BioCarbon Registry

EMTRE BIOGÁS BRAZIL

emtre
TRATAMENTO DE EFLUENTES

Document Prepared by EMTRE and Three Gold Partners

Contact Information

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Prepared By	*EMTRE and Three Gold Partners*
Contact	*Antonio Barbalho*

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1 PROJECT DETAILS

1.1 Summary Description of the Project

The EMTRE Biogas Brazil Project (Project) comprises the treatment of industrial effluents of the region Maringá state Paraná in which 2 products are fabricated with these effluents - biogas and liquid fertilizer - to supply the partnership with Cocamar.

The Biogas fuel is used in Power Generators of 200 kW of installed electric power each Generators, the project is to use 2 generators. The liquid fertilizer is used to irrigate a eucalyptus plantation in an area of 141.50 Ha.

The treatment system of Emtre Project is done in an area of 7.26 Ha. In total, the area comprised is the treatment and irrigation, total of 148.76 Ha.

The organic industrial residues (effluents) come from the food, agrochemical pharmochemical, and landfill sectors and are transported to the site by trucks. The effluent treatment uses anaerobic digestion technology through closed bioreactors equipped with a biogas recovery system Canadian and CSTR models.

The Project is in the municipality of Presidente Castelo Branco, located in the Northwest of the State of Paraná, in the Southern region of Brazil. The city has an area of 155.734 km², and according to the 2,000 Census, the population is 4,305 inhabitants (IBGE 2000).

The removal and reduction of methane (CH_4) emissions are accomplished through biodigesters, producing Biogas (CH_4 and CO_2) and liquid fertilizer after biodigestion processing. The biogas is used by two stationary internal combustion engines, where the CH_4 is used as fuel and converted into CO_2 with electricity generation. The liquid fertilizer produced is disposed of in a 141.50 ha area adjacent to the biogas plant, enhancing the growth of eucalyptus trees.

Before the project implementation, the base scenario was estimated the discharge of 225,083 tons per annum of organic effluent, where of this amount 70% Food Residue (Type1), 15% Effluent Landfill (Type2) and 15% Effluent Agrochemicals Pharmochemicals (Type 3). Treatment before the Project takes place in two ways, the first in anaerobic lagoon in the factories themselves and later sending the liquid to external treatment plants to final disposal, or, direct sending for external treatment in anaerobic lagoon without passing through internal lagoons.

The estimated total annual production of biogas with the region's maximum waste Project amounts to 3,050,872 m3, of which 1,830,523 m3 of methane, 209,636 m³ of liquid fertilizer. In normal operating conditions the electricity generation from biogas reaches 3,145 MWh per year. Flaring is used when a power generator available to perform methane destruction. The liquid fertilizer contributes to additional CO_2 fixation in the eucalyptus reforestation adjacent to the wastewater treatment plant.

The Baseline is 24,831 tCO2eq. The first 2 years Project removed an average 11,000 tCO2eq., in the year 2022 expected remove similar figures to 2020, 2021; and in the following years the trend is to increase annual removal to circa 20,000 tCO2eq.

1.2 Sectoral Scope and Project Type

The Project belongs to the sector scope of group 13 - Waste Handling and Disposal and group 1 - Energy Industries (renewable/non-renewable sources) with methodologies applicable to small and medium scale projects - less than 60,000 tons CO2 per year.

1.3 Project Eligibility

EMTRE Biogas Brazil is eligible under the VCC Program scope for the following reasons:

i. **Real** - All GHG emission reductions and removals from the project that generate them can be proven and continues to take place.

ii. **Measurable** – All GHG emission reductions and removals are quantifiable using recognized measurement tools. The application to the VC will drive further improvements in the measurement approach adopted by EMTRE ensuring adequate and modern real-time information at critical point in the process. The emissions baseline was reviewed several during the application for accurateness.

iii. **Permanent** – All GHG emission reductions or removals generated by project is impacted by the macroeconomics policy in Brazil and its possible variations through time. As a business, the Biogas Project stands on firm grounds and commercial relationships with industrial wastewater suppliers which are dependent on third-parties residues treatment facilities. The risk of reversibility is counterbalanced by the ongoing need to continue due to legal requirement to handle industrial residues – federal and municipal laws. EMTRE is unable to provide any safeguards to minimize its reversal. However, from a business standpoint this risk although real is unlikely to happen. If industrial treatment legal requirements are revoked and the treatment activities are ceased, then the certificates will be withdrawn.

iv. **Additional** – All GHG emission reductions and removals are additional to Baseline. If the project had not been carried out the emissions would have stood close to 20,000 t CO_2 per annum.

v. **Independently Audited** – All GHG emission reductions and removals are be verified to a reasonable level of assurance by an accredited validation/verification body with the expertise necessary in both the country and sector. The initial measurements took place during the Project's commissioning period and parameters are measured according to the Brazilian legislation. Those parameters will be expanded in compliance with AMS.III-H and implemented as result of the certification process.

vi. **Unique** - Each VCC is unique and associated with a single GHG emission reduction or removal activity – in this case associated to the power generation and flaring. There must be no double counting. There is no double claiming of the environmental benefits.

vii. **Transparent** – The project will be publicly disclosed regarding its GHG-related information to allow intended users to make decisions with reasonable confidence.

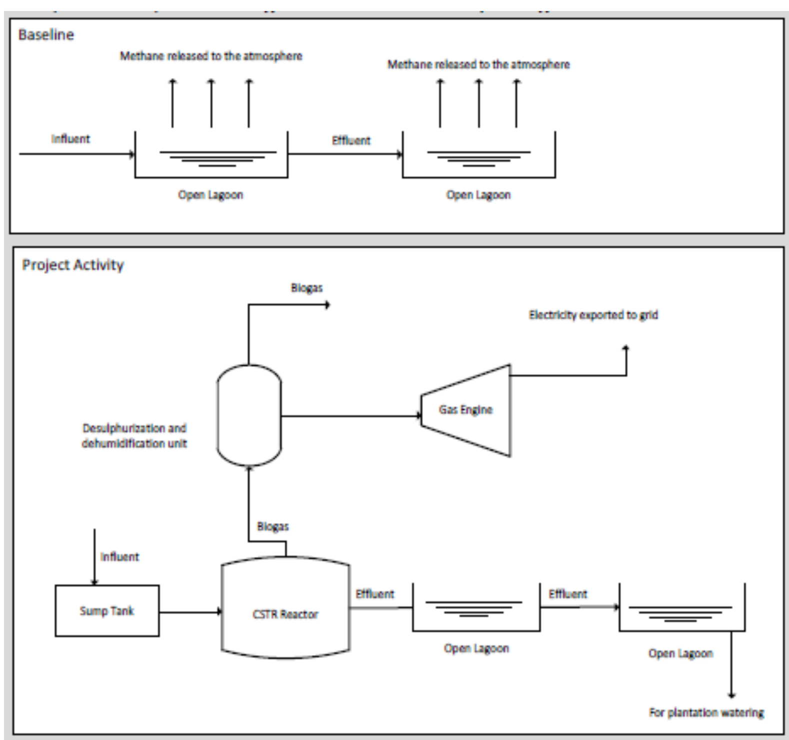
viii. **Conservative** – Conservative assumptions, values and procedures have been used to ensure that the GHG emission reductions or removals are not over-estimated. In contrary, EMTRE Brazil believes the emissions reductions will be higher and estimates could be revised up once the initial certification is concluded, and additional investments carried pout afterwards to improve efficiencies and removal of residual methane quantities.

1.4 Project Design

The Project was designed in an integrated manner for the treatment of effluents produced by third parties by incorporating four stages in one facility: (i) removal of organic effluents; (ii) the capture of GHG emissions through biodigesters; (iii) GHG reduction through power generation; and (iv) irrigation of eucalyptus plantation area adjacent to the treatment plant site.

The effluent treatment system was adopted based on the segregation of organic loads to improve anaerobic degradation for biogas production. The biogas will fuel power generating for self-consumption and distributed generation connected to the grid.

Fig. 1 - Simplified Project Design Diagram



This diagram is the item 2 (f) in methodology AMS-III.H.

The enterprise's site location is strategic due to the availability of Cocamar's eucalyptus plantation area for the Final Disposal of liquid fertilizer in the soil. The cooperative uses the firewood produced in this area as a thermal energy source for its grain dryers and boiler and wood treatment for fences and posts. The total area consolidated with eucalyptus cultivation is approximately 380 ha. The Final Effluent Disposal place has 141.50 ha, with the possibility of future expansion to an area of more than double of currently used is available.

The Project has been designed to include a single installation of activities.

Eligibility Criteria

The project is eligible according to the CDM guidelines.

1.5 Project Proponent

Organization name	EMTRE – Empresa Maringaense de Tratamento de Efluentes Ltda.
Contact person	Robson Hoepers
Title	Director President
Address	Estrada Atlântica, km 04. Lote 141 e 142, Zona Rural.
Telephone	+55 44 32252471 / +55 44 991417180
Email	robson@emtre.com.br

1.6 Other Entities Involved in the Project

Organization name	Three Gold Partners LLP
Role in the Project	Carbon credits commercial advisor and agent
Contact person	Antonio Barbalho
Title	Managing Partner
Address	251 Little Falls Drive Wilmington DE 19808 USA
Telephone	+1 202 341 6505 / +1 202 415 1910
Email	antonio.barbalho@threegoldpartners.com

1.7 Ownership

EMTRE is the sole owner of carbon credits generated by the Project. The ownership derives from three components:

A) Licenses to operate and ownership (Appendix 6.4).

EMTRE is the sole Project owner arising by virtue of statutory, property, and contractual rights in the residue's treatment plant, equipment, and process that generates GHG emission reductions and removals. EMTRE is registered at the Companies House (Junta Comercial do Paraná) and Inland Revenues (Secretaria da Receita Federal).

EMTRE has not divested the ownership of such a Project and its treatment process. The firm's registration at the Companies House (Junta Comercial do Paraná) is in Appendix 6.4.

B) Contractual arrangements for wastewater treatment and GHG destruction.

An enforceable and irrevocable agreement between holders of organic residues producers and EMTRE is critical for the process that captures GHG emission reductions and removals, which vests ownership into the project proponent. Summary of contracts for organic liquid effluents purchase from several producers is described in attachment Appendix 6.4.

EMTRE, by virtue of contractual rights, is the owner of treatment processes for GHG capture, GHG emissions reduction, and destruction through electricity generation. Cocamar's Letter of Consent to receive biogas for electricity production, without transferring the carbon credits title, and liquid fertilizer irrigation is attached in Appendix 6.4.

1.8 Project Start Date

The Project began operations in October 2019, according to the operating license.

1.9 Project Crediting Period

The first crediting period is January 1, 2020, to December 31, 2026, totalling seven years.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	X
Large Project	

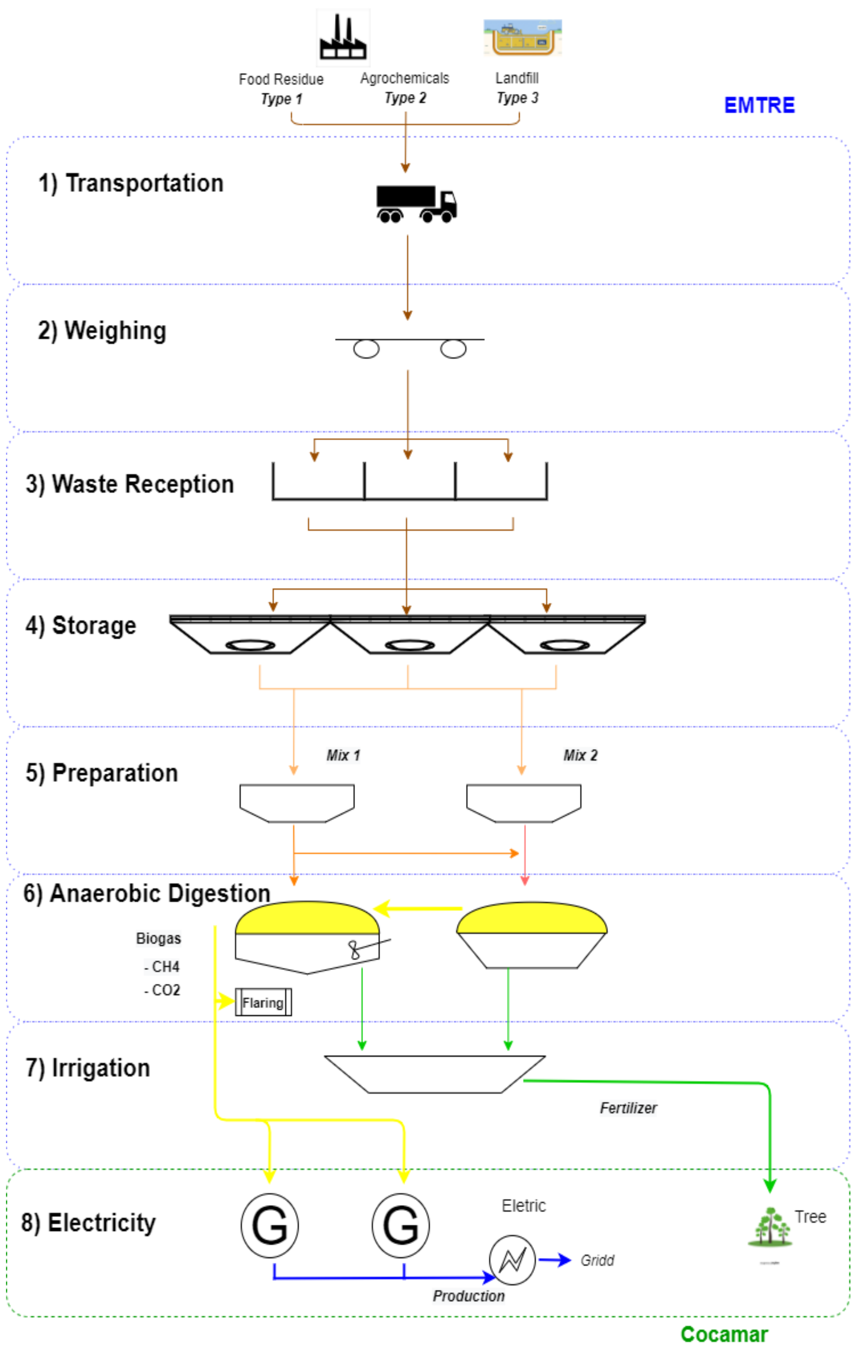
Year	Estimated GHG emission reductions or removals (tCO_2e)
2020	11,030
2021	11,686
2022	11,686
2023	21,375
2024	21,375
2025	21,375
2026	21,375
Total estimated ERs	119,902
Total number of crediting years	7
Average annual ERs 2020 to 2022	11,000
Average annual ERs 2023 to 2026	21,375

1.11 Description of the Project Activity

EMTRE's Industrial Wastewater Treatment Process comprises eight steps: (1) transportation, (2) weighing, (3) waste reception, (4) storage, (5) preparation, (6) anaerobic digestion/biogas, (7) irrigation, and (8) electricity production. Figure 2 shows the flow chart with the steps of the effluent treatment process.

