determined as follows:

$Q_{EG,m} = Q_{CO2,EG,m} + Q_{O2,EG,m} + Q_{N2,EG,m}$

Where:

$Q_{EG,m}$ = Volume of the exhaust gas on a dry basis per kg of residual gas on a dry basis at reference conditions in the minute m (m^3/kg residual gas)

$Q_{CO2,EG,m}$ = Quantity of CO2 volume in the exhaust gas per kg of residual gas on a dry basis at reference conditions in the minute m (m^3/kg residual gas)

$Q_{N2,EG,m}$ = Quantity of N2 volume in the exhaust gas per kg of residual gas on a dry basis at reference conditions in the minute m (m^3/kg residual gas)

$Q_{O2,EG,m}$ = Quantity of O2 volume in the exhaust gas per kg of residual gas on a dry basis at *reference conditions in the minute m (m^3/kg residual gas)*

With

$$Q_{CO2,EG,m} = n_{O2,EG,m} \times VM_{ref}$$

Where:

$Q_{O2,EG,m}$ = Quantity of O2 volume in the exhaust gas per kg of residual gas on a dry basis at reference conditions in the minute m (m^3/kg residual gas)

$n_{O2,EG,m}$ = Quantity of O2 (moles) in the exhaust gas per kg of residual gas on a dry basis at reference conditions in the minute m (kmol/kg residual gas)

V_{Mref} = Volume of one mole of any ideal gas at reference temperature and pressure (m^3/kmol)

$$Q_{N2,EG,m} = VM_{ref} \times \left\{ \frac{MF_{N,RG,m}}{2 \times AM_N} + \left(\frac{1 - v_{O2,air}}{v_{O2,air}} \right) \times \left[F_{O2,EG,m} + n_{O2,EG,m} \right] \right\}$$

Where:

$Q_{N2,EG,m}$ = Quantity of N2 volume in the exhaust gas per kg of residual gas on a dry basis at reference conditions in the minute m (m^3/kg residual gas)

V_{Mref} = Volume of one mole of any ideal gas at reference temperature and pressure (m^3/kmol)

$MF_{N,RG,m}$ = Mass fraction of nitrogen in the residual gas in the minute m

AMN = Atomic mass of nitrogen (kg/kmol)

$v_{O2,air}$ = Volumetric fraction of O2 in air

$F_{O2,RG,m}$ = Stochiometric quantity of moles of O2 required for a complete oxidation of one kg residual gas in minute m (kmol/kg residual gas)

$n_{O2,EG,m}$ = Quantity of O2 (moles) in the exhaust gas per kg of residual gas on a dry basis at reference conditions in the minute m (kmol/kg residual gas)

$$F_{O2,RG,m} = \frac{MF_{C,RG,m}}{AM_C} + \frac{MF_{H,RG,m}}{4AM_H} + \frac{MF_{O,RG,m}}{2AM_O}$$

Where:

$F_{O2,RG,m}$ = Stochiometric quantity of moles of O2 required for a complete oxidation of one kg residual gas in minute m (kmol/kg residual gas)

$M_{FC,RG,m}$ = Mass fraction of carbon in the residual gas in the minute m AMC = Atomic mass of carbon (kg/kmol)

$MF_{O,RG,m}$ = Mass fraction of oxygen in the residual gas in the minute m

AMO = Atomic mass of oxygen (kg/kmol)

$MF_{H,RG,m}$ = Mass fraction of hydroygen in the residual gas in the minute m

AM_H = Atomic mass of hydroygen (kg/kmol)

Determine the mass fractions of carbon, hydrogen, oxygen and nitrogen in the residual gas, using the volumetric fraction of component i in the residual gas and applying the equation below. The project participants use simplification b) offered by tool (d), which is to measure the volumetric fraction of methane and consider the difference to 100% as being nitrogen (N2).

$$MF_{j,RG,m} = \frac{\sum_i v_{i,RG,m} \times AM_i \times NA_{j,i}}{MM_{RG}}$$

Where:

$MF_{j,RG,m}$ = Mass fraction of element j in the residual gas in in minute m

$vi_{,RG,m}$ = Volumetric fraction of component i in the residual gas on a dry basis at reference conditions in minute m

AM_i = Atomic mass of element i (kg/kmol)

$NA_{j,i}$ = Number of atoms of element j in component i

$MM_{RG,m}$ = Molecular mass of residual gas in minute m (kg/kmol)

j = Elements C, O, H and N

i = Components in the residual gas i = CH4 and N2

Furthermore, in the project scenario, from 2025 to 2041 with all the Methane in biogas expected to be captured, hence around the 85% of captured biogas will be used in gensets and no flared.

During the present crediting period

Year	Methane in the biogas expected to be produced by the total waste deposited in the landfill (tCH_4)	Methane in landfill-produced biogas in project scenario, flared or used by the CCMP ($\boldsymbol{MLGPt}$) (tCH_4)	Project Emission from flaring of biogas ($\boldsymbol{LMDPEt}$) (tCO_2e)
2023	99,381	49,691	13,416
2024	101,899	50,949	13,756
2025	104,432	52,216	2,115
2026	106,795	53,397	2,163
2027	109,082	54,541	2,209
2028	111,295	55,648	2,254
2029	113,531	56,766	2,299
2030	115,602	57,801	2,341
2031	117,605	58,802	2,381
2032	119,544	59,772	2,421
2033	121,430	60,715	2,459
Total	**1,220,596**	**610,298**	**47,814**

Project scenario GHG emissions due to imported electricity consumption ($\boldsymbol{ECAPE_t}$)

As per Para 7.3.3 of M/MLF-DE_RE01 (version 2.1), In cases where imported electricity purchased from an external grid is used for methane contained in the biogas-capture, destruction or use systems, this fraction of the project scenario GHG emissions shall be determined as per in following equation

$$\mathbf{ECAPE_t = IECP_t \times EFGSP_t \times (1 + TDTP_t)}$$

Where

Variable	Units	Description
$\mathbf{ECAPE_t}$	*tCO_2e*	GHG emissions from electricity consumption in ancillary andcontrol systems in period ***t*** in the project scenario, including biogas treatment and purification systems.
$\mathbf{IECP_t}$	*MWh*	Imported electricity consumption in period ***t*** of project scenario.
$\mathbf{EFGSP_t}$	*tCO_2e/MWh*	CO_2 emission factor for the electric grid or electricity supplierin period ***t*** in project scenario.

$\mathbf{TDTP_t}$	%	Average technical transmission and distribution losses for electricity supply from the electric grid or an electricity supplier in period t.

CO_2 emission factor of interconnected grid $\mathbf{EFGSP_t}$ in the case of Colombia, is calculated by the grid operator - XM SA ESP for the operation margin, available in the application Sinergox as **0.595** tCO_2e/MWh[2]

In the project scenario,

Power Plant Availability	%	85
Plant Operating Hrs	h	8760
Captive Consumption by 2023	MW	0.25
Captive Consumption by 2024	MW	0.45
Captive Consumption by 2025	MW	1.45
Captive Consumption by 2025	MW	1.65
Electricity Consumption in project scenario by 2023	MWh	328.5
Electricity Consumption in project scenario by 2024	MWh	591.3
Electricity Consumption in project scenario by 2025	MWh	1905.3
Electricity Consumption in project scenario by 2026	MWh	2168.1

During the present crediting period

Year	Captive Consumption (MW)	Electricity Consumption ($IECP_t$) (MWh)	Project Emission from electricity consumption in project scenario ($ECAPEt$) (tCO_2e)
2023	0.25	328.5	210
2024	0.45	591.3	378
2025	1.45	1,905.3	1,220
2026	1.65	2,168.1	1,388
2027	1.65	2,168.1	1,388
2028	1.65	2,168.1	1,388
2029	1.65	2,168.1	1,388
2030	1.65	2,168.1	1,388
2031	1.65	2,168.1	1,388
2032	1.65	2,168.1	1,388

[2] https://sinergox.xm.com.co/oferta/Paginas/Historicos/Historicos.aspx?RootFolder=%2Foferta%2FHistricos%2FEmisionesCO2%2FSoportesCalculoMDL&FolderCTID=0x012000B3FC86CB37661147B52CAE93637C1249&View=%7B946210C0-4071-4173-964C-ED5BCCE4E66C%7D

2033	1.65	2,168.1	1,388
Total			**12,910**

Based on above, the Project Emission ($\boldsymbol{PEt}$) for the project activity

Year	Baseline Emissions		
	Project Emission from flaring of bio-gas ($\boldsymbol{LMDPEt}$)	Project Emission from electricity consumption in project scenario ($\boldsymbol{ECAPEt}$)	Total Baseline Emission $\boldsymbol{PEt}$ ($\boldsymbol{LMDPEt + ECAPEt}$)
	tCO_2e	*tCO_2e*	*tCO_2e*
2023	13,416	210	13,627
2024	13,756	378	14,135
2025	2,115	1,220	3,334
2026	2,163	1,388	3,550
2027	2,209	1,388	3,597
2028	2,254	1,388	3,641
2029	2,299	1,388	3,687
2030	2,341	1,388	3,729
2031	2,381	1,388	3,769
2032	2,421	1,388	3,808
2033	2,459	1,388	3,847
Total	**47,814**	**12,910**	**60,724**

3.3 Leakage

As per Para 7.2 of M/MLF-DE_RE01 (version 2.1), Leakage is not considered in projects using methane contained in landfill biogas. Hence, no leakage is considered for the project.