Fig. 2 - Flowchart with Process Steps.

Project EMTRE Biogas Brazil - Mass Flow Diagram



1) Transportation. The arrival of the waste is done by road trucks with completely closed tanks. The truck goes to the industrial site that produces the waste/wastewater, loads the material, and transports it to EMTRE. The supply industries are located at an average distance of 62.5km. Each supplier is responsible for its own effluent transportation - EMTRE neither arranges nor is responsible for this type of transportation. Appendix 6.5 indicates the list of organic effluent suppliers contracted with EMTRE.

2) Weighbridge. When trucks arrive at the EMTRE plant, they are registered and checked to see if they are in accordance with the transport and reception policy as agreed with EMTRE and the producer. After being confirmed, the truck is weighed by a weighbridge. The truck is weighed at the entrance, and exit, after unloading, where the difference is counted as the material received by EMTRE.

3) Waste Reception. The reception is done in 3 concrete bays with containment for unloading. The trucks arrive at the bays, and the Unit operator directs in which bay the truck should unload. Once it enters the bay, it parks and turns the truck off. EMTRE’s Operator opens the truck's unloading valves, and the material is unloaded. Each bay has a pipeline that takes the material to three storage ponds.

4) Storage. EMTRE has three rectangular storage lagoons of 1,500 m^3 each, and all the bays are connected to any lagoon, and effluents are placed as directed by the Unit Supervisor. The lagoons are waterproof, there is no leakage to the soil, and they are also sealed on the top to avoid gas leakage into the atmosphere before the anaerobic digestion begins.

5) Mixing / Preparation. For the treatment preparation, the plant has two circular tanks of 450 m^3 in volume, one tank is called Hydrolysis Tank, and the other is called Equalization Tank. Each one has a specific function for preparing the materials to feed to Bioreactors. The Equalization Tank supplies the Canadian Bioreactor exclusively, while the Hydrolysis Tank can be used to provide both Bioreactors - the preference is to feed the Adapted CSTR Bioreactor.

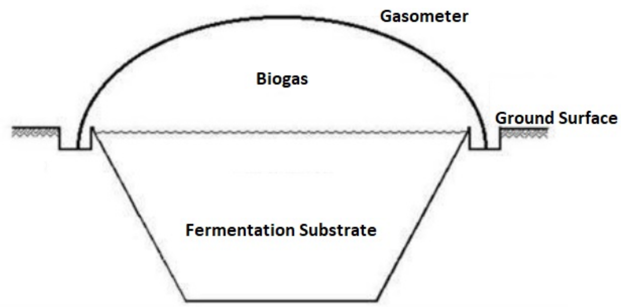
According to industrial standards, the lagoons materials are directed to both tanks through individual submerged pumps forming the necessary components for the Anaerobic Digestion process. The volume/flow formula of each Lagoon to be sent to the preparation tanks depends directly on the quantity of each type of residue received from the industries.

6) Anaerobic Digestion. EMTRE’s Treatment Process is a continuous process conducted by two technologies: 1) Canadian Reactor technology; 2) adapted CSTR Reactor technology.

According to CERVI, 2010, the Canadian Reactor is characterized by having a waterproofed rectangular base (in the EMTRE Project, the waterproofing is with HDPE tarpaulin) dug into the ground, where the prepared substrate is deposited, having the width greater than the depth (Fig. 3). A cover is made with flexible plastic canvas (in the EMTRE Project LLDPE is used) where the gas produced is stored in it, therefore, called a Gasometer. The blanket inflates as the Biogas production occurs.

The Biodigester comprises a distribution box. The PVC gasometer (LLPDE in EMTRE’s case) is placed on top of a waterproofed lagoon excavated in the ground and gas outlet pipe.

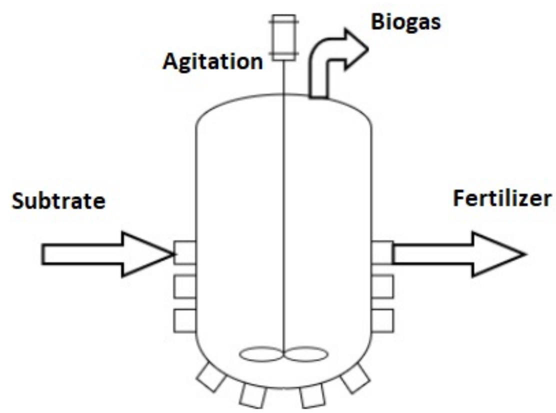
Figure 3 - Canadian-type reactor



Source: Adapted from Cervi, Esperancini, and Bueno (2010).

The CSTR (Continuous Stirred Tank Reactors, Fig. 4) technology can process with speed and performance residues from swine, cattle, agriculture, and others. Its capacity to convert biomass into methane is higher than traditional Biodigesters, but it is complex to make. (Bortoli; Kunz; Soares, 2009).

Figure 4 - CSTR type reactor.



The adapted CSTR technology at EMTRE comprises a circular tank with a conical trunk buried in the ground, with HDPE soil waterproofing and an LLDPE gasometer. The agitation is continuous, keeping the substrate in contact with the microorganism of the medium all the time. The substrate entry is at the top of the Bioreactor, and the removal is at the tank bottom.

The Canadian Bioreactor has 25,000 m³, and the CSTR Adapter Bioreactor has 5,000 m³ capacity, respectively. The substrate is digested through an anaerobic process called Digestate is directed to the Irrigation Pond after the process is completed.

The biogas is produced in the 2 Bioreactors and stored in gasometers whose composition is CH_4 (60%), CO_2 (39.8%), and traces H_2S (2,000 ppm). The removal of biogas is done through hoses that are connected to pipes of 200 millimetres in diameter that transport this biogas to the Flaring and Electricity Generators.

The biogas piping connects EMTRE's to Cocamar (AGRICULTURE COOPERATIVE) premises. EMTRE uses a Biogas pump located inside COCAMAR's facility, adjacent to the treatment plant. When entering The Cocamar property, the biogas is treated to remove humidity and other gases that could damage the electricity generator.

7) Irrigation. The digested digestate enters the Irrigation Lagoon through 150mm pipes by gravity and has a volume of 20,000 m^3. It is located at an altitude lower than the Bioreactors facilitating this flow and serves as a buffer tank for the irrigation of eucalyptus trees.

The licensed area for irrigation amounts to 141.50 Ha and is situated on levels below the irrigation pond. The irrigation process relies on submerged two electric pumps at the pond's bottom. The distribution of liquid fertilizer is done through 3" (central branches) and 2" (tree line branches) hoses. In each hose line, there are sprinklers to distribute the liquid to the plantation equally.

The processed wastewater is disposed in a monitored area with eucalyptus plantations and its composition is similar to an organic swine manure load after the biodigestion process. The fertilizer will not be released into any body of water.

8) Production of Electricity. The generators receive this gas at an approximate pressure of 60 mBar as fuel gas for electric energy generation. The electrical power of the Project is for 800 kW, 4 Generators of 200 kW each. Cocamar started with 2 Generators and will expand to 1 or 2 more Generators.EMTRE's Team of Operators conducts the power generation activity, whereas Cocamar's Team performs the Energy Generator Maintenance. All generated biogas flows to the generators, and the CH4 present in it is burned, accomplishing the captured CH4 destruction. Each 200 kW generators operate with a biogas consumption of 105.1 m3/h. The electricity for each generation set is about 122,194 kWh/month, equivalent to 1,466,000 kWh/year per unit.

The Project electricity consumption is indicated in the Table 1 and specifications of main equipment subdivided by stage.

Table 1 - Main Project equipment specifications.

Stage	Equipment	Years	Lifespan	Quantity	Power (kW)	Factor (%)	Electricity (MWh/year)

1 - Road Transport	Truck	N/A	N/A	N/A	N/A	N/A	N/A
2 - Cargo Weighing	Cargo weight scale	1	20	1	0.05	90%	0.39
3 - Reception	Receiving bays	2	15	3	N/A	N/A	N/A
4 – Effluent Storage	Lagoon 01. 02 e 03	2	18	3	N/A	N/A	N/A
	Lagoon Submerse Pump	2	20	3	3	40%	10.51
5 - Preparation/ Mixture	**Hydrolysis Tank**	2	20	1	N/A	N/A	N/A
	Equalization Tank Submerse Pump	2	20	1	3	60%	15.77
	Submerse Agitator - Hydrolysis Tank	2	15	1	7.5	40%	26.28
	Crusher	1	10	1	5	1%	0.44
	Crusher	1	10	1	2.2	1%	0.19
	Sieve Crusher	1	10	1	1.5	1%	0.13
	Tank Equalization	2	20	1	N/A	N/A	N/A
	Equalization Tank Submerse Pump	2	20	1	3	60%	15.77
	Agitator Equalization Tank	2	15	1	5.5	40%	19.27
6 - Anaerobic Digester	**Canadian Reactor**	2	20	1	N/A	N/A	N/A
	Positive Recirculation Pump	1	20	4	5.5	25%	12.05
	Air Blower	1	20	1	0.5	100%	4.38
	Microorganisms Agitator Input	2	15	1	0.5	5%	0.22
	CSTR Reactor	2	20	1	N/A	N/A	N/A
	CSTR Agitator	2	15	2	15	80%	105.12
	Positive Recirculation Pump	1	20	1	5.5	60%	28.91
	Air Blower	1	20	1	0.5	100%	4.38
7 - Irrigation	**Irrigation Lagoon**	2	20	1	N/A	N/A	N/A
	Irrigation Hose	2	15	1	N/A	N/A	N/A
	Submerse Pump	2	20	1	3	25%	6.57
	Centrifugal Pump	1	20	1	5.5	25%	12.05
	Irrigation Lagoon 1 Aerator	1	15	2	5.5	60%	28.91
	Irrigation Lagoon 2 Aerator	1	15	1	15	60%	78.84
	Irrigation Lagoon 2 Aerator	1	15	1	3.5	60%	18.4
8 - Biogas	Pipes	2	15	1	N/A	N/A	N/A
9 - Electricity Generation	CHP Genset	1	15	1	N/A	N/A	N/A
Water System	Well Pump	2	20	1	2.2	15%	2.89
	System Pump Plant	2	20	1	2.2	15%	2.89
Compressors	Air Compressors	1	15	1	2.2	10%	N/A
Test	Agitator Test	2	15	1	5.5	5%	N/A
Buildings	Lighting System	2	10	1	4	40%	14.02
	Management	0	10	16	0.015	10%	0.01
	Laboratory Dryer	0	10	1	0.5	20%	0.88

	Laboratory Muffle	0	10	1	4	10%	3.5
	Laboratory Others Equipment	0	10	4	0.2	45%	0.79
	Office Equipment	1	10	3	0.02	20%	0.04

Consumption Energy Total p/ year	(MWh/year)	413.58

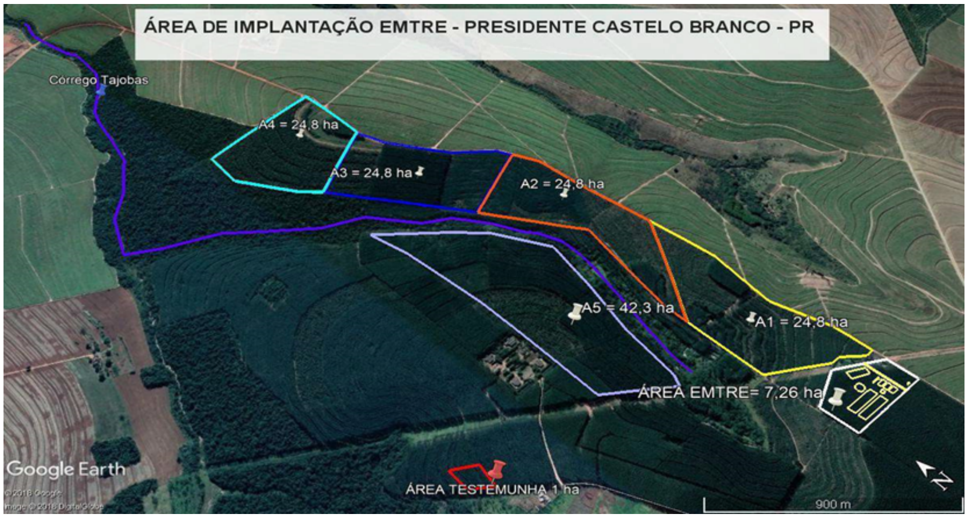
1.12 Project Location

The Project is located in Presidente Castelo Branco city in Northwest Paraná State in Brazil's southern region. The city has an area of 155,734 km² and, according to the 2000 Census, a population of 4,305 habitants (Fig 5 and 6).

Figure 5 - Map of the Project Location.

Source: Wikipedia.

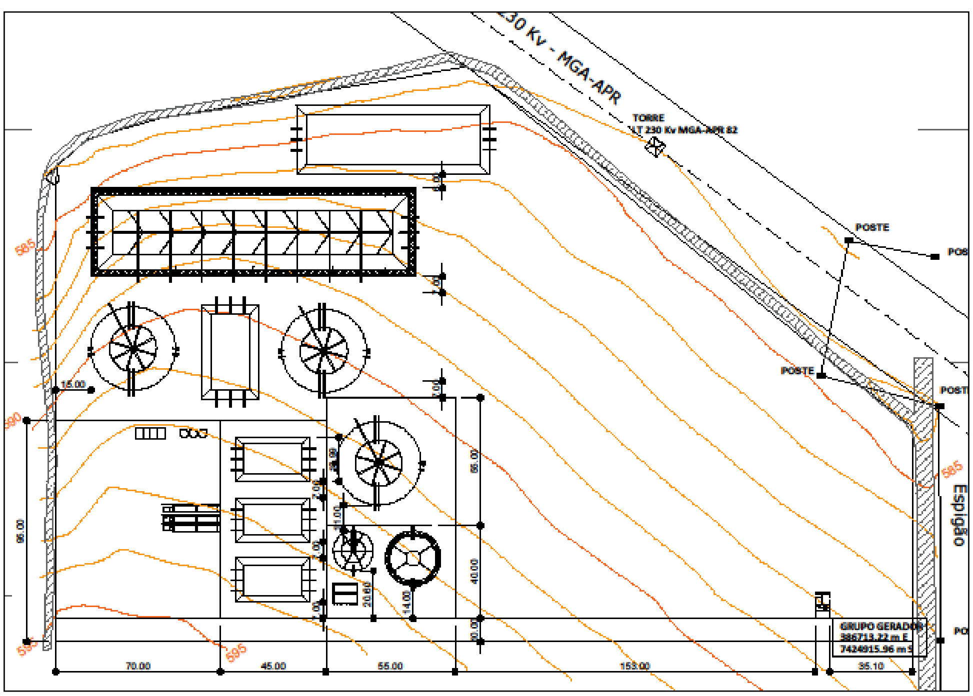
Figure 6 - Project implementation area.