3.4 Net GHG emission reductions

As per Para 8 of M/MLF-DE_RE01 (version 2.1), GHG emissions reduction from the CCMP is obtained by subtracting project scenario GHG emissions from baseline scenario GHG emisions, according to following equation:

$$\boldsymbol{ER_t = BLE_t - PE_t}$$

Year	Baseline scenario	Project scenario	Net reduction (tCO2e)	
	GHG emissions (tCO_2e)	GHG emissions (tCO_2e)	Leakage (tCO_2e)	
2023	1,211,417	13,627	0	1,197,791
2024	1,249,638	14,135	0	1,235,503
2025	1,326,135	3,334	0	1,322,801

2026	1,360,620	3,550	0	1,357,070
2027	1,388,409	3,597	0	1,384,812
2028	1,415,305	3,641	0	1,411,663
2029	1,442,473	3,687	0	1,438,786
2030	1,467,625	3,729	0	1,463,896
2031	1,491,964	3,769	0	1,488,195
2032	1,515,520	3,808	0	1,511,712
2033	1,538,442	3,847	0	1,534,595
Total	**15,407,548**	**60,724**	**0**	**15,346,824**

4 Legal and documentary aspects

4.1 Legal requirements

Management of Legal Requirement

The local, regional and national laws, statutes and regulatory frameworks that apply to the project activity and the main activity are as follows:

Norm or law	Type (legal, environmental, other)	Applicability/Compliance (total or partial)	Justification
Law 142 of 1994, which establishes the regime for home public services and other provisions are issued.	Legal	Partial	Biogás Colombia SAS ESP is a public services company, and it complies the regulatory frame for its activity.
Resolution 1274 of 2006 by which the terms of reference for the preparation of the Environmental Impact Study for the construction and operation of Sanitary Landfills are accepted and other determinations are adopted	Environmental	Partial	This resolution establishes guidelines for the Environmental Impact Study and licenses for landfills in Colombia, it involves indirectly the operation of the CCMP.
Resolution 235 of 2007 from UAESP, by which the concession is awarded for the	Legal	Total	The concession for the treatment and use of biogas from the Doña Juana

treatment and use of biogas from the Doña Juana landfill in the capital district applying the clean development mechanism			landfill was assigned to Biogás Doña Juana proposer.
Declaration of no need for an environmental license for the activity of capture, treatment, thermal destruction and/or use of biogas issued by the Ministry of the Environment, Housing and Territorial Development. Filed MAVDT 4120-E1-75635 of July 2008.	Environmental	Total	Concept from the Environment national institution about the environmental requirements for the operation of the CCMP.
National approval letter – National Designated Authority – ministry of environment, housing and territorial development. June 2008.	Environmental	Total	The CCMP got the Environment national institution approval as CDM project.
Concession contract 344 of 2010 signed between the UAESP and the center of waste management CGR Doña Juana SA ESP.	Legal	Partial	Concession contract between the UAESP and actual landfill operator. Technical and legal guidelines about relation and coordination with Biogás Colombia.
Resolution 724 of 2010 by which the regulations for the granting of management are adopted and operation of the Doña Juana landfill.	Legal	Partial	Guidelines for management and operation of the landfill, including related with the biogas treatment and use operator.
Resolution 1351 of 2014 by means of which the single environmental license granted for the "Doña Juana sanitary landfill" project is modified and other determinations are made.	Legal Environmental	Partial	Regarding the actual environmental license for the Landfill site.
Decree 1784 of Nov 2017, which modifies and adds Decree 1077 of 2015 regarding the complementary activities of treatment and final disposal of	Legal	Partial	It established some guidelines for the biogas use and treatment projects feasibility.

solid waste in the public sanitation service.			
Resolution 0330 of 2017 by which the technical regulations for the drinking water and basic sanitation sector –RAS are adopted and resolutions 1096 of 2000, 0424 of 2001, 0668 of 2003, 1459 of 2005, 1447 of 2005 and 2320 are repealed. of 2009.	Legal Environmental	Partial	It established some technical guidelines for the biogas use and treatment projects in the sanitary and drinking water sectors.
Decree 926 of 2017, which establishes the Procedure for Non-Causation of National Carbon Tax.	Legal	Partial	It established the bases for the structuring of a national carbon market based on Carbon Tax for the fossil fuels users.
Resolution 1447 of August 2018, which regulates the monitoring, reporting and verification system of mitigation actions at the national level referred to in article 175 of law 1753 of 2015, and dictates other provisions.	Legal	Partial	Guidelines for information systems and registration of climate change mitigation initiatives. RENARE.
Law 1931 of July 27, 2018, which establishes guidelines for change management climate	Legal	Partial	National guidelines for management of climate change and public policies.
Resolution 831 of September 2020, by which resolution 1447 of 2018 is modified and other determinations are made	Legal	Partial	Modifications for the VBB accreditation requirements, and information systems and registration of climate change mitigation initiatives

4.2 Link with NDCs

In accordance with the sectoral strategic lines of GHG emission mitigation of the NDC of Colombia, measure number 5. Comprehensive Solid Waste Management. A specific compliance goal is proposed for the biogas that is going to be treated and used at the Doña Juana Sanitary Landfill. The target can be consult at:

https://www.minambiente.gov.co/wp-content/uploads/2021/10/portafolio-de-medidas-sec-toriales-de-mitigacion-de-cambio-climatico-contribucion-determinada-Colombia-ndc-2020.pdf

4.3 CCMP documentation

The CCMP has supporting information to comply with the Cercarbono Voluntary Carbon Certification Protocol. This information is available to interested parties and it shall be presented as evidence during the validation, verification and/or any certification process. Documents such as:

-Contract C137 of 2007 with UAESP, which demonstrates the ownership of the CCMP over the use of the land and the rights over the landfill biogas.

-Documents about the legal and environmental scope, including: the document issued by the environmental authority Declaration of no need for an environmental license, and the certification of the Ministry of Interior OFI08-4442-DET-1000 of February 2008, which confirms the absence of indigenous communities in the area of influence of the project.

- Source documents supporting the data used for the application of the Cercarbono's methodology M/MLF-DE_RE01 for Projects for the Destruction and Utilization of Biogas from Landfill Sites. These include documentation from the electricity market operator XM, the Colombian energy planning entity UPME, the Bogotá network operator Enel Colombia, information on the operation of the landfill issued by the supervisory body, and also the estimate of the population and the amount of waste per capita according to the waste management plan issued by UAESP, etc.

-Technical documentation supporting the operation and monitoring of the project, including: Operation and maintenance manuals for the platforms for the treatment and use of landfill biogas, operation and maintenance manuals for each of the equipment that operates with landfill biogas, records and evidence sheet for the maintenance performed on them.

- Record data and operational forms, operation reports and all evidence of the technical traceability of the project, in compliance with adequate data management that guarantees the correct applicability of the Cercarbono's methodology M/MLF-DE_RE01.

5 Stakeholder consultation

As per Section 7.12.1 Public Consultation of CCMPs of CPVCC (Ver 4.4), *When the CCMP is developed in an area where a local population is established or when the CCMP activity may have an environmental, social, or economic impact on local populations or society in general, a public consultation by the CCMP with interested parties is required.*

The project as previously established in the legal, environmental and technical criteria, Contract C137, Document issued by the environmental authority Declaration of no need for an environmental license and the certification of the Ministry of Interior OFI08-4442-DET-1000 of February 2008, concludes that the project that is transferred from the CDM, as can be evidenced in the documents registered with the UNFCCC, The project obtained registration which justifies the consultation of interested parties before the start of the project, the following was developed there:

The consultation with the project's interested parties took place on December 20, 2007 in the "Auditorium of the Usme Community Development Center" in Bogotá. Project participants invited 679 local project stakeholders, including: Representatives of local and federal authorities, unions, academia, local media and community members. All invited interested parties were sent a personal invitation.

The stakeholder meeting was organized as follows: Entrance to the auditorium, delivery of a folder with: the meeting agenda, a project brochure, a list of questions about the project, paper and a pen.