Source: Google Earth.

The area for the Project is located in the lower right corner (area EMTRE. figure 7). The sites for disposal of liquid fertilizer are numbered from A1 to A5 and the control area (Area Testemunha). See Appendix 6.7 for Area EMTRE details.

Fig. 7 Effluent Treatment Area.



1.13 Conditions Prior to Project Initiation

Please see Section 3.4 – Baseline Scenario.

1.14 Compliance with Laws. Statutes and Other Regulatory Frameworks

The Project has been designed, constructed, and operated according to the Brazilian legislation as confirmed in the following licenses and permits in Appendix 6.4:

A. License to operate – section 1.16

B. Environmental Licenses and Laws.

C. Operating licenses: Municipality Operating license.

D. Operating procedures: According to the activity's Waste Management Plan, waste is classified according to ABNT 10.004 since production, storage, and final destination. Invoices and waste collection certificates are duly issued by licensed companies and filed as proof of final disposal.

1.15 Participation under Other GHG Programs

1.15.1 Projects Registered (or seeking registration) under Other GHG Program(s)

The Project has neither been registered nor seeking registration in any entity other than in the VCC Program.

1.15.2 Projects Rejected by Other GHG Programs

No entity has not rejected the Project.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

The Project has not been included in any other carbon trading program.

1.16.2 Other Forms of Environmental Credit

The Project has not received any credit from any program. To date. the Project’s proponents have not applied to REC certificates.

1.17 Sustainable Development Goals - SDGs

1.17.1 EMTRE Contribution to Monitored SDGs.

The EMTRE Project monitored contribution to the SDGs and to be verified regularly are indicated in Table 2. It includes the SDG Goals and indicators used.

Table 2 – Contribution to the SDGs and included in Monitoring Plan.

Position in 12/31/2020	Position in 12/31/2021	Assessment and Forward-Looking
Goal 6 Ensure availability and sustainable management of water and sanitation for all		
6.3.1 Proportion of domestic and industrial wastewater flows safely treated		
In 2020, Emtre executed the treatment of 108,678 tons of industrial wastewater and destined the correctly treated final effluent for eucalyptus irrigation..	In 2021, Emtre executed the treatment of 120,973 tons of industrial wastewater and destined the correctly treated final effluent for eucalyptus irrigation..	EMTRE plans to reach its industrial wastewater treatment target of 250,000 tons by 2030.
Goal 7 Ensure access to affordable, reliable, sustainable, and modern energy for all		
7.2.1 Renewable energy share in the total final energy consumption.		
EMTRE electricity consumption was 154,500 kWh in 2020. Copel, the distribution network company, supplied electricity.	EMTRE consumed a total of 304,300 kWh in 2021. Most of this energy was using renewable sources (hydroelectric), which is the main matrix in Paraná.	EMTRE will continue to buy renewable energy and may increase purchases as availability increases and price remains below the regulated market.
7.b.1 Installed renewable energy-generating capacity in developing countries (in watts per capita).		
Installed capacity in 2020 achieved 148.590 MW from the following sources: Hydropower (109,272 MW), Biomass (15,306 MW), Wind (17,131 MW), Solar (3,287 MW), and Others* (3,594 MW) (EPE, 2021).	Produced electricity renewable in 2021 achieved 518,713 GWh from the following sources: Hydropower (362,818 GWh), Biomass (51,711 GWh), Wind (72,286 GWh), Solar (16,752 GWh), and others (15,146 GWh) (EPE, 2022).	EMTRE contribution to Indicator 7.b.1 is the biogas production from waste management (included in biomass) and supplying power generation units. Biomass is anticipated to reach 16,295 MW by 2030, with RSU adding expected to add a

* Others comprise Biogas, Elephant Grass, Charcoal, Rice Husk, Blast Furnace Gas - Biogas, Black Liquor, Vegetable Oils, Wood Waste.	* Others comprise Biogas, Elephant Grass, Charcoal, Rice Husk, Blast Furnace Gas - Biogas, Black Liquor, Vegetable Oils, Wood Waste.	minimum of 250MW (EPE, PDE 2031). The potential for power generation is above 20 MW with circa 49% be explored to date,
Goal 11 – Make cities and human settlements inclusive, safe, resilient, and sustainable		
11.6.2 Annual mean levels of fine particulate matter (e.g., PM2.5 and PM10) in cities (population weighted)		
Previus data could not be found. Emtre is located far from the big cities (where it has monitoring stores).	According to AccuWeather, Inc, the air quality index in Maringá city in july 2022 the following levels: • PM2.5: 6 µg/m3 • PM10: 11 µg/m3	
Goal 13 Take urgent action to combat climate change and its impacts*		
13.2.2 Total greenhouse gas emissions per year.		
In 2020 an estimated 11 thousand tons of carbon dioxide equivalent could have been released into the atmosphere. The EMTRE Project implementation avoided such emissions from landfills managed by EMTRE. All methane was destroyed through flaring (100%). *The conversion factor considered is the GWP ratio equal to 21 tCO2/tCH4.	In 2021, it was estimated that the emission of 11,686 thousand tons of carbon dioxide equivalent in the atmosphere was avoided in EMTRE. The breakdown of methane destruction is flaring (80%) and power generation (20%). The gas is delivered to a third party in charge of power generation. *The GWP conversion factor remained unchanged (21 tCO2/tCH4).	Since 2020 EMTRE has implemented and managed a Clean Development Mechanism project responsible for generating carbon credits. The Project covers methane capture and destruction in the Waste Treatment Plant - EMTRE. By 2030 EMTRE will take every measure to always improve the Clean Development Mechanism.

1.17.2 Biodiversity, Community Benefits, Gender Equity, Climate Change and Adaptation

The EMTRE Project includes a special components category like biodiversity, benefits related to the community, gender equity, and climate change adaptation. Although those goals are not part of the monitoring plan, it adds tangible EMTRE Project's contribution to sustainable development. Table 3 includes the SGD Goal and indicator used, the Project Contribution, and additional comments.

Table 3 – EMTRE Project Contribution to Biodiversity, Benefits relates to the community, Gender Equity, and Climate Change Adaptation.

Project Contribution	Comments
Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	
15.2.1 Progress towards sustainable forest management	
EMTRE reuses the final treated effluent to irrigate a 141.5 ha area of eucalyptus trees since 2020, reducing the use of fertilizer in this area. These eucalyptus trees serve as a fuel for a thermal source to generate electricity and steam for food industry use.	The irrigation project intends to be expanded to 300 ha, which is the total of Cocamar's eucalyptus farm that is situated around Emtre's project, by 2030.
Goal 5. Achieve gender equality and empower all women and girls	
5.5.2 Proportion of women in managerial positions	
EMTRE personnel totaled 20 employees in 2021, of which 18 are men, and 2 are women, located in the city of Maringá. The two women work in administrative positions, one is secretary and the other is responsible for finance.	EMTRE is committed to increasing the participation of women operational positions by 50% by 2030. It is also taking steps to ensure fairness and equity of women's participation in selection processes.
Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	
4.3.1 Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex	
EMTRE regularly promotes courses, corporate, occupational health, and safety training for its collaborators, which is essential to ensure the services' quality. In 2021, 16 collaborators participated in those programs promoted by EMTRE The training courses are held	EMTRE intends to continue its education & training programs in the foreseeable future.

periodically to improve the teams' knowledge concerning the activities developed. It includes possible risks associated with them, being directed to the teams according to the specifics of each area, involving technical, legal, safety, health, and operational updates.	
4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill	
EMTRE hasn't young apprentice collaborators in the information and communication area.	The company will take steps and ensure young apprentice collaborators in the information and communication area.
Goal 13. Take urgent action to combat climate change and its impacts*	
13.2.2 Total greenhouse gas emissions per year	
According to the updated NDC in 2021, Brazil is expected to increase its emissions from 982 MtCO2 in 2020 to 1,037 MtCO2 by 2030. The EMTRE project aims at contributing to methane destruction equivalent to 0.11 Mt per annum (1,1 ktCH4), equivalent to 0.011% of the overall target. Source: UNFF NDC Registry and Carbontracket.org.	The EMTRE Project can further improve its contribution to CO_2 emissions reduction by replacing fossil fuels in transport and constructing power plant units in the next concession period.
Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation	
9.b.1 Proportion of medium and high-tech industry value added in total value-added	
The World's average in 2019 leveled at 45.11%, with Brazil standing at 33.74%. In the concession period starting in 2023, units for recovery of recyclable materials and energy targets minimizing waste disposal in landfills can help the industry to increase the national average.	

1.18 Additional Information Relevant to the Project

Leakage Management

Where applicable. describe the leakage management plan and implementation of leakage and risk mitigation measures.

Commercially Sensitive Information

Indicate whether any commercially sensitive information has been excluded from the public version of the project description and briefly describe the items to which such information pertains.

Note - Information related to the determination of the baseline scenario. demonstration of additionality. and estimation and monitoring of GHG emission reductions and removals (including operational and capital expenditures) cannot be considered to be commercially sensitive and must be provided in the public versions of the project documents.

Sustainable Development

Describe how the Project contributes to achieving any nationally stated sustainable development priorities. including any provisions for monitoring and reporting same. TGP

Further Information

Include any additional relevant legislative. technical. economic. sectoral. social. environmental. geographic. site-specific and/or temporal information that may have a bearing on the eligibility of the Project. the net GHG emission reductions or removals. or the quantification of the Project's net GHG emission reductions or removals.

2 SAFEGUARDS

2.1 No Net Harm

The Project causes no damage to the environment and social conditions and local economic activities.

2.2 Local Stakeholder Consultation

The project follows the Brazilian Environmental legislation on consultation.

2.3 Environmental Impact

The Project conducted its environmental impact assessment (PCA) during the design and construction phases as part of the licensing requirements. The PCA is attached as Appendix 1 and a summary of critical information in Appendix 2.

2.4 Public Comments

To be included once the Project Validation is under way.

2.5 AFOLU-Specific Safeguards

For non-AFOLU projects. this section is not required.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

The methodology used for emissions calculations is “AMS-III.H Methane recovery in wastewater treatment --- Version 19”. Its entry in force date is June 14. 2019. when the EB 103 meeting report was published.

The design and implementation of the EMTRE Biogas Brazil Project adopted the GHG emissions calculations method set out by the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC). ICLEI developed the protocol. WRI (World Resources Institute). and C40 (Climate Leadership Group) in 2014. based on the national inventory guide published in 2006 by the IPCC (Intergovernmental Panel on Climate Change).

3.2 Applicability of Methodology

The methodology applicability is shown in Table 4.

Table 4 – Assessment of Methodology Applicability Conditions.

Applicability Condition	Explanation
A - Baseline system is anaerobic lagoons	
• Lagoon depth equal to or above 2 meters	Effluents are treated in each plant separately through lagoons of 3 to 5 meters deep.
• Ambient temperature above 15ºC at least during part of the year on a monthly average basis;	The average low temperature in the region ranges between May and July stands at 18ºC. The average high temperature from August to April is 29ºC. (weather.com/metered)
• The minimum interval between two consecutive sludge removal events shall be 30 days.	N/A We don´t have to access to the data. This is conservative value.
B - The recovered Biogas from the above measures may also be utilized for the	

following applications instead of combustion/flaring:	
• Thermal or mechanical-electrical energy generation directly	Heat source from biogas burning for the treatment process and electricity generation fuelled by the biogas.
C - The location of the wastewater treatment plant and the source generating the wastewater shall be uniquely defined and described in the PDD.	The treatment site is defined in 1.12. The waste generating plants located in the Maringa region as per item 1 - Transportation in section 1.11.
D - Measures are limited to those that result in aggregate emissions reductions of less than or equal to 60 kt CO2 equivalent annually from all Type III components of the project activity.	It meets the annual aggregate emission cap requirement estimated. The project is less than 20,000 tCO2eq. as per 1.10.

Source: AMS-III.H Methane recovery in wastewater treatment --- Version 19.

3.3 Project Boundary

The project boundary (simplified diagram) is indicated in Fig. 1. Section 1.4.

The Project physical limits are indicated in Figure 6. with additional details shown in the following appendices:

- Effluent treatment units and energy generation units see Figure 7 and Appendix 7.
- Area for final effluent disposal. See figure 6. The geodesic coordinates of the Project are 23° 16' 51" S 52° 06' 28" W (Google Earth).

The project boundary and relevant GHG sources sinks and reservoirs for the project and baseline scenarios are displayed in Table 5. The equipment list and electricity consumption are shown in Table 1 (Appendix 3).