During the meeting, participants were encouraged to ask questions. Forms were provided to allow participating stakeholders to submit comments on the questions. Project representatives collected the completed forms at the end of the meeting.

The meeting started with an introduction of the main objectives of the meeting by the company president and an explanation of the structure of the meeting. Participating stakeholders were able to suggest changes during this part of the meeting.

A panel of experts then made presentations on the main aspects of the project, as described below:

- CDM and Climate Change. A forty (40) minutes presentation on the main aspects of climate change and the CDM goals. The presentation was given by Francisco Charry, environmental consultant and former coordinator of the Colombian Climate Change Mitigation Group.
- The Terms and Conditions of the Project: The presentation made by representatives of the Bogotá mayor's office, which explained the Community Benefits related to the Doña Juana CDM project.
- Doña Juana CDM Project.
- Potential thermal use of biogas in nearby industries.

Participating stakeholders were able to write specific questions to the panelists in order to clarify their understanding of the project.

The last part of the meeting focused on answering all the panelists questions and formulating the final conclusions of the meeting. The meeting chair encouraged participants to send further comments to an email address included in the brochure.

The consultation with interested parties allowed opinions to be collected in three different ways:

- Answers to defined questions prepared by project participants.
- Questions asked of individual panelists during the meeting
- Comments received by mail after pamphlet distribution.

Finally, 89 people participated in the meeting. Demonstrating their interest in the project by asking 38 questions that were answered during the meeting. 26 written questions were addressed and answered.

There have not been changes in areas, facilities, processes, legal or regulatory changes that modify what was agreed between the CCMP and the interested parties, and that lead to developing a public consultation again. Furthermore, Biogás Colombia has the internal procedure PR-SIG-003- PQR and Corrective actions, which explains the procedure and treatment of communications and requests received.

For Petitions, Complaints, Claims or requests in general, the channel is available on the project website:

https://www.biogas.com.co/index.php/contacto/

or you can contact the email:

administracion@biogas.com.co

6 Uncertainty

In the GHG emissions reduction calculations, the aggregate uncertainty of the mitigation results is taken into account, mainly in the uncertainty present in the measurement instruments that could affect the results obtained.

This uncertainty will be evaluated during the calibrations and the correct operating parameters are established, guaranteeing with the certificate that the instrument operates within the normal parameters and conditions, adequately quantifying the recording and measurement of the variables.

According to the Guidelines for the Expression of Measurement Uncertainty, the Parameters associated with the result of the measurement, which characterize the dispersion of the values that could reasonably be attributed to the measurand, are implicit in the measurement obtained during the measurement process. calibration.

7 Contributions to the United Nations Sustainable Development Goals

The reporting of contributions to the Sustainable Development Goals (SDGs) will be carried out in accordance with the provisions of the Cercarbono Tool to report contributions of climate change mitigation initiatives to the Sustainable Development Goals. In the following summary table, you can see the applicable SDGs and specific goals, as well as the justification and parameters that will be monitored during the project accreditation period.

SDG	SDG Target Indicator	PMCC contribution
7. Affordable and clean energy	7.2.1 Total electricity produced by unconventional renewable sources	The CCMP currently has two gensets powered with landfill gas from Doña Juana landfill site, considered as an unconventional renewable source. This electricity is being supplied to the National Interconnected System (SIN).
7. Affordable and clean energy	7.2.3 Total and proportion of electricity produced by unconventional renewable sources consumed by PMCC activities.	The CCMP requires electricity consumption from the grid to start the operation, specifically the pumping platform and gensets; However, increasing the installed capacity will reduce the grid electricity consumption when any genset goes out for maintenance.
8. Decent work and economic growth	8.5.1 Total number of jobs created by PMCC.	PMCC has employed 28 individuals under indefinite-term contracts.
8. Decent work and economic growth	8.5.2 Proportion of local employees.	PMCC has employed 7 individuals who are part of the community near the Doña Juana landfill site under indefinite-term contracts. This is 25% of total employees
13. Climate action	13.2.1 Amount of greenhouse gas emissions avoided or sequestered.	During the current accreditation period, project is expected to reduce 1,534,682 tCO_2e annually

8 Grouped project

Not Applicable, as project is not a grouped project.

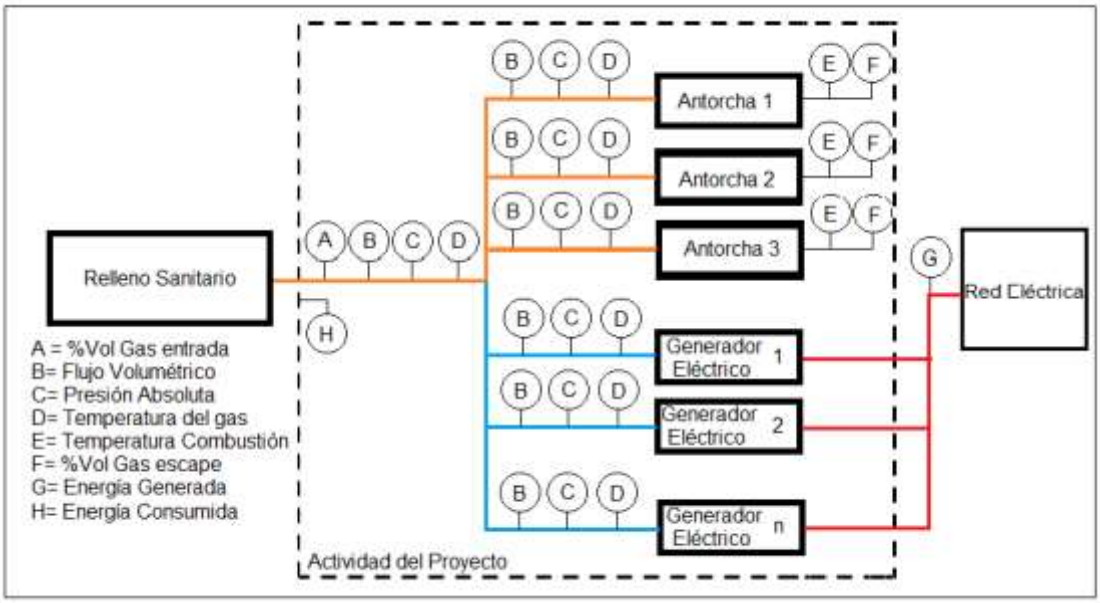
9 CCMP monitoring

9.1 Monitoring plan

The monitoring equipment, described in this document, may be modified to meet operational requirements or system upgrades. Any modification will take into account the monitoring

requirements specified in the applied methodology and will be subject to review in the verification process.

The following Figure shows the flow diagram and important monitoring equipment. Gas flow monitoring will be carried out in each electricity generation equipment j and in each flare j according to the following diagram. However, the gas composition, temperature and pressure will be measured in the common head as shown in the diagram.



Calibration procedures: The instrumentation will be calibrated as recommended by the manufacturers or as recommended by the applied methodology. The most strict and conservative procedures will be used and will be supported by calibration or product conformity certificates issued by the accredited entity for said calibration.

Procedures for managing records: Most of the data will be recorded with a Data Logger that will feed the main PLC and then be sent to the main SCADA computer that will store the raw data of the system in a secure database that will guarantee the quality and reliability of the data. data that will mostly be recorded every minute. The file will be converted to a spreadsheet using a predefined format. The file will then be used directly for the report.

Check: Data that is not automatically recorded will be recorded every day from Monday to Saturday on a dedicated control form by the technician in charge of the operation and will be used as an alternative method for calculating emission reductions. Paper forms will be added and maintained on the site. The electronic data will be stored on site on the hard drive of a computer and will have a backup on magnetic media that will be updated monthly.

Procedures to address adjustments and uncertainties in monitoring data: The verification report will evaluate the uncertainty associated with each category of adjustments.

Procedures for internal audits, performance reviews and corrective actions: On a monthly basis, the project manager will review the performance of the project activity and will take

the necessary actions. The plant operator will carry out a daily check of the condition of the installation to detect any abnormal wear or malfunction of the equipment.

Maintenance program:

Preventive maintenance will be carried out in accordance with the manufacturer's recommendations and planning, a general maintenance plan must be carried out and a record of scheduled activities must be maintained.

Data collection:

Certain data is collected automatically with a data logger, such as data on torch temperature or gas flow.

The daily inspection will be carried out by a landfill plant technician. During this inspection, the technician checks instrumentation and monitoring data, such as gas quality, gas flow, suction, and torch temperature. During this daily inspection, the technician analyzes the data and balances the landfill gas collection system with proper suction to maintain consistent gas quality throughout the extraction system.

Periodically, gas quality and suction level are checked at each gas well individually using portable instrumentation. This monitoring plan allows you to maximize gas collection and maintain infrastructure. Finally, during this daily inspection, the technician will analyze the data and adjust the suction applied to the landfill extraction system to maintain consistent gas flow and quality.

Gas quality and vacuum levels are monitored directly at each gas well, using a portable meter. This monitoring routine allows you to identify underperforming gas wells and take the necessary corrective actions. The measurement of gas quality in the plant is carried out automatically. The combination of these two inspections optimizes the efficiency of gas extraction from the landfill.

Data analysis:

The operator analyzes the data daily. In the event that a parameter deviates, the operator can react quickly and fix any potential problems. All data necessary for the calculation of emission reductions will be maintained in the on-site monitoring database.

This information will be reported monthly. IN case of a fault that the operator cannot resolve, the maintenance manager or project manager will be informed for resolution.

Data storage:

Data will be monitored and archived as described in the applied methodology.

For greater precision, it is clarified that the monitoring of the main parameters will be every minute, energy production will be daily and emissions reductions will be monthly.

Storage is done on-site on the main server with a backup to an external hard drive.

Project management

Monitoring, measurement and reporting will be carried out following procedures mentioned above. This procedure allows numerous cross-checks of the validity of the data.

Training of monitoring staff

When monitoring functions are assigned or monitoring responsibility is delegated, staff will be trained internally or externally. The training will include one or more of the following elements:

- Regulation of the landfill gas extraction system.
- Calibration of monitoring equipment.
- Impact of monitoring on project activity.

Procedure in case of breakdown

If any equipment (flow meter, gas analyzer, transmitter, etc.) fails, the equipment supplier will be notified immediately. If possible, repairs will be made. If damaged equipment cannot be repaired, it will be replaced with the same or equivalent unit as soon as possible.

In case of failure of the inlet gas analyzer, while the failure is being resolved, a portable meter with a calibration certificate can be installed. In the event of failure of the exhaust gas analyzer, the procedure that defines the adopted methodology will be followed.

The torch will be equipped with a monitoring system that will allow the plant technician to be notified if the torch stops. If the flaring is stopped, no landfill gas will be flared and no reductions will be requested during this period. Flare operating hours will be monitored as part of the control procedures.

9.2 Monitoring of GHG emissions in the baseline scenario

The parameters considered in the baseline scenario are fixed ex ante according to Cercarbono methodology are presented below:

Constant parameters

Data / Parameter	OXt
Data unit	Fraction
Description	Fraction of the oxidation factor in period t.
Source of data	IPCC data. 2019. Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 5 Waste. Chapter 3: Solid Waste Disposal. Table 3.2 Oxidation factor (OX) for SWDS
Value applied	0.1

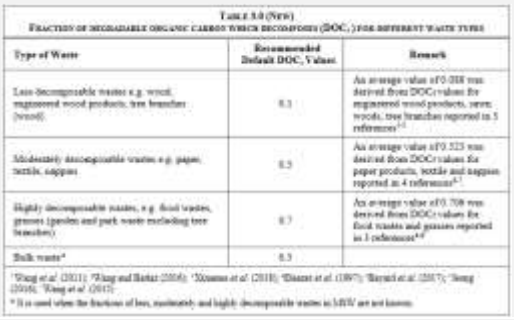
Justification of choice of data or description of measurement methods and procedures applied	In the case of the project, the oxidation factor of 0.1 will be used as recommended by the IPCC and in a conservative manner, taking into account that the Doña Juana landfill is considered an Administered or managed landfill, as established by the MR- methodology of CERCARBONO and the IPCC (2019),
Purpose of Data	For the calculation of the Baseline Emission
Comments	This is fixed ex-ante for the entire crediting period

Data / Parameter	GWP_{CH4}
Data unit	tCO_2e/tCH_4
Description	Global warming potential of methane
Source of data	IPCC_AR6_Table 7.15
Value applied	27
Justification of choice of data or description of measurement methods and procedures applied	The value is used for the third commitment period (3th Commitment Period) according to the Sixth Assessment Report (Sixth Assessment Report AR6) of the IPCC – Updated value
Purpose of Data	For the calculation of the Baseline and Project Emission
Comments	This is fixed ex-ante for the entire crediting period.

Data / Parameter	ηCS
Data unit	tCO_2e/tCH_4
Description	Biogas capture system efficiency
Source of data	M/MLF-DE_RE01 (versión 2.1)
Value applied	50%
Justification of choice of data or description of measurement methods and procedures applied	Default Value as per applied meth
Purpose of Data	For the calculation of the Baseline and Project Emission
Comments	This is fixed ex-ante for the entire crediting period.

Data / Parameter	$MFUBL_t$
Data unit	tCH_4
Description	Methane in landfill-produced biogas, flared or used in baseline scenario in period t.
Source of data	M/MLF-DE_RE01 (versión 2.1)
Value applied	0
Justification of choice of data or description of measurement methods and procedures applied	Default Value as per applied meth
Purpose of Data	For the calculation of the Baseline Emission
Comments	This is fixed ex-ante for the entire crediting period.

Data / Parameter	**FCOD_t**
Data unit	tCH_4
Description	Fraction of degradable organic carbon in the waste deposited in period t, in tons of C/ ton of waste. The FCOD_t fraction is estimated as the average between the groups or classes of waste (types) or materials within a landfill. It is calculated from equation 23. For the total estimation of the FCOD_t fraction, it is important to be precise with the inert or non-degradable content of the waste contained in a landfill. This calculation must be supported step by step and the specific values obtained from secondary information must be correctly referenced (IPCC, 2019).

Source of data	IPCC data. 2019. Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 5 Waste. Chapter 3.0 New. 
Value applied	0.1, 0.5, 0.7
Justification of choice of data or description of measurement methods and procedures applied	According to the criteria of the M/MLF-DE_RE01 (versión 2.1) methodology of CERCARBONO and the IPCC (2019), Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories
Purpose of Data	For the calculation of the Baseline Emission
Comments	This is fixed ex-ante for the entire crediting period.

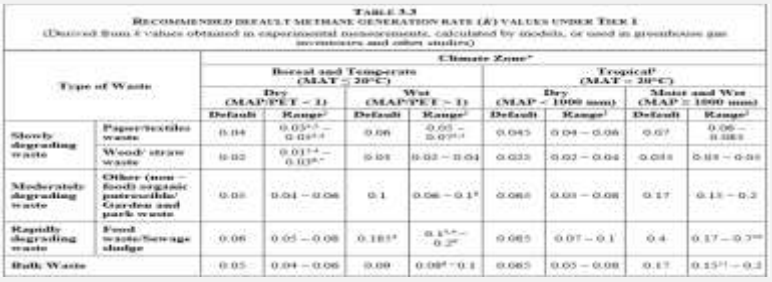
Data / Parameter	**MCF**
Data unit	NA
Description	Methane correction factor for aerobic decomposition in the year of deposition.
Source of data	IPCC data. 2019. Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 5 Waste. Chapter 3: Solid Waste Disposal. Table 3.1 (updated) SWDS classification and methane correction factors (MCF). 
Value applied	1.0
Justification of choice of data or description	The IPCC (2019) publishes the average values for the MCF according to the indicated conditions, which are recommended

of measurement methods and procedures applied	to be used in situations in which no associated measurement is carried out
Purpose of Data	For the calculation of the Baseline Emission
Comments	This is fixed ex-ante for the entire crediting period.

Data / Parameter	**FCOD_r,t**
Data unit	NA
Description	Fraction of degradable organic carbon that decomposes under anaerobic conditions for the group or class of residue r, in period t
Source of data	IPCC data. 2019. Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. The FCODt fraction is estimated as the average between the groups or classes of waste (types) or materials within a landfill.
Value applied	The following values apply for the different types of waste r:
Justification of choice of data or description of measurement methods and procedures applied	According to the IPCC (2019), it is good practice to use values of the estimated FCOD_r,t and measurement fraction for different types of waste. It is recommended to use the values proposed by IPCC (2019) for different types of waste, with different degrees of biodegradability. The values are applied according to the guidelines of the IPCC 2019 Methodology for the presentation of the value of FCOD_r,t.

Waste type r	**COCr (% wet residue)**
Wood and wood products	43
Pulp, paper and cardboard (except sludge)	40
Food, food waste, beverages and tobacco (not sludge)	15
Textiles	24
Pruning waste, gardens and parks	20
Glass, plastic, metal, other inert waste	--

Purpose of Data	For the calculation of the Baseline Emission
Comments	This is fixed ex-ante for the entire crediting period.