Table 5 – GHG sources and destruction points

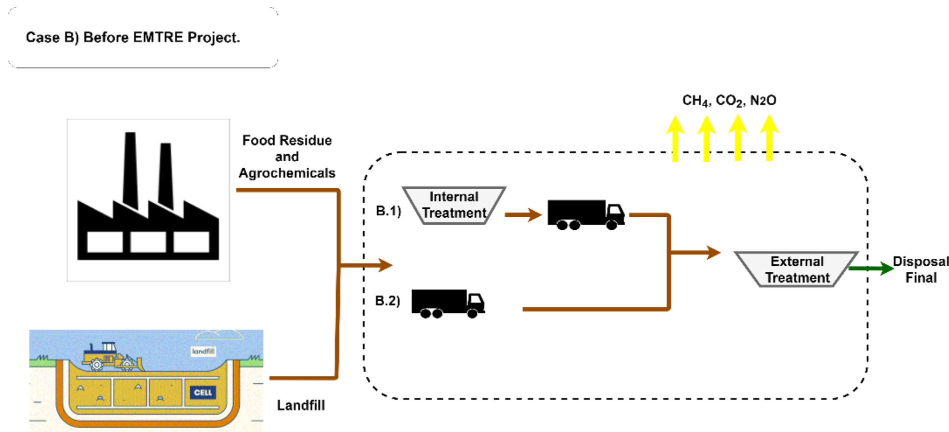
Source		Gas	Included	Justification/Explanation
Baseline	Source 1 - Industrial Organics Effluents and Landfill Leachate	CO_2	No	CO2 emitted in baseline can be estimated.
		CH_4	Yes	Biogas production in lagoons deeper than 2 meters. CH4 generation in biogas not recovered in the treatment.
		N_2O	No	N/A
		Other	No	Electricity consumption can only be estimated.
	Source 2 Transport Destination Before Project	CO_2	Yes	Diesel is used as fuel for wastewater transportation from industries to external treatment plant disposal final.
		CH_4	No	No emission CH4 transport

Source		Gas	Included	Justification/Explanation
		N_2O	Yes	Diesel is used as fuel for wastewater transportation from industries to external treatment plant disposal final.
		Other		
Project	Source 1 Anaerobic Biodigestion	CO_2	Yes	CO2 formation in biogas production through Anaerobic Bioreactors.
		CH_4	Yes	CH4 formation in biogas production through Anaerobic Bioreactors.
		N_2O	No	No emission N2O Treatment
		Other		
	Source 2 Electricity Generation	CO_2	Yes	Biogas combustion byproduct in the electricity generator and released in the atmosphere.
		CH_4	Yes	Destruction through generator.
		N_2O	No	N/A
		Other		Consumption electricity for Emtre Process.
	Source 3 - Flaring	CO_2	No	No calculated
		CH_4	Yes	CH4 produced biogas, and destroyed through flaring.
		N_2O	No	N/A
		Other		
	Source 4 – Irrigation Water	CO_2	No	Irrelevant
		CH_4	Yes	Irrigation of eucalyptus plantation next to Treatment Plant
		N_2O	No	N/A
		Other		
	Source 5 Wastewater Transport to EMTRE's gate	CO_2	Yes	Diesel is used as fuel for wastewater transportation from industries to EMTRE's treatment plant.
		CH_4	No	N/A
		N_2O	Yes	Diesel is used as fuel for wastewater transportation from industries to EMTRE's treatment plant.
		Other		

3.4 Baseline Scenario

Before implementing the Project, the organic effluents were directed to uncovered anaerobic lagoons where they generated Methane (CH4) and Carbon Dioxide (CO2) released into the atmosphere, as shown in Figure 8.

Figure 8 - Flowchart before the EMTRE Project.



In the Project Baseline Scenario, there are two organic waste supply lines: industrial (Type 1 and Type 3) and landfill (Type 2) effluents. The organic waste (effluent) usually has 2 ways destination options: B.1) effluent treatment inside factory with anaerobic lagoons and after this effluent sending by trucks treatment external; B.2) effluent sending directly by trucks external treatment in anaerobic lagoons. In both cases the final disposal is carried out in the external treatment closest to the mills.

These lagoons perform the decomposition of residual organic matter and release gases produced into the atmosphere. In addition, we have the transport of the effluent by trucks to the final disposal, where this transport emit gas to the atmosphere too.

The AMS.III-H methodology was chosen due to its direct application fit to the process carried out by the Project. Calculations were performed to include transport to anaerobic lagoons and landfill areas. Applicable IPCC default parameters were also used to ensure consistency of approach when detailed when detailed measurements were unavailable. Table 6 represents the key components of Baseline Calculations,

Table 6 – Baseline Summary Estimates

Waste	Type	Qty (m^3/year)	Treatment (tCO_2e)	Transport (tCO_2e)	Transport (tN_2O)
Food Residue	I	154,469	20,797	812	0.00762
Landfill	II	33,100	1,276	73	0.00069
Agrochemicals Pharmochemicals	III	33,100	1,782	86	0.00081

Source: EMTRE measurements and estimates.

3.5 Additionality

The Project's additionality is deemed automatic based on the Methodological Tool 32 v03.00 "Positive List of Technologies" item "5.1.2. Methane recovery in wastewater treatment". The date of entry into force is the publication date of the EB 110 meeting report on May 27. 2021.

3.6 Methodology Deviations

No methodological deviation was observed or adopted.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The Baseline scenario applicable to this project is in accordance with the methodology AMS-III.H (Version 19) and may consist of:

a) *Emission on account of electricity or fossil fuel used (BE power,y);*
b) *Methane emissions from baseline wastewater treatment system (BE ww,treatment,y);*
c) *Methane emissions from baseline sludge treatment systems (BE s,treatment,y);*
d) *Methane emissions on account of inefficiencies in the baseline wastewater treatment systems and presence of degradable organic carbon in the treated wastewater discharged into river/lake/sea (BE ww,discharge,y); and*
e) *Methane emissions from the decay of the final sludge generated by the baseline treatment systems (BE s,final,y)*

For this project the items c), d) and e) are not being considered for the following reasons:

- *c) and e) Emtre does not receive sludge, Emtre receives only the liquid effluent, therefore it was not measured.*
- *d) item disregarded because we did not have access to the final destination data before having Emtre's project.*
- *The item a) corresponding to electricity in the Baseline is also disregarded because generally companies do not have high consumption of electricity in this sector of the plant.*

Equation (1)

BE_y={$BE_{power,y}$+$BE_{ww,treatment,y}$+$BE_{s,treatment,y}$+$BE_{ww,discharge,y}$+$BE_{s,final,y}$}

Where:

BE_y = Baseline emissions in year y (t CO2e)

$BE_{power,}$ = Baseline emissions from electricity or fuel consumption in year y (t CO2e)

$BE_{ww,t,y}$ = Baseline emissions of the wastewater treatment systems affected by the project activity in year y (t CO2e)

$BE_{s,t,y}$ = Baseline emissions of the sludge treatment systems affected by the project activity in year y (t CO2e)

$BE_{ww,harge,y}$ = Baseline methane emissions from degradable organic carbon in treated wastewater discharged into sea/river/lake in year y (t CO2e). The value of this term is zero for the case 1(b)

$BEs_{,,}$ = Baseline methane emissions from anaerobic decay of the final sludge produced in year y (t CO2e). If the sludge is controlled combusted, disposed in a landfill with biogas recovery, or used for soil application in the baseline scenario, this term shall be neglected.

Baseline emissions from electricity and fossil fuel consumption ($BE_{power,y}$) are determined as per the procedures described in the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" and "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion", respectively. The energy consumption shall include all equipment/devices in the baseline wastewater and sludge treatment facility. If recovered biogas in the baseline is used to power auxiliary equipment it should be taken into account, accordingly, using zero as its emission factor.

Considering that the Baseline has no electricity consumption, the following table shows the calculations for Baseline emissions from fuel consumption in year y (t CO_{2e}).

Table 7 - Emissions on account fossil fuel used (BEpower,y)

Waste Type	Medium Distance to Previous (km)	Medium Volume per Truck (m^3)	Nº Cargas (un./year)	Travelled Distance (km/year)	Fuel Diesel (L/year)	tCO2eq. (t/year)	t N_2O_{Diesel} (t/year)	GWP_{N2O}	Emission N_2O Fuel (tCO_{2eq}/year)	BEpower,y (a) Emission Fuel Fossil ($tCO_{2eq.}$/year)
I	69,1	18	8,364	577,934	253,849	812	0.00762	310	2.4	131.5
II	70,1	42	749	52,484	23,053	74	0.00069	310	0.2	146.4
III	48,4	25	1,267	61,316	26,932	86	0.00081	310	0.3	286.6

Methane emissions from the baseline wastewater treatment systems affected by the project ($BE_{ww,treatment,y}$) are determined using the COD removal efficiency of the baseline plant:

Equation (2)

$$BE_{ww,treatment,y}=\Sigma(Q_{ww,i,y}\times COD_{inflow,i,y}\times \eta COD_{,BL,ii}\times MCF_{ww,treatment,BL,i})\times B_{o,ww}\times UF_{BL}\times GWP_{CH4}$$

Where:

$Q_{ww,i,y}$ = Volume of wastewater treated in baseline wastewater treatment system i in year y (m3). For ex ante estimation, forecasted wastewater generation volume or the designed capacity of the wastewater treatment facility can be used. However, the ex-post emissions reduction calculation shall be based on the actual monitored volume of treated wastewater

$COD_{inflow,,}$ = Chemical oxygen demand of the wastewater inflow to the baseline treatment system i in year y (t/m3). Average value may be used through sampling with the confidence/precision level 90/10

$\eta COD_{,}$, = COD removal efficiency of the baseline treatment system i, determined as per the paragraphs 35, 36 or 37 below

$MCF_{ww,t,BL,i}$ = Methane correction factor for baseline wastewater treatment systems i (MCF values as per Table 7 below)

i = Index for baseline wastewater treatment system

$B_{o,}$ = Methane producing capacity of the wastewater (IPCC value of 0.25 kg CH4/kg COD)5

UF_{BL} = Model correction factor to account for model uncertainties (0.89)

GWP_{CH4} = Global Warming Potential for methane

The Methane Correction Factor (MCF) shall be determined based on the following table:

Table 8 - IPCC default values for Methane Correction Factor (*MCF*)

Type of wastewater treatment and discharge pathway or system	*MCF* value
Discharge of wastewater to sea, river or lake	0.1
Land application	0.1
Aerobic treatment, well managed	0.0
Aerobic treatment, poorly managed or overloaded	0.3
Anaerobic digester for sludge without methane recovery	0.8

Anaerobic reactor without methane recovery	0.8
Anaerobic shallow lagoon (depth less than 2 meters)	0.2
Anaerobic deep lagoon (depth more than 2 meters)	0.8
Septic system	0.5
Land application[(a)]	0.1

(a) Please refer SSC_664, "Clarification on methane correction factors for treated water used for irrigation under AMS-III.H ver. 19".

The following table shows the calculations for the Baseline emissions of the wastewater treatment systems affected by the project activity in year y (t CO_{2e}).

Table 9 - Methane emissions from baseline wastewater treatment systems ($BE_{ww,treatment,y}$)

Waste Type	$Q_{ww,I,y}$ (m^3/year)	Medium $COD_{inflow,I,y}$ (t/m^3)	η ($COD_{removal}$)	$MCF_{ww,treatment,BL,y}$	B_{0ww}	UF_{BL}	GWP_{CH4}	$BE_{treatment,y}$ (tCO_{2eq}/year)
I	154,469	0.07204	0.50	0.80	0.25	0.89	21	20,797
II	33,100	0.02064	0.50	0.80	0.25	0.89	21	1,276
III	33,100	0.02881	0.50	0.80	0.25	0.89	21	1,782
Total								**23,857**

Disregarding items ($BE_{s,t,y}$, $BE_{ww,discharge,y}$ and $BE_{s,final,y}$), the following table shows the calculations for the Baseline emissions in year y (t CO_{2e}).

Table 10 - Baseline Emissions $BE_y=\{BE_{power,y}+BE_{ww,treatment,y}\}$

	t CO_2 eq.
$BE_{power,y}$	975.09
$BE_{ww,treatment,y}$	23,856.67
BE_y (Total)	24,831.76

4.2 Project Emissions

Project activity emissions consist of:

a) CO_2 emissions from electricity and fuel used by the project facilities ($PE_{power,y}$);

b) Methane emissions from wastewater treatment systems affected by the project activity; and not equipped with biogas recovery in the project scenario ($PE_{ww,treatment,y}$);

c) Methane emissions from sludge treatment systems affected by the project activity, and not equipped with biogas recovery in the project situation ($PE_{s,treatment,y}$);

d) Methane emissions on account of inefficiency of the project activity wastewater treatment systems and presence of degradable organic carbon in treated wastewater ($PE_{ww, discharge,y}$);

e) Methane emissions from the decay of the final sludge generated by the project activity treatment systems ($PE_{s, final,y}$);

f) Methane fugitive emissions due to inefficiencies in capture systems ($PE_{fugitive,y}$);

g) Methane emissions due to incomplete flaring ($PE_{flaring,y}$); and

h) Methane emissions from biomass stored under anaerobic conditions which would not have occurred in the baseline situation ($PE_{biomass,y}$)

In this case, items (b), (c), (e), (f) and (h) are not applicable to the project activity emissions for the following reasons:

- Item b) the project has biogas recovery; the value is zero.
- Item c) and e), the project does not have sludge, the value is zero.
- Item f), the inefficiency value in the fugitive is irrelevant and the anaerobic inefficiency of the project in the item d) discharge.
- Item h), the project does not have storage biomass the value is zero.

For the years 2020 and 2021, the values and measures have already been evaluated because the years have already ended. For the year 2022, as we are in progress this year, we will consider the same values as for 2021 for all the Project's parameters, which is running very similar to the year mentioned.

Equation (3)

$PE_y = PE_{power,y}+PE_{ww,treatment,y}+PE_{s,treatment,y}+PE_{ww,discharge,y}+PE_{s,final,y}+PE_{fugitive,y}+ PE_{biomass,y} + PE_{flaring,y}$

Considering that the items b), c), e) and h) are not applicable for this project, the equation is:

$$PE_y = PE_{power,y}+PE_{ww,discharge,y}+PE_{flaring,y}$$

Where:

PEy	Project emissions in the year y (t CO_{2e})
$PE_{power,y}$	Emissions from electricity or fuel consumption in the year *y* (t CO_2e). These emissions shall be calculated as per paragraph 26 of the Methodology AMS-III.H, for the situation of the project scenario, using energy consumption data of all equipment/devices used in the project activity wastewater and sludge treatment systems and systems for biogas recovery and flaring/gainful use

$PE_{ww,discharge,y}$ Methane emissions from degradable organic carbon in treated wastewater in year *y* (tCO_2e). These emissions shall be calculated as per equation (6) in paragraph 33 of the Methodology AMS-III.H, using an uncertainty factor of 1.12 and data applicable to the project conditions ($COD_{ww,discharge,PJ,y}$, $MCF_{ww,PJ,discharge}$) and with the following changed definition of parameters:

$COD_{ww,discha}$ Chemical oxygen demand of the treated wastewater *rge,PJ,y* discharged into the sea, river or lake in the project scenario in year *y* (t/m^3)

$MCF_{ww,PJ,disc}$ Methane correction factor based on the discharge *harge* pathway of the wastewater in the project scenario (e.g. into sea, river or lake) (*MCF* values as per Table 8)

$PE_{flaring,y}$ Methane emissions due to incomplete flaring in year *y* ($t\ CO_2e$). For ex ante estimation, baseline emission calculation for wastewater and/or sludge treatment (i.e. equation (2) and/or equation (3)) can be used but without the consideration of GWP for CH_4. However, the ex-post emission reduction shall be calculated as per methodological tool "Project emissions from flaring"

The following table shows the calculations for the Emissions from Fuel Fossil (Tool to Calculate).

Table 11 - Emissions from Fossil Fuel.