Data / Parameter	**k**
Data unit	NA
Description	Decomposition rate for waste type r
Source of data	Methodological tool (b) "Emissions from solid waste disposal sites" (version 08.0) based on IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Table 3.3 Data source to determine MAT, MAP, PET NATIONAL CLIMATOLOGICAL ATLAS ISBN 958-8067-14-6 (National Climate Atlas)
Value applied	 The data corresponding to MA≤20°C are applied; MAP/PET>1 – Wet that are obtained from the following formulation: Mean Average MAT 13.50 Mean Average MAP 972 Potential evap PET 942 Aridity index (4 MAP/PET 1.03
Justification of choice of data or description of measurement methods and procedures applied	• Average annual temperature (MAT): 13.5 ° C • Average annual precipitation (MAP): 972 mm • Potential evapotranspiration (PET): 942 mm • MAP/PET ratio = 1.03 > 1 Therefore, column 2 "Boreal and Temperate", "Humid" of parameter table 7 of the methodological tool (b) is applied.

Purpose of Data	For the calculation of the Baseline Emission
Comments	This is fixed ex-ante for the entire crediting period.

Data / Parameter	**Fr,t**
Data unit	%
Description	Average fraction of type r residue in year t (weight fraction)
Source of data	UAESP - Comprehensive Solid Waste Management Plan – PGIRS, according to the Decree National 1077 of 2015
Value applied	**MODEL** / **UAESP PGIRS** Food / 51.31% Garden / 0.00% Paper / 13.67% Wood / 1.60% Textile / 4.54% Nappies / 0.00% Plastics, other inert / 28.88%
Justification of choice of data or description of measurement methods and procedures applied	Studies carried out by the UAESP to determine the characterization of waste from the Doña Juana landfill, selection of values according to the study and classification according to IPCC. 2019. Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. These values are chosen, which are the data verified and prepared by the capital district of Bogotá
Purpose of Data	For the calculation of the Baseline Emission
Comments	This is fixed ex-ante for the entire crediting period.

Data / Parameter	**WLB_t**
Data unit	t
Description	Mass of waste deposited in the landfill, in period t.

Source of data	UAESP - Comprehensive Solid Waste Management Plan – PGIRS, according to the Decree National 1077 of 2015
Value applied	

	Waste RSDJ ton	Ggr/year	Popula-tion
2023	2,407,469	2,407	7,968,095
2024	2,433,260	2,433	8,034,649
2025	2,435,401	2,435	8,101,412
2026	2,448,550	2,449	8,168,421
2027	2,461,720	2,462	8,235,512
2028	2,487,686	2,488	8,302,442
2029	2,489,668	2,490	8,368,915
2030	2,502,808	2,503	8,434,700
2031	2,515,970	2,516	8,498,716
2032	2,530,433	2,530	8,559,942
2033	2,545,021	2,545	8,635,698
2034	2,558,506	2,559	8,702,858
2035	2,571,992	2,572	8,770,017
2036	2,585,477	2,585	8,837,176
2037	2,598,963	2,599	8,904,336
2038	2,612,448	2,612	8,971,495
2039	2,625,934	2,626	9,038,655
2040	2,639,419	2,639	9,105,814
2041	2,652,904	2,653	9,172,973
2042	2,666,390	2,666	9,240,133

Justification of choice of data or description of measurement methods and procedures applied	Years 2021 – 2032 projection UAESP - Comprehensive Solid Waste Management Plan – PGIRS, according to National Decree 1077 of 2015. Years 2032 onwards linear projection developed by the project owner based on data from previous years
Purpose of Data	For the calculation of the Baseline Emission
Comments	This is fixed ex-ante for the entire crediting period.

Data / Parameter	**TVM**
Data unit	Years
Description	Half-Life Time (TVM).
Source of data	IPCC data. 2019. Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

	Volume 5 Waste. Chapter 3: Solid Waste Disposal. Table 3.4 Recommended default half- life (t1/2) values (yr) under tier 1. (Derived from k values obtained in experimental measurements, calculated by models, or used in greenhouse gas inventories and other studies). Data source to determine MAT, MAP, PET NATIONAL CLIMATOLOGICAL ATLAS ISBN 958-8067-14-6 (National Climate Atlas)
Value applied	TABLE 3.4 RECOMMENDED DEFAULT HALF-LIFE ($t_{1/2}$) VALUES (YR) UNDER TIER 1 (Derived from *k* values obtained in experimental measurements, calculated by models, or used in greenhouse gas inventories and other studies)

Type of Waste		Climate Zone*							
		Boreal and Temperate (MAT ≤ 20°C)				Tropical[1] (MAT > 20°C)			
		Dry (MAP/PET < 1)		Wet (MAP/PET > 1)		Dry (MAP < 1000 mm)		Moist and Wet (MAP ≥ 1000 mm)	
		Default	Range[2]	Default	Range[2]	Default	Range[2]	Default	Range[2]
Slowly degrading waste	Paper/textiles waste	17	14[2,5] – 23[2,6]	12	10 – 14[2,5]	15	12 – 17	10	8 – 12
	Wood/ straw waste	35	23[2,6] – 69[2,7]	23	17 – 35	28	17 – 35	20	14 – 23
Moderately degrading waste	Other (non – food) organic putrescible/ Garden and park waste	14	12 – 17	7	6 – 9[8]	11	9 – 14	4	3 – 5
Rapidly degrading waste	Food waste/Sewage sludge	12	9 – 14	4*	3[2,4] – 6[9]	8	6 – 10	2	1[10] – 4
Bulk Waste		14	12 – 17	7	6 – 9[8]	11	9 – 14	4	3 – 5[11]

The data corresponding to MATÿ20°C are applied; MAP/PET>1 – Wet that are obtained from the following formulation:

Mean Average	***MAT***	13.50
Mean Average	***MAP***	972
Potential evap	***PET***	942
Aridity index (4	***MAP/PET***	1.03

Justification of choice of data or description of measurement methods and procedures applied	Default values, IPCC data. 2019. Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 5 Waste. Chapter 3: Solid Waste Disposal. Table 3.4
Purpose of Data	• Average annual temperature (MAT): 13.5 ° C • Average annual precipitation (MAP): 972 mm • Potential evapotranspiration (PET): 942 mm • MAP/PET ratio = 1.03 > 1 Therefore, column 2 “Boreal and Temperate”, “Humid” of parameter table 7 of the methodological tool (b) is applied.

Comments	This is fixed ex-ante for the entire crediting period.

Monitoring parameters:

Data / Parameter	$EFIGt$
Data unit	tCO2e/MWh
Description	CO2 emission factor of interconnected grid for period t.
Source of data	XM – Operator National Interconnected System. Statistics and Indicators web - Sinergox
Value applied	**0.289** tCO_2e/MWh[3]
Justification of choice of data or description of measurement methods and procedures applied	The value is stablished by the UPME, and calculated by XM SAS ESP, and published in the Sinergox website, in the case of Colombia, in which case the values associated with its calculation should not be demonstrated.
Purpose of Data	For the calculation of the Baseline and Project Emissions
Comments	This is fixed ex-ante and monitored annually.

Data / Parameter	$EFGSPt$
Data unit	tCO2e/MWh
Description	CO2 emission factor for the electric grid or electricity supplier in period t in project scenario.
Source of data	XM – Operator National Interconnected System. Statistics and Indicators web - Sinergox
Value applied	**0.595** tCO_2e/MWh[4]
Justification of choice of data or description of	The value is stablished by the UPME, and calculated by XM SAS ESP, and published in the Sinergox website, in the case

[3] https://sinergox.xm.com.co/oferta/Paginas/Historicos/Historicos.aspx?RootFolder=%2Foferta%2FHistricos%2FEmisionesCO2%2FSoportesCalculoMDL&FolderCTID=0x012000B3FC86CB37661147B52CAE93637C1249&View=%7B946210C0-4071-4173-964C-ED5BCCE4E66C%7D

[4] https://sinergox.xm.com.co/oferta/Paginas/Historicos/Historicos.aspx?RootFolder=%2Foferta%2FHistricos%2FEmisionesCO2%2FSoportesCalculoMDL&FolderCTID=0x012000B3FC86CB37661147B52CAE93637C1249&View=%7B946210C0-4071-4173-964C-ED5BCCE4E66C%7D

measurement methods and procedures applied	of Colombia, in which case the values associated with its calculation should not be demonstrated.
Purpose of Data	For the calculation of the Baseline and Project Emissions
Comments	This is fixed ex-ante and monitored annually.

Data / Parameter	$TDTL_{j,t}$
Data unit	%
Description	Average technical transmission and distribution losses for electricity supply from the electric grid or an electricity supp
Source of data	The value used is calculated by Enel Colombia S.A ESP – Distribution Grid Operator for Cundinamarca and Bogotá, and published in the Financial results report for 2023.
Value applied	7.51%
Justification of choice of data or description of measurement methods and procedures applied	For the Average technical losses for electricity transmission and distribution to grid, the average value for the Enel Colombia distribution grid is considered, due to the CCMP deliver the energy to the distribution grids of this Operator.
Purpose of Data	For the calculation of the Baseline and Project Emissions
Comments	This is fixed ex-ante and monitored annually.

Data / Parameter	$TDTP_{j,t}$
Data unit	%
Description	Average technical losses for electricity transmission and distribution to grid user j in period t.
Source of data	The value used is calculated by Enel Colombia S.A ESP – Distribution Grid Operator for Cundinamarca and Bogotá, and published in the Financial results report for 2023.
Value applied	7.51%
Justification of choice of data or description of measurement methods and procedures applied	For the Average technical losses for electricity transmission and distribution to grid, the average value for the Enel Colombia distribution grid is considered, due to the CCMP electricity consumption is from the distribution grids of this Operator.

Purpose of Data	For the calculation of the Baseline and Project Emissions
Comments	This is fixed ex-ante and monitored annually..

9.3 Monitoring of GHG emissions and GHG emission reductions in the project scenario

The data monitored for the project corresponds to the data provided or recommended by the IPCC. 2019. Refinement of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories and by UNFCCCC methodological tools TOOL06: Project emissions from flaring (Ver 04.0) and TOOL 08: Tool to determine the mass flow of a greenhouse gas in a gaseous stream (Ver 03.0).

Constants used in equations according to Table 1 of TOOL 06:

Parameter	SI Unit	Description	Value
MM_{CH4}	kg/kmol	Molecular mass of methane	16.04
MM_{CO}	kg/kmol	Molecular mass of carbon monoxide	28.01
MM_{CO2}	kg/kmol	Molecular mass of carbon dioxide	44.01
MM_{O2}	kg/kmol	Molecular mass of oxygen	32.00
MM_{H2}	kg/kmol	Molecular mass of hydrogen	2.02
MM_{N2}	kg/kmol	Molecular mass of nitrogen	28.02
AM_C	kg/kmol (g/mol)	Atomic mass of carbon	12.00
AM_H	kg/kmol (g/mol)	Atomic mass of hydrogen	1.01
AM_O	kg/kmol (g/mol)	Atomic mass of oxygen	16.00
AM_N	kg/kmol (g/mol)	Atomic mass of nitrogen	14.01
P_{ref}	Pa	Atmospheric pressure at reference conditions	101 325
R_u	Pa.m³/kmol.K	Universal ideal gas constant	0.008314472
T_{ref}	K	Temperature at reference conditions	273.15
$v_{O2,air}$	Dimensionless	O_2 volumetric fraction of air	0.21
GWP_{CH4}	t_{CO2}/t_{CH4}	Global warming potential of methane valid for the commitment period	see table above
MV_n	m³/Kmol	Volume of one mole of any ideal gas at reference conditions	22.414
$\rho_{CH4,n}$	kg/m³	Density of methane gas at reference conditions	0.716
$NA_{i,j}$	Dimensionless	Number of atoms of element j in component i, depending on molecular structure	
VMref	m³/kmol	Volume of one mole of any ideal gas at reference temperature and pressure	22.4

Data / Parameter	**$SPEC_{flare}$**
Data unit	• Temperature - °C • Flow rate or heat flux - kg/h or m3/h • Maintenance schedule - number of days
Description	Manufacturer's flare specifications for temperature, Flow rate and maintenance schedule
Source of data	Document by flare manufacturer (Chapter 3.1.5)
Value applied	• Temperature: >800 °C – 1,200 °C • Flow rate: 1,000 - 5,000 Nm^3/h (functioning limits 20% - 100%) • Maintenance schedule - annually
Justification of choice of data or description of measurement methods and procedures applied	Document in the CDM-PDD the flare specifications set by the manufacturer for the correct operation of the flare for the following parameters: a) Minimum and maximum inlet flow rate, if necessary converted to flow rate at reference conditions or heat flux; b) Minimum and maximum operating temperature; and c) Maximum duration in days between maintenance events
Purpose of Data	Ex post determination of project emissions
Comments	Only applicable in case of enclosed flares which is the case. The flare specification and manuals do not specify a specific maintenance schedule in days; therefore, the requirement of the methodological tool (d) "Project emissions from flaring" (Version 02.0.0) of annual maintenance is applied (see also monitoring parameter "Maintenance")

The parameters considered in the project scenario are presented below

Monitored parameters

Data / Parameter	$\boldsymbol{IECPt}$
Data unit	MWh
Description	Imported electricity consumption in period t of project scenario.

<table>
<tr><td>Source of data</td><td>Totalizing meters located at the energy reception point of the national or local interconnected network, or the project facilities</td></tr>
<tr><td>Description of measurement methods and procedures to be applied</td><td>Imported electricity consumption in period t of baseline scenario is fixed ex ante from the table. For the project scenario is monitored.
<table>
<tr><th>Year</th><th>Captive Consumption (MW)</th><th>Electricity Consumption ($\boldsymbol{IECP_t}$) (MWh)</th></tr>
<tr><td>2023</td><td>0.25</td><td>328.5</td></tr>
<tr><td>2024</td><td>0.45</td><td>591.3</td></tr>
<tr><td>2025</td><td>1.45</td><td>1,905.3</td></tr>
<tr><td>2026</td><td>1.65</td><td>2,168.1</td></tr>
<tr><td>2027</td><td>1.65</td><td>2,168.1</td></tr>
<tr><td>2028</td><td>1.65</td><td>2,168.1</td></tr>
<tr><td>2029</td><td>1.65</td><td>2,168.1</td></tr>
<tr><td>2030</td><td>1.65</td><td>2,168.1</td></tr>
<tr><td>2031</td><td>1.65</td><td>2,168.1</td></tr>
<tr><td>2032</td><td>1.65</td><td>2,168.1</td></tr>
<tr><td>2033</td><td>1.65</td><td>2,168.1</td></tr>
<tr><td>Total</td><td></td><td>20,169.9</td></tr>
</table></td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Continuous measurement and at least monthly recording</td></tr>
<tr><td>Value monitored</td><td>kWh</td></tr>
<tr><td>Monitoring equipment</td><td>Electric meter at the commercial border or reception energy point to the facility.</td></tr>
<tr><td>QA/QC procedures to be applied</td><td>If it is a distribution company meter, calibration is not applicable; If it is your own meter, what is determined by the current regulation for electric meters.</td></tr>
<tr><td>Purpose of the data</td><td>Calculation of Baseline emissions</td></tr>
<tr><td>Calculation method</td><td>NA</td></tr>
</table>

Comments	The data would be archived electronically and maintained for the entire crediting period plus two years.

Data / Parameter	$\boldsymbol{ECBL_{j,t}}$
Data unit	MWh
Description	Electricity that would be consumed by user j in the baseline scenario in period t, expected to be displaced by the project.
Source of data	Electric meter at the commercial border or point of delivery of the energy.
Description of measurement methods and procedures to be applied	Monitoring of net electricity generation from project activity using biogas.
Frequency of monitoring/recording	Continuous measurement and at least monthly recording
Value monitored	
Monitoring equipment	Electric meter at the commercial or point of delivery of the energy.
QA/QC procedures to be applied	Calibration frequency: According to the provisions of the Energy and Gas Regulation Commission (CREG), specifically in

Year	Installed Generation Capacity (MW)	Annual generation (MWh)
2023	1.70	12,658
2024	5.00	37,230
2025	24.76	184,363
2026	27.26	202,978
2027	27.26	202,978
2028	27.26	202,978
2029	27.26	202,978
2030	27.26	202,978
2031	27.26	202,978
2032	27.26	202,978
2033	27.26	202,978
Total		**1,858,075**

	CREG Resolution 038 of 2014. According to article 6, the energy delivery point is classified as type 2. According to article 28, for energy delivery points type 2, the maintenance period is every 4 years. Thus, the meter will be calibrated every four years. This value is directly related to the amount of energy that is produced by the project, since it is the energy that is prevented from being produced by other sources of the interconnected network, which would occur if the project was not carried out. The cross-checking method will be done against XM reports, against sales invoices or against direct measurements of the equipment, whichever is available
Purpose of the data	Calculation of Baseline and project emissions
Calculation method	NA
Comments	The data would be archived electronically and maintained for the entire crediting period plus two years.

Data / Parameter	$\eta MDPm,t$
Data unit	%
Description	Flare methane destruction efficiency in minute m in period t in project scenario.
Source of data	Methodological tool "Project emissions from flaring Version 03.0" of the methodology: UNFCCC ACM0001 Flaring or use of landfill gas
Description of measurement methods and procedures to be applied	Flare methane destruction efficiency in period t of the baseline scenario, defined as one minus the ratio of the methane mass flow in the exhaust gas and the mass flow of methane in the landfill biogas to be burned.