2020

Waste Type	Travelled Distance (km/year)	Fuel Diesel (L/year)	tCO2eq. (t/year)	t N_2O_{Diesel} (t/year)	GWP_{N2O}	Emission N_2O Fuel (tCO_{2eq}/year)	BEpower,y (a) Emission Fuel Fossil ($tCO_{2eq.}$/year)
I	154,886	68,031	217.7	0.00204	310	0.6	218.3
II	52,668	23,133	74.0	0.00069	310	0.2	74.2
III	57,182	25,1616	80.4	0.00075	310	0.2	80.6
Total							373.18

2021

Waste Type	Travelled Distance (km/year)	Fuel Diesel (L/year)	tCO2eq. (t/year)	t N_2O_{Diesel} (t/year)	GWP_{N2O}	Emission N_2O Fuel (tCO_{2eq}/year)	BEpower,y (a) Emission Fuel Fossil ($tCO_{2eq.}$/year)
I	161,289	70,843	226.7	0.00213	310	0.7	227.4
II	52,615	23,110	74.0	0.00069	310	0.2	74.2
III	60,706	26,664	85.3	0.00080	310	0.2	85.6
Total							387.10

2022

Waste Type	Travelled Distance (km/year)	Fuel Diesel (L/year)	tCO2eq. (t/year)	t N_2O_{Diesel} (t/year)	GWP_{N20}	Emission N_2O Fuel (tCO_{2eq}/year)	BEpower,y (a) Emission Fuel Fossil ($tCO_{2eq.}$/year)
I	161,289	70,843	226.7	0.00213	310	0.7	227.4
II	52,615	23,110	74.0	0.00069	310	0.2	74.2
III	60,706	26,664	85.3	0.00080	310	0.2	85.6
Total							387.10

2023 to 2026

Waste Type	Travelled Distance (km/year)	Fuel Diesel (L/year)	tCO2eq. (t/year)	t N_2O_{Diesel} (t/year)	GWP_{N20}	Emission N_2O Fuel (tCO_{2eq}/year)	BEpower,y (a) Emission Fuel Fossil ($tCO_{2eq.}$/year)
I	303,145	133,152	426.1	0.00399	310	1.2	427.3
II	34,125	14,989	48.0	0.00045	310	0.1	48.1
III	33,100	14,539	46.5	0.00044	310	0.1	81.1
Total							556.50

Note: Waste Types: I - Food Industry Residue; II – Landfill; III - Agrochemicals e Pharmochemicals.

Table 12 shows the calculations for Emissions from Electricity consumed in the Project.

Table 12 - Emissions from Electricity Consumption.

Month	2020 (kWh)	2021 and 2022 (kWh)	2023 : 2026 (kWh)
January	6,621	6,549	34,414
February	15,623	0	34,414
March	8,421	7,575	34,414
April	8,421	7,504	34,414
May	22,933	0	34,414
June	10,235	16,567	34,414
July	10,235	32,230	34,414
August	22,389	36,203	34,414

September	11,340	52,434	34,414
October	11,340	51,979	34,414
November	14,685	44,515	34,414
December	12,405	49,017	34,414
kWh/year	**154,648**	**304,573**	**412,973**
MWh/year	**154.6**	**304.6**	**412.9**
t CO2eq./year	**16.7**	**36.2**	**44.5**

Equation (4)

$PE_{ww,discharge,y} = Q_{ww,y} * GWP_{CH4} * B_{o,ww} * UF_{PJ} * COD_{ww,discharge,PJ,y} * MCF_{ww,PJ,discharge}$

Where:

$PE_{ww,discharge,y}$: *Methane emissions from degradable organic carbon in treated wastewater in year y (tCO_{2e}). These emissions shall be calculated as per equation (6) in paragraph 33 of the Methodology AMS-III.H V.19, using an uncertainty factor of 1.12 and data applicable to the project conditions ($COD_{ww,discharge,PJ,y}$, $MCF_{ww,PJ,discharge}$) and with the following changed definition of parameters:*

$COD_{ww,discharge,PJ,y}$: *Chemical oxygen demand of the treated wastewater discharged into the sea, river or lake in the project scenario in year y (t/m3);*

MCFww,PJ,discharge: Methane correction factor based on the discharge pathway of the wastewater in the project scenario (e.g. into sea, river or lake) (MCF values as per Table 8).

Table 13 - Emissions from Discharge

Year	$Q_{ww,y}$	GWP_{CH4}	$B_{0,ww}$	UF_{BL}	Medium $COD_{ww,discharge,PJ,y}$	$MCF_{ww,PJ,discharge}$	$PE_{discharge,y}$
2020	101,221	21	0.250	0.890	0.00278	0.10	131.5
2021	112,672	21	0.250	0.890	0.00278	0.10	134.3
2022	112,672	21	0.250	0.890	0.00278	0.10	134.3
2023 : 2026	220,670	21	0.250	0.890	0.00278	0.10	286.7

Equation (5)

$PE_{flaring} = GWP_{CH4} \times F_{CH4,\ RG} \times (1 - \eta_{flaring})$

Where,

$F_{CH4,RG} = V_{db} * V_{CH4,db} * \rho_{CH4}$

$PE_{flaring,y}$: *Methane emissions due to incomplete flaring in year y (t CO2e).Methane emissions due to incomplete flaring in year y (t CO2e). However, the ex-post emission reduction shall be calculated as per methodological tool "Project emissions from flaring". Table 14 shows the calculations for the flaring emissions.*

Table 14 - Emissions from Flaring

Year	$V_{db}*V_{CH4,db}$ (m^3/year)	ρ_{CH4}	(1 - $\eta_{flaring}$)	GWP_{CH4}	$PE_{flaring,y}$
2020	938,075	0.657	10%	21	1,294.26
2021	972,803	0.657	10%	21	1,342.18
2022	972,803	0.657	10%	21	1,342.18
2023 : 2026	1,886,728	0.657	10%	21	2,603.12

Summary of Project Emissions

As explained previously and disregarding items ($PE_{ww,treatment,y}$, $PE_{s,eatment,y}$, $PE_{s,final,y}$, $PE_{fugitive,y}$, *and* $PE_{biomass,y}$), table 15 shows the calculations for the Project emissions in year y (t CO2e).

Table 15 – Project Emissions

Year	$PE_{power,y}$	$PE_{discharge,y}$	$PE_{flaring,y}$	*PE (Total)*
2020	389.5	131.5	1294.3	1815.3
2021	427.6	134.3	1291.4	1853.3
2022	427.6	134.3	1291.4	1853.3
2023 to 2026	605.7	286.7	2603.2	3495.6

Note: $PE_{Power,y}$ include totals from Tables 11 (Fossil Fuel) and 12 (Electricity).

4.3 Leakage

The Project is dedicated to methane capture and destruction. Any further leakage has been considered in Project's activities.

4.4 Net GHG Emission Reductions and Removals

The Emission Reductions for this Project fall within activities with high conversion of organic matter into methane. In this way, emission reductions are limited to Baselines, according to paragraph 44 of Methodology AMS-III.H, the equation is:

Equation (6)

$$ER_{y,ex\ post} = _{min}((BE_{y,ex\ post} - PE_{y,ex\ post} - LE_{y,ex\ post}),(MD_y - PE_{power,y} - PE_{biomass,y} - LE_{y,ex\ post}))$$

Where:

$ER_{y,\ post}$ = Emission reductions achieved by the project activity based on monitored values for year y (t CO_{2e});

$BE_{y,\ post}$ = Baseline emissions calculated as per Item 4.1 using ex post monitored values;

$PE_{y,\ post}$ = Project emissions calculated as per Item 4.2 using ex post monitored values;

MD_y = Methane captured and destroyed/gainfully used by the project activity in the year y (t CO_{2e}).

The first part of the Equation for the limiting of the Project, considering the Baseline and the Full Project:

$BE_{y,\ post} - PE_{y,\ post} - LE_{y,\ post}$ = 24,831.8 - 3,169.7 - 0.0 = 21,662.0 tCO_{2eq}.,

According methodology AMS-III.H the maximum Emission Reduction is 21,662.0 tCO_{2eq}.

In the case of flaring/combustion MDy will be measured using the conditions of the flaring process:

Equation (7)

$$MDy = BG_{burnt,y} \ x \ w_{CH4,y} \ x \ D_{CH4} \ x \ FE \ x \ GWP_{CH4}$$

Where:

$BG_{burnt,}$ = *Biogas flared/combusted in year y (m3)*

$w_{CH4,}$ = *Methane content13 of the biogas in the year y (volume fraction)*

D_{CH4} = ρ_{CH4} - *Density of methane at the temperature and pressure of the biogas in the year y (t/m3)*

FE = *Flare efficiency in year y (fraction). If the biogas is combusted for gainful purposes, e.g., fed to an engine, an efficiency of 100 per cent may be applied.*

Applying equation 7, table 16 shows the calculations from MDy in the year.

Table 16 – Methane captured and destroyed

Year	$BG_{burnt,y}$	$w_{CH4,y}$	ρ_{CH4}	*FE*	GWP_{CH4}	MD_y
2020	1,532,802	60%	0.67	90%	21	11,419.96
2021	1,589,547	60%	0.67	90% / 100%	21	12,105.90
2022	1,589,547	60%	0.67	90% / 100%	21	12,105.90
2023 : 2026	3,144,547	60%	0.67	90% / 100%	21	25,770.87

The value calculated of each year for the second part of the equation is:

Year 2020:

$MD_{2020} - PE_{power,2020} - PE_{biomass,2020} - LE_{2020,ex\ post}$ =11,420.0 - 389.9 - 0.0 - 0.0 = 11,030.1 $tCO2_{eq}$.

As this value is less than the limiting, so,

ER_{2020} = 11,030.1 tCO_{2eq}.

Year 2021:

$MD_{2021} - PE_{power,2021} - PE_{biomass,2021} - LE_{2021,ex\ post}$ = 12,105.9 – 419.9 - 0.0 - 0.0 = 11,686.0 $tCO2_{eq}$.

As this value is less than the limiting, so,

ER_{2021} = 11,686.0 $tCO2_{eq}$.

Year 2022:

The same value 2021.

ER_{2022} = 11,686.0 $tCO2_{eq}$.

Full Project (2023 to 2026):

$MD_{full} - PE_{power,full} - PE_{biomass,full} - LE_{full,ex\ post}$ =25,770.9 – 566.6 - 0.0 - 0.0 = 25,204.3 $tCO2_{eq}$.

According to paragraph 44 of Methodology AMS-III.H V.19, the emission reductions achieved by the project activity is limited to the ex post calculated baseline emissions minus project emissions using the actual monitored data for the project activity so,

$ER_{2022-2026}$ = 21,375.4 $tCO2_{eq}$.

According to Equation 6, Table 17 shows the emissions reductions:

Table 17 – Emissions Reductions

Year	$(BE_{y,ex\ post} - PE_{y,ex\ post} - LE_{y,ex\ post})$	$(MD_y - PE_{power,y} - PE_{biomass,y} - LE_{y,ex\ post})$	Emissions Reductions $ER_{y,ex\ post}$
2020	21,375	11,030	11,030
2021	21,375	11,686	11,686
2022	21,375	11,686	11,686
2023	21,375	25,204	21,375
2024	21,375	25,204	21,375
2025	21,375	25,204	21,375
2026	21,375	25,204	21,375
Total			**119,902**

5 MONITORING

5.1 Data and Parameters Available at Validation

Relevant data and parameters will be determined or available at validation as indicated in the tables below.

Data/Parameter 1

Data / Parameter:	GWP_{CH4}
Data unit:	CO2e/tCH4
Description:	Global Warming Potential of Methane
Source of data	Latest IPCC default factor
Value applied	21
Justification of choice of data or description of	In accordance with the parameter definition in AMS III H, v.19

measurement methods and procedures applied	
Purpose of Data	Determination of the baseline and project emissions for the ex-ante calculation of emission reduction
Any Comments	-

Data/Parameter 2

Data / Parameter:	$B_{0,ww}$
Data unit:	Kg CH4/kg COD
Description:	Methane producing capacity of the treated wastewater
Source of data	IPCC default value for domestic wastewater as cited in UNFCCC AMS III H, V.19 methodology
Value applied	0.25
Justification of choice of data or description of measurement methods and procedures applied	In accordance with the parameter definition in AMS III H, v.19
Purpose of Data	Determination of the baseline and project emissions for the ex-ante calculation of emission reduction
Any Comments	-

Data/Parameter 3

Data / Parameter:	UF_{BL}
Data unit:	-
Description:	Model correction factor to account for model uncertainties
Source of data	Refer to AMS III-H, V.19 methodology
Value applied	0.89
Justification of choice of data or description of measurement methods and procedures applied	In accordance with the parameter definition in AMS III H, v.19
Purpose of Data	Calculation of baseline emissions
Any Comments	-

Data/Parameter 4

Data / Parameter:	$MCF_{ww,treatment,BL,i}$
Data unit:	Fraction
Description:	Methane correction factor
Source of data	IPCC default value as cited in UNFCCC AMS III H, V.19 methodology
Value applied	0.8
Justification of choice of data or description of measurement methods and procedures applied	The current type of wastewater treatment and discharge pathway or system to which this project will be applied from Table 2 of applied methodology is Anaerobic deep lagoon (depth more than 2 meters).
Purpose of Data	Calculation of baseline emissions
Any Comments	-

Data/Parameter 5

Data / Parameter:	$MCF_{ww,discharge,PJ,y}$
Data unit:	Fraction
Description:	Methane correction factor based on discharge pathway in the baseline situation of the wastewater
Source of data	IPCC default value as cited in UNFCCC AMS III H, V.19 methodology
Value applied	0.3
Justification of choice of data or description of measurement methods and procedures applied	The final discharge in the baseline is land application
Purpose of Data	Calculation of baseline emissions
Any Comments	-

Data/Parameter 6

Data / Parameter:	$\rho_{CH4,n}$
Data unit:	kg/m3
Description:	Density of methane at temperature and pressure of the biogas
Source of data	Tool for Project emissions from flaring version 2.0.0
Value applied	0.657
Justification of choice of data or description of measurement methods and procedures applied	-

Purpose of Data	-
Any Comments	-

Data/Parameter 7

Data / Parameter:	η COD
Data unit:	-
Description:	COD removal efficiency of the baseline treatment system i
Source of data	Sampling campaign
Value applied	0.50
Justification of choice of data or description of measurement methods and procedures applied	Ex ante measurement campaign
Purpose of Data	Calculation of baseline emissions
Any Comments	

5.2 Data and Parameters to be Monitored

Relevant parameters will be monitored during the crediting period as indicated in the tables below.