	For closed flares, project participants can choose between the following two options to determine flare efficiency: Option A: Apply a default value for torch efficiency Option B: Measure torch efficiency Torch efficiency measurement is chosen as Option B and expanded with Option B.2: Torch efficiency is measured every minute. In case of failure, it will be used. Option A with a default value of 90% while the parameters and compliance with the UNFCCC methodological tool "Project emissions from flaring V03.0" are guaranteed. To control flame detection, a UV cell will be used. The torch efficiency at minute m is a measured value ($\eta flare,m = \eta flare,calc,m$) when the following three conditions are met to prove that the torch is working: (1) The temperature of the torch and the flow rate of the waste gas to the torch is within manufacturer specifications (2) The flame is detected at minute *m* (3) Otherwise, the efficiency is = 0
Frequency of monitoring/recording	Continuous measurement and at least monthly recording
Value monitored	In the baseline scenario, flare efficiency of **99%** is used (specified for manufacturer equipment). In the project scenario is calculated minute-by-minute.
Monitoring equipment	Calculated.
QA/QC procedures to be applied	Equipment for source calculation data will be at least annual calibrated.
Purpose of the data	Calculation of Project emissions
Calculation method	Methodological tool "Project emissions from flaring Version 03.0"

Comments	The data would be archived electronically and maintained for the entire crediting period plus two years.

The following parameters are monitored during the crediting period according to the methodological tool (d) "Project emissions from flaring"; parameters not required are not quoted

Data / Parameter	$T_{EG,m}$
Data unit	°C
Description	Temperature in the exhaust gas of the enclosed flare in minute m
Source of data	Combustion temperature in the torch via thermocouple. Data to be aggregated monthly and yearly.
Description of measurement methods and procedures to be applied	Measurement of the temperature of the exhaust gas in the flare by a thermocouple type N
Frequency of monitoring/recording	Recorded minute-by-minute. Data will continuously be registered through a data logger and would be monthly consolidated
Value monitored	Not required for ex ante estimations
Monitoring equipment	Thermocouple type N
QA/QC procedures to be applied	Data will be recorded continuously through a data logger. Thermocouples will be replaced or calibrated according to the recommendations of the manufacturer or at most every year
Purpose of the data	Project emissions from flaring

Calculation method	-
Comments	Unexpected changes such as a sudden increase/drop in temperature can occur for different reasons. These events should be noted in the site records along with any corrective action that was implemented to correct the issue. Monitoring of this parameter is applicable in case of enclosed flares.

Data / Parameter	$vi_{\mathrm{RG,m}}$
Data unit	%
Description	Volumetric flow of residual gas (LFG) on a dry basis in the minute m (m^3 dry gas /m) for each torch
Source of data	Measured by flowmeters. Data to be aggregated monthly and yearly.
Description of measurement methods and procedures to be applied	A gas sample will be taken from the residual gas, will go through a condensate trap before being analysed. Value will be logged through a data logger every minute. Measurement will be made continuously and on dry gas.
Frequency of monitoring/recording	Not required for ex ante estimations. Measured minute-by-minute for project emissions and would be monthly consolidated
Value monitored	% where i = CH4, CO2, O2
Monitoring equipment	Continuous Gas analyser.
QA/QC procedures to be applied	Analysers will be checked or calibrated according to manufacturer's recommendation or at least annually. A zero check and a typical value check will be performed annually by comparison with a standard gas.
Purpose of the data	Project emissions from flaring

Calculation method	As defined within the tool to determine project emissions from flaring gases containing methane, N2 will be determined from the CH4, CO2 and O2 concentrations.
Comments	For CH4, this parameter is equal to vCH4.h,db (= F) to be monitored hourly according to the methodological tool (i) "Tool to determine the mass flow of a greenhouse gas in a gaseous stream".

Data / Parameter	$V_{RG,tb,m}$
Data unit	m³ dry gas
Description	Volumetric flow of the residual gas (LFG) on a dry basis in the minute m (m³ dry gas/m) for each flare
Source of data	Measured by flow meters.
Description of measurement methods and procedures to be applied	A flowmeter will be used for each generator. The person in charge of the operation will check the data every business day. The flow is will monitor after a condensate trap that will remove most of the humidity. The humidity level will be controlled or calculated and used to give the exact dry measurement. The volumetric flow measurement will consider the pressure and real temperature
Frequency of monitoring/recording	Data will be monitored and recorded automatically and continuously through a data logger. Data to be aggregated monthly and yearly.
Value monitored	Not required for ex ante estimations.
Monitoring equipment	Flow meters. Flow will be monitored after a condensate trap which will remove moisture. Data will be checked each business day by the landfill gas technician.

QA/QC procedures to be applied	The flowmeter will be calibrated according to the manufacturer's recommendations. The Calibration frequency will be annual. Periodic calibration against a device primary provided by an independent accredited laboratory. The flow will be monitored after a condensate trap that will eliminate the most of the humidity. The plant operator will check the data every business days.
Purpose of the data	Project emissions from flaring
Calculation method	Not Applicable
Comments	Data will be automatically and continuously monitored and recorded by a data logger.

Data / Parameter	$V_{O_2 \mathrm{eEG},,\mathrm{m}}$
Data unit	%
Description	Volumetric fraction of O2 in the exhaust gas on a dry basis at reference conditions in minute m
Source of data	Gas analyzer
Description of measurement methods and procedures to be applied	Extractive sampling analyzers with water removal devices and particles or in situ analyzer for wet base determination. The point of measurement (sampling point) should be in the upper section of the torch (80% of the total height of the torch). Sampling will be carried out with sampling probes Suitable for high temperature measurements.
Frequency of monitoring/recording	Values averaged per minute
Value monitored	Continuously. Values averaged on a minute basis.
Monitoring equipment	Continuous gas Analyzers
QA/QC procedures to be applied	Analysers will be checked or calibrated according to manufacturer’s recommendation or at least

	annually. A zero check and a typical value check will be performed annually by comparison with a standard gas.
Purpose of the data	Project emissions from flaring
Calculation method	Monitoring of this parameter is only applicable in case of enclosed flares and continuous monitoring of the flare efficiency.
Comments	Project emissions from flaring

Data / Parameter	$fc_{CH4,FG,h}$
Data unit	mg/m3
Description	Concentration of methane in the exhaust gas of the flare in dry basis at reference conditions in the minute m
Source of data	Continuous gas analyser.
Description of measurement methods and procedures to be applied	Extractive sampling analysers with water and particulates removal devices or in situ analyser for wet basis determination. The point of measurement (sampling point) shall be in the upper section of the flare (80% of total flare height). Sampling shall be conducted with sampling probes adequate for high temperature measurements.
Frequency of monitoring/recording	Continuously. Values averaged on a minute basis.
Value monitored	Not required for ex ante estimates
Monitoring equipment	Continuous gas Analysers
QA/QC procedures to be applied	Analyzers will be calibrated according to the manufacturer's recommendations when least once a year. A zero check and

	a standard value annually compared to a standard certified gas.
Purpose of the data	Project emissions from flaring
Calculation method	NA
Comments	Monitoring of this parameter is only applicable in case of enclosed flares and continuous monitoring of the flare efficiency. Measurement instruments may read ppmv or % values. To convert from ppmv to mg/m3, the value shall be multiplied by 0.716. 1% equals 10 000 ppmv. The gas analyser will monitor directly landfill gas methane concentration and give a direct measurement of methane content in the landfill gas

Data / Parameter	$Maintenance_y$
Data unit	Calendar days
Description	Maintenance events completed in year y
Source of data	Project operation records
Description of measurement methods and procedures to be applied	Records are maintained in an on-site maintenance log
Frequency of monitoring/recording	Annual; additionally, event-driven
Value monitored	Not Applicable
Monitoring equipment	Not Applicable
QA/QC procedures to be applied	Records are kept in a maintenance log for two years beyond the life of the flare

Purpose of the data	Ensure proper operation of equipment
Calculation method	Not Applicable
Comments	Not Applicable

The following parameters are monitored during the crediting period according to the methodological TOOL 08 "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 03.0); parameters not required are not quoted:

Data / Parameter	$V_{\mathrm{tb,m}}$
Data unit	m³ dry gas
Description	Volumetric flow of the LFG stream in time interval t on a dry basis in the hour h (m³ dry gas/h) for each power generator
Source of data	Measured by flow meters. Data to be aggregated monthly and yearly.
Description of measurement methods and procedures to be applied	A flowmeter will be used for each power generator. Data will be checked each business day by the landfill gas manager. Flow will be monitored after a condensate trap which will remove most of the moisture. Moisture level will be monitored, or calculated and will be used to give the exact measurement on a dry basis.
Frequency of monitoring/recording	Data will be automatically and continuously monitored and recorded by a data logger.
Value monitored	Not required for ex ante estimations
Monitoring equipment	A flowmeter will be used for each generator. The person in charge of the operation checks the data every business day. The flow is monitor after a condensate trap that will remove most of the humidity. The humidity level is controlled or calculated and used to give the exact dry measurement. The volumetric flow measurement will consider the pressure and actual temperatures.
QA/QC procedures to be applied	The flowmeter is calibrated according to the manufacturer's recommendations. The Calibration frequency is annual.