Data/Parameter 1

Data / Parameter:	$Q_{ww,i,y}$
Data unit:	m^3/month
Description:	The flow of wastewater
Measurement procedures (if any):	Measurements are undertaken using flow meters
Monitoring frequency:	Monitored continuously (at least hourly measurements are undertaken, if less, confidence/precision level of 90/10 shall be attained)
Any comment:	-

Data/Parameter 2

Data / Parameter:	$COD_{ww,untreated,y}$, $COD_{ww,treated,y}$, $COD_{ww,discharge,PJ,y}$
Data unit:	t COD/m^3
Description:	The chemical oxygen demand of the wastewater before and after the treatment system affected by the project activity

Measurement procedures (if any):	Measure the COD according to national or international standards. COD is measured through representative sampling
Monitoring frequency:	Samples and measurements shall ensure a 90/10 confidence/precision level
Any comment:	-
Data / Parameter:	-

Data/Parameter 3

Data / Parameter:	$BG_{burnt,y}$
Data unit:	m^3
Description:	Biogas volume in year *y*
Measurement procedures (if any):	In all cases, the amount of biogas recovered, fueled, flared or otherwise utilized (e.g., injected into a natural gas distribution grid or distributed via a dedicated piped network) shall be monitored ex post, using continuous flow meters. If the biogas streams flared and fueled (or utilized) are monitored separately, the two fractions can be added together to determine the total biogas recovered, without the need to monitor the recovered biogas before the separation. The methane content measurement shall be carried out close to a location in the system where a biogas flow measurement takes place
Monitoring frequency:	Monitored continuously (at least hourly measurements are undertaken, if less, confidence/precision level of 90/10 shall be attained)
Any comment:	-

Data/Parameter 4

Data / Parameter:	$W_{CH4,y}$
Data unit:	%
Description:	Methane content in biogas in the year *y*
Measurement procedures (if any):	The fraction of methane in the gas should be measured with a continuous analyzer or, alternatively, with periodical measurements at a 90/10 confidence/precision level. It shall be measured using equipment that can directly measure methane content in the biogas - the estimation of methane content of biogas based on measurement of other constituents of biogas such as CO_2 is not permitted. The methane content measurement shall be carried out close to a location in the system where a biogas flow measurement takes place
Monitoring frequency:	-
Any comment:	-

Data/Parameter 5

Data / Parameter:	T

Data unit:	ºC
Description:	Temperature of the biogas
Measurement procedures (if any):	The temperature of the gas is required to determine the density of the methane combusted. If the biogas flow meter employed measures flow, pressure and temperature and displays or outputs the normalized flow of biogas, then there is no need for separate monitoring of pressure and temperature of the biogas
Monitoring frequency:	Shall be measured at the same time when methane content in biogas ($w_{CH4,y}$) is measured
Any comment:	-

Data/Parameter 6

Data / Parameter:	***P***
Data unit:	Pa
Description:	Pressure of the biogas
Measurement procedures (if any):	The pressure of the gas is required to determine the density of the methane combusted. If the biogas flow meter employed measures flow, pressure and temperature and displays or outputs the normalized flow of biogas, then there is no need for separate monitoring of pressure and temperature of the biogas
Monitoring frequency:	Shall be measured at the same time when methane content in biogas ($w_{CH4,y}$) is measured
Any comment:	-

Data/Parameter 7

Data / Parameter:	**FE**
Data unit:	%
Description:	The flare efficiency
Measurement procedures (if any):	As per the methodological tool “Project emissions from flaring”. Regular maintenance shall be carried out to ensure optimal operation of flares
Monitoring frequency:	Monitored continuously
Any comment:	-

Data/Parameter 8

Data / Parameter:	L_{diesel} and $E_{electricity}$
Data unit:	L (Litros) e MWh
Description:	Parameters related to emissions from electricity and/or fuel consumption in year *y*

Measurement procedures (if any):	As per the procedure in the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" and/or "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion". Alternatively, it shall be assumed that all relevant electrical equipment operates at full rated capacity, plus 10 per cent to account for distribution losses, for 8,760 hours per annum
Monitoring frequency:	-
Any comment:	-

5.3 Monitoring Plan

The monitoring plan has been developed to ensure that data measurements are correct, real and feasible. The plan is based on to good practices for accomplishing high levels of excellence in quality equipment and measurements. Emtre's local personnel at the wastewater treatment plant will be responsible for implementing the plan and managing the data acquisition, storage and analyses activities.

The data acquisition process has the following sequence: 1) the operator collects the value in the field, write it down on paper, and pass it on to the plant manager; 2) the plant manager together with the administrative sector enter the data electronically in spreadsheets; 3) this data is supervised by the advisor and stored electronically for later evaluation by the external audit team. This data will be stored and secure for 2 years.

Training will be provided to all those involved in the plan, takes place before data collection begins, and frequently monitoring the activities effectiveness.

The description of parameters to be used in the monitoring plan and respective responsible technicians are indicated below.

Parameter 1

Qww,i,y : *The flow of wastewater*

Measurement procedures (if any): *Measurements are undertaken using flow meters*

Data Acquisition: *Giuliano Andrade – Technician*

Frequency: *Daily*

Data Manager: *Henrique Batilani – Manager, Treatment Facility*

Data Supervisor: *Joao Allebrandt – Adviser, Treatment Facility*

Parameter 2

CODww,discharge,PJ,y : *The chemical oxygen demand of the wastewater before and after the treatment system affected by the project activity*

Measurement procedures (if any): *Measure the COD according to national or international standards. COD is measured through sampling*

Data Acquisition: *Giuliano Andrade – Technician*

Frequency: *Weekly*

Data Manager: *Henrique Batilani – Manager, Treatment Facility*

Data Supervisor: *Joao Allebrandt – Adviser, Treatment Facility*

Parameter 3

BGburnt,y : *Biogas volume in year y*

Measurement procedures (if any): *continuous flow meters, the biogas streams flared and fuelled (or utilized) are monitored separately*

Data Acquisition: *Giuliano Andrade – Technician*

Frequency: *Hourly*

Data Manager: *Henrique Batilani – Manager, Treatment Facility*

Data Supervisor: *Joao Allebrandt – Adviser, Treatment Facility*

Parameter 4

WCH4 : *Methane content in biogas in the year y*

Measurement procedures (if any): *Periodical measurements at a 90/10 confidence/precision level. The external company.*

Data Acquisition: *Giuliano Andrade – Technician*

Frequency: *Weekly*

Data Manager: *Henrique Batilani – Manager, Treatment Facility*

Data Supervisor: *Joao Allebrandt – Adviser, Treatment Facility*

Parameter 5

T : *Temperature of the biogas*

Measurement procedures (if any): *the same equipment measurement WCH4*

Data Acquisition: *Giuliano Andrade – Technician*

Frequency: *Weekly*

Data Manager: *Henrique Batilani – Manager, Treatment Facility*

Data Supervisor: *Joao Allebrandt – Adviser, Treatment Facility*

Parameter 6

P : *Pressure of the biogas*

Measurement procedures (if any): *the same equipment measurement WCH4*

Data Acquisition: *Giuliano Andrade – Technician*

Frequency: *Weekly*

Data Manager: *Henrique Batilani – Manager, Treatment Facility*

Data Supervisor: *Joao Allebrandt – Adviser, Treatment Facility*

Parameter 7

FE : *The flare efficiency*

Measurement procedures (if any): *the temperature of burn flaring*

Data Acquisition: *Giuliano Andrade – Technician*

Frequency: *Hourly*

Data Manager: *Henrique Batilani – Manager, Treatment Facility*

Data Supervisor: *Joao Allebrandt – Adviser, Treatment Facility*

Parameter 8

L fuel transport e Electricity: *Consumption fuel transport to Project, and electricity consumption project*

Measurement procedures (if any): *litres of diesel calculated through medium distance travelled monthly; and electricity consumption measurement power distribution company.*

Data Acquisition: *Giuliano Andrade – Technician*

Frequency: *Monthly*

Data Manager: *Henrique Batilani – Manager, Treatment Facility*

Data Supervisor: *Joao Allebrandt – Adviser, Treatment Facility*

6 APPENDIX

6.1 Environmental Management Plan

Attached is the Environmental Control Plan (PCA) in Portuguese (original) and English (translated). The PCA is a requirement for obtaining the environmental license in accordance with federal and state laws. The PCA provides details on information used in the application including equipment description, initial CAPEX program, timeline, monitoring guidance and Wastewater Unit layout.

6.2 Summary of Environmental Impacts

According to the Brazilian environmental legislation. the Environmental Control Plan (PCA - Appendix 1) was prepared to obtain the environmental license. a mandatory requirement for the implementation and operation of the Project. The following potential impacts that could be caused by the Project were evaluated: (i) water abstraction and use; (ii) organic waste treatment; (iii) final effluent management and disposal; (iv) gas effluent and solid waste management.

1. **Collection and use of water.**

We use about 1.00 m3/day of drinking water received by tank truck and deposited in a 10 m3 capacity glass fiber tank.) Consumption is separated into human (0.42 m3/day) and industrial (0.68 m3/day) for cleaning and washing.

The rainwater collection system is composed of a roof. gutters. pipes. and directing the flow to infiltrate the soil. Water used for human consumption at EMTRE's facilities is directed to the biodigestion system.

2. **Organic waste treatment.**

Table 19 - Types and quantities of effluents received.

Type of waste	Quantity m3/day
Type 1 - **Food Industry Residue**	432
Type 2 - **Landfill**	93
Type 3 - **Agrochemicals e Pharmochemicals**	93

3. Management and final effluent disposal.

The area available for final disposal is 141.5 ha to be used in eucalyptus plantation for Cocamar. Five areas were selected for management and final effluent disposal: area 1 (a-1) - 24.8 ha; area 2 (a-2) - 24.8 ha; area 3 (a-3) - 24.8 ha. area 4 (a-4) - 24.8 ha and area 5 (a-5) - 42.3 ha. The existing Area Witness (A-T) is 1.00 ha. In these areas eucalyptus will be planted with 3 x 2 spacing.

The effluent sizing flow is 800 m3/day and is operated according to the schedule: 800 m3/day (Mon-Fri) and 200 m3/day (Sat). The characteristics of the effluent leaving the biodigesters are indicated in table X. The effluent for final disposal will have a higher organic load than the one presented above in that table. Additional parameters to be analyzed include settleable solids. total solids. chlorides. phosphorus. potassium. nitrates. total alkalinity. ammoniacal nitrogen. and total nitrogen.

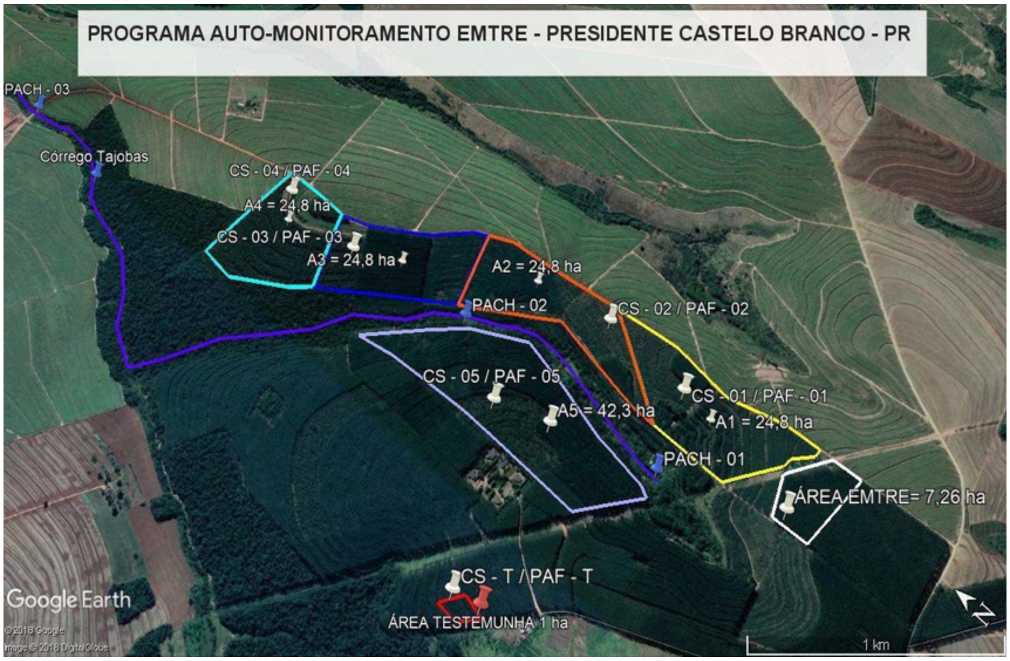
Table 20 – Final Effluent Composition.

PARAMETERS	RESULTADO	UNIDADE
pH	7.42	upH
BOD - Biochemical Oxygen Demand	791	mg/l
COD - Chemical Oxygen Demand	2,780	mg/l
Sediments	2.0	mg/l

Souce: PCA. 2018.

The collection points are indicated in figure 9 where: PACH - Receiving body analysis point (Tajobás Stream); CS - Soil collection; CS-T - Witness soil collection; PAF - Leaf analysis point; and PAF - Witness leaf analysis point. Figure 9 indicates the location of the final effluent disposal areas. And data collection points.

Figure 9 - Area for final effluent disposal and data collection points.



In the analysis of the water body. 3 sampling points were determined for the quality of the Tajobás Stream (PACH-01; PACH-02 and PACH-03) with the purpose of monitoring over time the parameters listed below for upstream. in the Area of Influence of the Effluent Final Disposal System and downstream respectively.

The following parameters are collected and analysed: (i) microbiological - thermotolerant coliforms. total coliforms and E. coli. (ii) physical-chemical - pH. BOD. COD. oils and grease. settleable solids. total solids. chlorides. phosphorus. potassium. nitrates. total alkalinity. ammoniacal nitrogen and total nitrogen.

Hydraulic Conductivity (CE) and Permeability (PE) tests in the Effluent Final Disposal and Witness areas are shown in Table 21.

Table 21 - Hydraulic Conductivity and Permeability Tests.

POINT	Hydraulic conductivity (m/s)	Infiltration Coefficient (l/m².dia)
EC-01	1.81×10^{-5}	37.8
EC-02	1.03×10^{-5}	62.0
EC-03	2.53×10^{-5}	30.0
EC-04	9.05×10^{-5}	56.8
EC-05	2.88×10^{-5}	36.2
MÉDIA	3.46×10^{-5}	44.56
EC-T	1.21×10^{-5}	53.0

Attention should be paid to the areas of final disposal of effluent referring to points EC-03 and 04. especially in point EC-05 due to the higher hydraulic conductivity of these locations.

The Average Infiltration Coefficient of 44.56 l/m2.day will be used as a calculation base for the effluent application rate in the Final Disposal Areas. The final disposal of effluent on soil of about 800 m3/day requires an area of 1.8 ha.

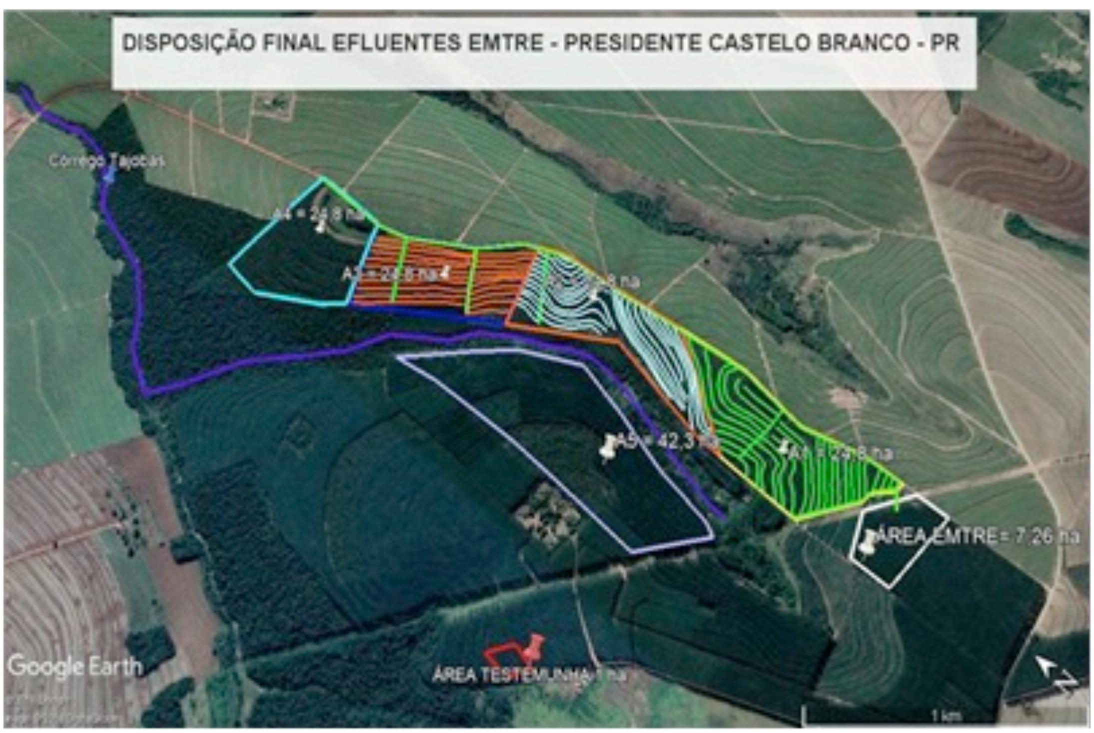
The total area available for final disposal equals 141.5 ha (78 times larger than the Required Area). Even if the lowest infiltration coefficient (EP- 03) was considered. the Required Area would be 2.7 ha and the Available Area for final disposal is 52 times larger than the minimum Required Area.

The details of the CE and EP points are described in the Percolation Capacity Test in the PCA. attached to the environmental licensing process. as well as the slope and potentiometric maps.

For the soil and leaf analysis. no significant deviations were observed. These items will be investigated during self-monitoring in order to verify the trend (increase. stabilization or reduction). although they do not compromise the System's operation (PCA pg 21 and 22).

Figure 9 indicates the location of the areas and the hose system - main line and its branches. The effluent distribution in these areas is gravitational and by pumping (higher areas) using polyethylene hoses with main lines (Ø = 3") and secondary branches (Ø = 2").

Figure 10 - Area for final effluent disposal (liquid fertilizer).



4. **Handling of solid and gaseous effluents.**

The sludge formed in the Biodigesters will be stirred by an agitation system with a progressive displacement pump. for a predetermined time each day.

The biogas production is 5.400 m3/day. with an average composition of 60% CH_4 and 39.8% CO_2. 2.000 ppm H_2S and trace amounts of other components.

The burning of the biogas will be done in an internal combustion engine. 2 ER-BR Filtration Systems are used for the removal of H_2S contained in the biogas to a content of up to 100 ppm.

All the biogas produced will be used in the closed combustion chamber (spark plugs) of the generators. The engines are originally for operation with diesel oil that are converted to use biogas. In case of maintenance. the biogas produced will be stored in the domes of the biodigesters.

6.3 List of Relevant Equipment Specification

Stage	Equipment	Idade	Lifespan	Quantity
1 - Road Transport	Truck	N/A	N/A	N/A
2 - Weighing	Road Balance	1	20	1
3 - Reception	Receiving bays	2	15	3
4 - Storage Residue	Lagoon 01, 02 e 03	2	18	3
	Pump Submerse Lagoon	2	20	3
5 - Preparation/Mixture	**Tank Hydrolysis**	2	20	1
	Pump Submerse Equalization Tank	2	20	1
	Submerse Agitator Hydrolysis Tank	2	15	1
	Crusher	1	10	1
	Crusher	1	10	1
	Sieve Crusher	1	10	1
	Tank Equalization	2	20	1
	Pump Submerse Equalization Tank	2	20	1
	Agitator Equalization Tank	2	15	1
6 - Anaerobic Digestion	**Reactor Canadense**	2	20	1
	Positive Pump Recirculation	1	20	4
	Air Blower	1	20	1
	Agitator Microorganisms Input	2	15	1
	Reactor CSTR	2	20	1
	Agitator CSTR	2	15	2
	Positive Pump Recirculation	1	20	1
	Air Blower	1	20	1
7 - Irrigation	**Irrigation Lagoon**	2	20	1
	Hose Irrigation	2	15	1
	Pump Submerse Lagoon Irrigation	2	20	1
	Centrifugal Pump Lagoon Irrigation	1	20	1
	Aerator Lagoon Irrigation	1	15	2
	Aerator Lagoon Irrigation	1	15	1
	Aerator Lagoon Irrigation	1	15	1
8 - Biogas	Pipes	2	15	1
9 - Electricity Generators	Genset CHP	1	15	1
Water System	Well Pump	2	20	1
	System Pump Plant	2	20	1
Compressors	Compresses air	1	15	1
Test	Agitator Test	2	15	1
Buildings	Plant Lighting	2	10	1
	Administrative Lamp	0	10	16
	Laboratory Dryer	0	10	1
	Laboratory Muffle	0	10	1
	Laboratory Others Equipment	0	10	4
	Administrative Equipment	1	10	3

6.4 List of Relevant Legislation and Licenses

SEDEST Operating and Environment Licence

PARANÁ
GOVERNO DO ESTADO
SECRETARIA DO DESENVOLVIMENTO SUSTENTÁVEL E DO TURISMO

INSTITUTO ÁGUA E TERRA

Secretaria de Estado do Desenvolvimento Sustentável e do Turismo - SEDEST
Instituto Água e Terra

LICENÇA DE OPERAÇÃO

Número do Protocolo: 17.193.841-4
Número do Documento: 169073
Validade da Licença: 22/10/2021

O Instituto Água e Terra, com base na legislação ambiental e demais normas pertinentes, e tendo em vista o contido no expediente protocolado sob o nº 17.193.841-4, concede LO - Licença de Operação nas condições e restrições abaixo especificadas.

1. IDENTIFICAÇÃO DO EMPREENDEDOR

CPF/CNPJ	Nome/Razão Social		
13.374.888/0002-84	EMTRE - EMPRESA MARINGAENSE DE TRATAMENTO DE EFLUENTES LTDA.		
RG/Inscrição Estadual	Logradouro e Número		
9082804827	Estrada Atlântica, s/n, Lote 141 e 142, Km 04		
Bairro		Município / UF	CEP
Zona Rural		Presidente Castelo Branco/PR	87.180-000

2. IDENTIFICAÇÃO DO EMPREENDIMENTO

Atividade			Porte
Estação de tratamento de despejos industriais - ETDI			Grande
Atividade Específica			
Estação de tratamento biológico de efluente			
Detalhes da Atividade			
—			
Coordenadas UTM (E-N)	Logradouro e Número		
386653.2 - 7425128.4	ESTRADA ATLANTICA, s/n, LOTE 141 e 142		
Bacia Hidrográfica	Bairro	Município / UF	CEP
Pirapó	Zona Rural	Presidente Castelo Branco/PR	87.180-000

* Houve alteração do Nome/Razão Social do Empreendimento: de 'EMTRE - EMPRESA MARINGAENSE DE TRATAMENTO DE EFLUENTES LTDA - ME(13.374.888/0001-01)' para 'EMTRE - EMPRESA MARINGAENSE DE TRATAMENTO

3. CARACTERÍSTICAS DO EMPREENDIMENTO

3.1 ÁGUA UTILIZADA

Origem Água	Tipo de Uso	Volume (m³/hora)	Nº Outorga	Coordenadas UTM (E-N)
Rede Pública	Humano e Empreendimento	0,02	—	—

3.2 EFLUENTES LÍQUIDOS

Origem Efluente	Forma Tratamento	Destino Final	Vazão (m³/hora)	Nº Outorga	Coordenadas UTM (E-N)
Efluente de esgoto sanitário	ETDI	Infiltração em Solo	0,01	—	386504.4 - 7425536
Efluentes gerados no processo industrial	ETDI	Infiltração em Solo	33,33	—	386504.4 - 7425536

3.4 CONDIÇÕES PARA LANÇAMENTO DE EFLUENTES

a) pH entre 5 a 9

b) temperatura: inferior a 40°C, sendo que a variação de temperatura do corpo receptor não deverá exceder a 3°C no limite da zona de mistura

c) materiais sedimentáveis: até 1 mL/L em teste de 1 hora em cone Inmhoff. Para o lançamento em lagos e lagoas, cuja velocidade de circulação seja praticamente nula, os materiais sedimentáveis deverão estar virtualmente ausentes

d) regime de lançamento com vazão máxima de até 1,5 vez a vazão média do período de atividade diária do agente poluidor, exceto nos casos permitidos pela autoridade competente

3.6 RESÍDUOS SÓLIDOS

Código e Descrição	Quant./Dia	Destino Final
190814 - Lodos de outros tratamentos de efluentes industriais não abrangidas em 19 08 13	1.000,00 kg	Aterro Industrial Terceiros
190801 - Resíduos retirados da fase de gradeamento	30,00 kg	Aterro Industrial Terceiros

Obs.: As informações das seções 1, 2 e 3 são de responsabilidade do requerente.

4. CONDICIONANTES

1. No controle das condições de lançamento, é vedada, para fins de diluição antes do seu lançamento, a mistura de efluentes com águas de melhor qualidade.

2. Os efluentes líquidos somente poderão ser lançados, direta ou indiretamente, no corpo receptor desde que obedeçam os limites e condições estabelecidos na presente Licença.

3. Quaisquer operações e/ou equipamentos que envolvam a utilização de produtos líquidos poluentes, tais como combustíveis em geral, óleo lubrificante, hidráulico, de corte, produtos químicos em geral e outros eventuais, quaisquer sejam, deverão ser dotados de dispositivos de contenção adequados, instalados nos locais onde a referidas operações forem realizadas e/ou onde os mencionados equipamentos estiverem instalados, para que em casos de vazamentos, estes líquidos permaneçam confinados nos respectivos locais.

4. Os critérios adotados para emissão da presente Licença de Operação poderão ser reformulados e/ou complementados de acordo com o desenvolvimento científico e tecnológico e a necessidade de preservação ambiental.

5. Outros resíduos líquidos, eventualmente gerados, em outras operações e atividades diversas levadas a efeito, de forma permanente ou sazonalmente no local, deverão ser objeto de procedimentos idênticos aos conferidos aos resíduos sólidos, devendo atender a Portaria IAP 212/2019 ou a que venha substituí-la.

6. Os resíduos sólidos gerados e relacionados à atividade desenvolvida, quaisquer sejam e em qualquer época, com a finalidade de evitar danos ambientais, deverão ser convenientemente armazenados e reutilizados no próprio local e/ou, encaminhados a terceiros para reutilização e/ou destinação final adequada, em empreendimentos e atividades devidamente licenciados por este instituto para a realização dos referidos serviços.

7. Em caso da existência de Áreas de Preservação Permanente no local, deverá ser rigorosamente observado o que estabelecem sobre a matéria a Legislação vigente.

8. Tancagens eventualmente existentes, destinadas ao armazenamento de combustíveis, matérias primas, produtos e/ou resíduos líquidos e semi-sólidos, deverão estar de conformidade com as respectivas NBR's.

9. Apresentar Plano de Gerenciamento de Resíduos Sólidos - PGRS, conforme estabelece a Resolução CEMA 70/2009, Art. 7º, § 3º, Inciso V e Decreto Estadual 6674/2002.

10. A presente Licença foi emitida de acordo com o que estabelecem os Artigos 8º, Inciso III da Resolução Nº 237/97 - CONAMA, e 3º, Inciso VII da Resolução Nº 107/2020 - CEMA, 09 de Setembro de 2020, e autoriza a operação propriamente dita do empreendimento e atividade, devendo ser observados rigorosamente, durante sua operação, os itens abaixo listados, bem como outros eventuais, constantes de fases anteriores do licenciamento ambiental.

11. Os níveis de pressão sonora (ruídos) decorrentes da atividade desenvolvida no local do empreendimento deverão estar em conformidade com aqueles preconizados pela Resolução CONAMA N.º 001/90.

12. A presente licença não contempla aspectos de segurança das instalações, estando restrita a aspectos ambientais.

LO Nº 169073 - [illegible]
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13. É terminantemente proibida a queima a céu aberto de qualquer tipo de material.

14. A concessão desta licença não impedirá exigências futuras, decorrentes do avanço tecnológico ou da modificação das condições ambientais, conforme Decreto Estadual 857/79 - Artigo 7º, § 2º.

15. O não cumprimento à legislação ambiental vigente sujeitará a empresa e/ou seus representantes, às sanções previstas na Lei Federal 9.605/98, e seus decretos reguladores.

16. As ampliações ou alterações nos processos de produção ou volumes produzidos, ora licenciados, de conformidade com o estabelecido pela Resolução CEMA nº 107, 09 de Setembro de 2020, ensejarão novos licenciamentos, prévio de instalação e de operação, para a parte ampliada ou alterada.

17. A presente Licença de Operação, em conformidade com o que consta do Artigo 19 da Resolução CONAMA Nº 237/97 poderá ser suspensa ou cancelada, na ocorrência de violação ou inadequação de quaisquer condicionantes ou normas legais, omissão ou falsa descrição de informações relevantes que subsidiaram a sua emissão, bem como na superveniência de graves riscos ambientais e de saúde, sendo assim deverão ser apresentados os documentos e atendidos os condicionantes acima estabelecidos, caso contrário, a presente Licença de Operação será cancelada.