	Periodic calibration against a device primary provided by an independent accredited laboratory. The flow is monitored after a condensate trap that will eliminate the most of the humidity. The plant operator checks the data every business day.
Purpose of the data	Quantification of baseline GHG emissions
Calculation method	NA
Comments	

Data / Parameter	T_f, T_{EG}, T_{HG}
Data unit	K - °C
Description	Biogas temperature at a point close to each flow meter, if used volumetric flowmeters: • In each torch (f), • In each engine (EG).
Source of data	Temperature sensor
Description of measurement methods and procedures to be applied	No independent temperature monitoring is necessary when using flow meters that automatically measure temperature and pressure, expressing biogas volumes in normalized cubic meters or when uses a mass flow meter in order to monitor the condition of the landfill gas temperature not exceeding the limit of 60°C
Frequency of monitoring/recording	Data will be recorded continuously through a data logger and will record with a frequency of every minute in line with the monitoring of the flow of gas
Value monitored	Not required for ex ante estimates
Monitoring equipment	Temperature sensor

QA/QC procedures to be applied	Periodic calibration against a primary device provided by an independent accredited laboratory. Calibration and frequency of calibration is according to manufacturer's specifications
Purpose of the data	Quantification of baseline GHG emissions
Calculation method	NA
Comments	Continuously monitored to ensure that the flow temperature of the condition of applicability being less than 60ºC.

10 Information management

The selection of information for baseline calculations corresponds to studies or official information prepared by the entities designated for each activity, minimizing uncertainty.

For the operation data of the landfill, official information from the special Administrative Unit of Public Services UAESP or the Temporary Union Inter DJ – UT-INTER DJ is used.

As the entity is in charge of supervising the project in the landfill. For the calculations of emission factors, the XM and UPME source is used, responsible at the national level for issuing said factors. For the technical and legal evaluation of the operation of the project in the financial framework, the studies of the Water and Sanitation Regulation Commission (CRA) are sent, the entity in charge at the national level of regulating the rates of water and sanitation services.

Regarding the operation data in the project scenario, all records are stored in raw data (Raw Data) and minute-by-minute records are obtained for the majority of operation data, the equipment is calibrated according to the manufacturers' criteria and the equipment used has low uncertainty.

11 Annexure (Safeguarding Principles and Procedures)

With reference of Safeguarding Principles and Procedures of Cercarbono's Certification Programme (Ver1.0), the below table provide the assessment of Safeguard Principles established by Cercarbono's Voluntary Carbon Certification Programme in reference to project case. The Sustainable Development and Safeguards Focus Areas Compliance Statement is attached as an annex.

Parameter	Risks identified	Mitigation or preventative measure taken
Environmental Safeguarding Principles		
1. Biodiversity Conservation and Sustainable Management of living environmental components		
1a. Genetic resources.	No Risk Identified	The project activity does not impact Genetic resources nearby.
1b. Endangered species	No Risk Identified	Project is not located in or adjacent to habitats for rare, threatened, or endangered species
1c. Dignified treatment of animals.	No Risk Identified	The project activity does not involve any animals and also strictly follow animal protection policy.
2. Natural heritage	No Risk Identified	The project activity does not impact the tangible or intangible cultural heritage or Natural heritage nearby
3. Sustainable management of Non-living environmental components		
3a. Water	No Risk Identified	The water consumption is reasonable and been approved. No water consumption and stress risk
3b. Soil.	No Risk Identified	This project activity has no effect on soil degradation or erosion
3c. Landscape	No Risk Identified	No impact on landscape is envisaged for the project
4. Pollution, pesticides, and fertilisers		
4a. Pollution	No Risk Identified	The implementation of the project at the Doña Juana landfill also created additional environmental improvements and made a positive contribution to the global problem

		of climate change by reducing greenhouse gas emissions.
4b. Pesticides and fertilisers.	No Risk Identified	No Pesticides or Fertilisers are used in project activity
Social safeguarding principles		
5. Gender equality and human rights	No Risk Identified	The project strictly follows the national laws promoting the gender equality in labor and work, and commits that equal opportunities have been or will be provided in the context of gender equity and pay for labor and work
6. Cultural heritage	No Risk Identified	The project activity does not impact the tangible or intangible cultural heritage or Natural heritage nearby
7. Communities and Indigenous Peoples	No Risk Identified	The project activity does not impact the tangible or intangible cultural heritage or the indigenous people nearby.
8. Land acquisition and involuntary resettlement	No Risk Identified	The land / property for the project activity belongs to the project proponent and, it can be supported through the relevant documents. This ensures that their lands are property rights are protected and respected.
9. Health, safety, and security	No Risk Identified	The project strictly follows the national laws related to Health, safety, and security.
10. Corruption	No Risk Identified	The project strictly follows the national laws related to anti-corruption policy.
11. Legal compliance	No Risk Identified	All regulatory compliance has been taken by the project activity
Economic principles		
12. Negative economic consequences	No Risk Identified	The project activity generates permanent and temporary employment opportunity within the vicinity of the project. The electricity

		supply in the nearby area improves which directly and indirectly improves the economy and life style of the area.
13. Labour rights	No Risk Identified	The project strictly follows the national laws prohibiting discrimination and hence no discrimination has occurred or will occur in the future.

12 References

- CERCARBON Protocol for Voluntary Carbon Certification of CERCARBONO CVCC Version 4.4
- IPCC. (2006). IPCC 5th Assessment. Guidelines for National Greenhouse Gas Inventories, Prepared by the National Greenhouse Gas Inventories Programme, Eggleston HS, Buendia L., Miwa K., Ngara T. and Tanabe K. (eds). Tokyo, 2006.
- IPCC. (2019). Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Calvo Buendia, E., Tanabe, K., Kranjc, A., Baasansuren, J., Fukuda, M., Ngarize S., Osako, A., Pyrozhenko, Y ., Shermanau, P. and Federici, S. (eds). Published: IPCC, Switzerland.
- ISO 14064-2:2019. Greenhouse gases —Specification with guidance, at the project level, for the quantification, monitoring and reporting of emissions reductions or increases in greenhouse gas removals. Ministry of Mines and Energy. (2014). CREG Resolution 038 of 2014, by which the measurement code contained in the General Annex of the networks code is modified. 65 p.
- United Nations Framework Convention on Climate Change. Clean Development Mechanism, ACM0001Large-scale Consolidated Methodology: Flaring or use of landfill gas. Version 19.0.
- United Nations Framework Convention on Climate Change. Clean Development Mechanism, Tool 04 “Emissions from solid waste disposal sites. Methodological tool. Version 08.0.
- United Nations Framework Convention on Climate Change. Clean Development Mechanism, Tool 06 “Project emissions from flaring. Methodological tool. Version 03.0.
- United Nations Framework Convention on Climate Change. Clean Development Mechanism, Tool 07 “to calculate the emission factor for an electricity system. Methodological tool. Version 07.0.
- United Nations Framework Convention on Climate Change. Clean Development Mechanism, Tool 08 “Tool to determine the mass flow of a greenhouse gas in a gaseous stream. Version 03.0. m”
- United Nations Framework Convention on Climate Change. Clean Development Mechanism, Tool 10: Tool to determine the remaining lifetime of equipment (Ver 01.0).
- CRA, Commission for the Regulation of Drinking Water and Basic Sanitation. Diagnosis and identification of problems, objectives, alternatives, evaluation and selection of alternatives, implementation and monitoring.
- Mayor's Office of Bogotá – Special Administrative Unit of Public Services UAESP; Plan of Comprehensive Solid Waste Management – PGIRS 2020
- UPME Mining Energy Planning Unit; Calculation of the emissions factor of the electrical energy network in Colombia. 2017, 2018, 2019.
- Safeguarding Principles and Procedures of Cercarbono's Certification Programme (Ver 1.0)
- Cercarbono Certification Program Procedures Version 2.2

13 Document History (PDD)

Version	Date	Comments or editions
1.0	05.03.2024	Initial version of the document.
2.0	17.05.2024	Adjustments requested in validation/verification and date of adjustments made
3.0	20.11.2024	Technical review adjustments

14 Template history

Version	Date	Comments or changes
1.0	30.10.2019	Initial version.
2.0	11.01.2022	Redesign to give more relevance to the institution developing the CCMP and to adjust to the new version of the Protocol.
3.0	01.08.2022	Content adjustments and editorial changes.