18. A renovação da presente licença deverá ser requerida com antecedência mínima de 120 (cento e vinte) dias da expiração de seu prazo de validade.

19. No caso de destinação final de resíduos sólidos, deverão ser atendidos os requisitos da Portaria IAP 212/2019 e/ou Resolução CEMA 076/2009, observando a necessidade de solicitação de Autorização Ambiental.

20. Salientamos que é responsabilidade dos consultores os planos e testes ambientais apresentados, assim como é responsabilidade da contratante a implantação, implementação, manutenção e operação das medidas e sistemas propostos nestes estudos.

21. Esta Licença foi concedida com base nas informações apresentadas pelo requerente e não dispensa, tão pouco, substitui quaisquer outros Alvarás e/ou Certidões de qualquer natureza a que, eventualmente, esteja sujeita, exigidas pela legislação federal, estadual ou municipal.

Maringá, 19 de Janeiro de 2021	Assinatura do Representante
Súmula dessa licença deverá ser publicada no Diário Oficial do Estado e em jornal de grande circulação local ou regional, no prazo máximo de 30 (trinta) dias, nos termos da resolução CONAMA nº 006/86.Esta LICENÇA DE OPERAÇÃO, tem a validade acima mencionada, devendo em sua renovação ser solicitada ao Instituto Água e Terra com antecedência mínima de 120 (cento e vinte) dias. Quaisquer alterações ou expansões nos processos de produção ou volumes produzidos pela indústria e alterações ou expansões no empreendimento, deverão ser licenciados pelo Instituto Água e Terra. Esta LICENÇA DE OPERAÇÃO deverá ser afixada em local visível.	Digitally signed by ANTONIO CARLOS CAVALHEIRO MORETO Date: 2021.01.19 18:01:11 BRT ANTONIO CARLOS CAVALHEIRO MORETO Escritório Regional de Maringá

Instituto Água e Terra
Rua Engenheiro Rebouças, 1206 - 80215-100 - Curitiba-PR

Companies House Authorization (Junta Comercial do Paraná)

JUCEPAR

Governo do Estado do Paraná
Secretaria da Micro e Pequena Empresa
Junta Comercial do Estado do Paraná

PARANÁ

CERTIDÃO SIMPLIFICADA

Sistema Nacional de Registro de Empresas Mercantis - SINREM

Certificamos que as informações abaixo constam dos documentos arquivados nesta Junta Comercial e são vigentes na data da sua expedição.

Nome Empresarial: EMTRE - EMPRESA MARINGAENSE DE TRATAMENTO DE EFLUENTES LTDA
Natureza Jurídica: Sociedade Empresária Limitada
Protocolo: PRC2108513918

NIRE (Sede)	CNPJ	Data de Ato Constitutivo	Início de Atividade
41207004874	13.374.868/0001-01	09/03/2011	09/03/2011

Endereço Completo
Rua PIONEIRO MIGUEL JORDAO MARTINES, Nº 859, SALA 01, PARQUE INDUSTRIAL MARIO BULHOE - Maringá/PR - CEP 87065-660

Objeto Social
REPRESENTAÇÃO COMERCIAL, ASSESSORIA, CONSULTORIA DE PROJETOS DA INDUSTRIA QUÍMICA, PROJETOS DE MEIO AMBIENTE, SERVIÇOS DE TRATAMENTO DE EFLUENTES LÍQUIDOS, ARQUITETURA, ENGENHARIA, ASSESSORAMENTO TÉCNICO EM TRATAMENTO DE ÁGUA, BIOENERGIA, BIOCOMBUSTÍVEL, ENSAIOS DE MATERIAIS E DE PRODUTOS E ANALISE DE QUALIDADE DE ÁGUA E BIODIESEL, COMÉRCIO DE PRODUTOS QUÍMICOS UTILIZADOS EM TRATAMENTO DE ÁGUA E EFLUENTES, OUTRAS OBRAS DE ENGENHARIA CIVIL, TRATAMENTO E DISPOSIÇÃO DE RESÍDUOS NÃO PERIGOSOS, COLETA DE RESÍDUOS NÃO PERIGOSOS, DESCONTAMINAÇÃO E OUTROS SERVIÇOS DE GESTÃO DE RESÍDUOS, CONSTRUÇÃO DE REDES DE ABASTECIMENTO DE ÁGUA, COLETA DE ESGOTO E CONSTRUÇÃO CORRELATAS, EXCETO OBRAS DE IRRIGAÇÃO, CONSTRUÇÃO DE REDES DE ÁGUA E DE ESGOTO, OUTRAS OBRAS DE ENGENHARIA CIVIL E CAPTAÇÃO, TRATAMENTO E DISTRIBUIÇÃO DE ÁGUA E DE OBRAS DE TERRAPLANAGEM E PROJETO, CONSTRUÇÃO E OPERAÇÃO DE ATERROS DE RESÍDUOS PERIGOSOS E NÃO PERIGOSOS, EXECUÇÃO DE OBRAS DA CONSTRUÇÃO CIVIL EM GERAL E AFINS.

Capital Social	Porte	Prazo de Duração
R$ 200.000,00 (duzentos mil reais) **Capital Integralizado** R$ 200.000,00 (duzentos mil reais)	Demais	Indeterminado

Dados do Sócio

Nome	CPF/CNPJ	Participação no capital	Espécie de sócio	Administrador	Término do mandato
ROBSON HOEPERS	029.932.469-92	R$ 124.000,00	Sócio	S	Indeterminado
JOAO HENRIQUE VILELA DE ANDRADE	049.710.338-90	R$ 76.000,00	Sócio	S	Indeterminado

Dados do Administrador

Nome	CPF	Término do mandato
ROBSON HOEPERS	029.932.469-92	Indeterminado
JOAO HENRIQUE VILELA DE ANDRADE	049.710.338-90	Indeterminado

Último Arquivamento

Data	Número	Ato/eventos	Situação / Status
19/05/2021	20213178443	002 / 051 - CONSOLIDAÇÃO DE CONTRATO/ESTATUTO	ATIVA / SEM STATUS

Filial(ais) nesta Unidade da Federação ou fora dela
1 - NIRE: 41901828592 **CNPJ:** 13.374.868/0002-84
Endereço Completo
ESTRADA ATLANTICA, Nº SN, LOTE 141 E 142;KM 04; , RURAL, Presidente Castelo Branco, PR, CEP: 87180000

Esta certidão foi emitida automaticamente em 27/09/2021, às 07:58:10 (horário de Brasília).
Se impressa, verificar sua autenticidade no **https://www.empresafacil.pr.gov.br**, com o código **GC1ZAB17.**

PRC2108513918

LEANDRO MARCOS RAYSEL BISCAIA
Secretário Geral

1 de 1

Municipality of Presidente Castelo Branco Authorization

PREFEITURA MUNICIPAL DE PRESIDENTE CASTELO BRANCO

Rua José Peres Gonçalves, Nº 53 Centro - Fone 44 3135-6810 Cep 87.180-000

ESTADO DO PARANÁ

EXERCÍCIO 2021

E-mail: tributospmpcbranco@hotmail.com

DEPARTAMENTO DE TRIBUTAÇÃO

VALIDO ATÉ 31/12/2021

ALVARÁ DE FUNCIONAMENTO **INSCRIÇÃO MUNICIPAL 2680**

A PREFEITURA MUNICIPAL DE PRESIDENTE CASTELO BRANCO, CONCEDE ALVARÁ DE LICENÇA PARA O FUNCIONAMENTO:

NOME / RAZÃO SOCIAL

EMTRE EMPRESA MARINGAENSE DE TRATAMENTO DE EFLUENTES LTDA

NOME FANTASIA

ENDEREÇO

Logradouro: Estrada ATLANTICA — Número:

Complemento: LOTE 141 E 142 KM 04 — CEP: 87180-000

Bairro: ZONA RURAL

Distrito:

Cidade: Presidente Castelo Branco — UF: PR

C.N.P.J./CPF

CNPJ: 13.374.868/0002-84

INSCRIÇÃO ESTADUAL

RAMO DE ATIVIDADE PRINCIPAL

696 TRATAMENTO E DISPOSIÇÃO DE RESIDUOS NÃO-PERIGOSOS

RAMO DE ATIVIDADES SECUNDÁRIAS

NTANTES COMERCIAIS E AGENTES DO COMÉRCIO DE COMBUSTÍVEIS, MINERAIS, PRODUTOS SIDERÚRGICOS E

DESCONTAMINAÇÃO E OUTROS SERVIÇOS DE GESTÃO DE RESÍDUOS

OUTRAS OBRAS DE ENGENHARIA CIVIL NÃO ESPECIFICADAS ANTERIORMENTE

SERVIÇOS DE ENGENHARIA

FICA O MESMO SUJEITO ÀS EXIGÊNCIAS CONSTANTES EM LEI, SOB PENA DE SUSPENSÃO DE SUAS ATIVIDADES E DEMAIS FINALIDADES LEGAIS

SERÁ OBRIGATÓRIO NOVA LICENÇA TODA VEZ QUE OCORREREM MODIFICAÇÕES NAS CARACTERÍSTICAS DO ESTABELECIMENTO

MANTER FIXADO EM LOCAL VISÍVEL - Certidão de Regularidade para o Exercício

Otávio Augusto Paião Teixeira
Fiscal de Tributos

Presidente Castelo Branco(PR), 21 de Maio de 2021.

Lei Nº 04/2014 - Institui o Novo Código Tributário do Município de Presidente Castelo Branco - PR

Extract of Contract for Wastewater Treatment

DocuSign Envelope ID: D94EBE8B-BCDD-42D5-B1CE-5E50D54D7267

CONTRATO DE PRESTAÇÃO DE SERVIÇOS

Este Contrato de Prestação de Serviços ("Contrato") é celebrado nesta data entre:

I – AMYRIS BIOTECNOLOGIA DO BRASIL LTDA., estabelecida à Rua James Clerk Maxwell, nº 315, sala Farnoceno, Techno Park, Campinas/SP – CEP 13.069-380, regularmente inscrita no CNPJ/MF sob 12.065.083/0003-48, neste ato por seus representantes legais, simplesmente denominada "**CONTRATANTE**", e;

II - EMTRE - EMPRESA MARINGAENSE DE TRATAMENTO DE EFLUENTES LTDA., sociedade limitada, com sede na cidade de Maringá, Estado do Paraná, na Rua Pioneiro Miguel Jordao Martines, nº 859B, Bairro Parque Industrial Mario Bulhões da Fonseca, CEP 87.065-660, devidamente inscrita no Cadastro Nacional de Pessoa Juridica do Ministério da Fazenda - CNPJ/MF sob o nº 13.374.868/0001-01, neste ato presentada nos termos de seu Contrato Social, doravante denominada simplesmente "**EMTRE**" ou "**PRIMEIRA CONTRATADA**".

III - S. ALTOE TRANSPORTES EIRELI. ("INGA TRANSPORTES"), sociedade limitada, com sede na cidade de Iguaraçu, Estado do Paraná, Rua Guatambu, nº 168, sala 01, Bairro Gleba Aurora, CEP 86.750-000, devidamente inscrita no Cadastro Nacional de Pessoa Juridica do Ministério da Fazenda - CNPJ/MF sob o nº 14.299.733/0001-83, neste ato presentada nos termos de seu Contrato Social, doravante denominada simplesmente "**INGA**" ou "**SEGUNDA CONTRATADA**".

PRIMEIRA CONTRATADA e **SEGUNDA CONTRATADA** coletivamente como "Contratadas".

CONTRATANTE, PRIMEIRA CONTRATADA e **SEGUNDA CONTRATADA** coletivamente como "Partes" e individualmente como "Parte".

CONSIDERANDO QUE a **CONTRATANTE** tem interesse na contratação de serviços de Coleta e Tratamento de Efluentes Liquidos e Residuos Orgânicos oriundos dos Processos Industriais ("Serviços") a serem prestados pelas **CONTRATADAS**;

CONSIDERANDO QUE a **PRIMEIRA CONTRATADA** possui a expertise no tocante aos Serviços supramencionados e garante que as demais **CONTRATADAS** também detêm expertise em suas áreas de atuação, sendo, portanto, de total responsabilidade da **PRIMEIRA CONTRATADA** a gestão e qualidade dos Serviços desenvolvido pela **SEGUNDA CONTRATADA** à **CONTRATANTE**;

As Partes concordam em celebrar este Contrato, a ser regulado pelas cláusulas e condições seguintes.

1. DOS SERVIÇOS

1.1 A **PRIMEIRA CONTRATADA** prestará os serviços de tratamento e destinação final de resíduos liquidos e de resíduos orgânicos e a **SEGUNDA CONTRATADA** prestará os serviços de coleta de resíduos liquidos e de resíduos orgânicos, conforme disposto na Proposta Orçamentaria Nº 000247/20 - revisada de 31 de julho de 2020 ("Anexo I") e na Proposta Orçamentária Nº 00250/20 – do dia 04 de agosto de 2020 ("Anexo II"), que devidamente rubricados pelas Partes, constituem parte integrante deste Contrato. Os Serviços e demais condições deste Contrato somente poderão ser alterados por mútuo acordo por escrito entre as Partes.

1.1.1 Nos termos deste Contrato, a **EMTRE** declara expressamente à **CONTRATANTE** que os serviços que serão prestados pela **INGA**, serão de sua exclusiva responsabilidade, sendo

LEGAL amyris DEPARTMENT

Contrato de Prestação de Serviços entre Amyris Biotecnologia e EMTRE e INGA *Página 1 de 9*

emtre
TRATAMENTO DE EFLUENTES

CONTRATO DE PRESTAÇÃO DE SERVIÇOS Nº 130/20

Pelo presente instrumento particular de Prestação de Serviços, que entre si fazem, de um lado, a empresa **EMTRE - EMPRESA MARINGAENSE DE TRATAMENTO DE EFLUENTES LTDA**, pessoa jurídica de direito privado, devidamente inscrita no CNPJ/MF sob n.° 13.374.868/0001-01, estabelecida na Rua Pioneiro Miguel Jordão Martinez, n.° 859, Parque Industrial Mario Bulhões da Fonseca, no Município de Maringá – PR e filial com CNPJ/MF sob nº 13.374.868/0002-84, na Estrada Atlântica, S/Nº, Lotes 141 e 142, Zona Rural, Presidente Castelo Branco – PR, doravante denominada **CONTRATADA**, e de outro, a **AGROQUÍMICA BRASINHA LTDA.**, devidamente inscrita no CNPJ/MF sob Nº 05.696.101/0001-62, estabelecida à Estrada da Farinheira, S/Nº, Lotes 228G1/228H2/229/229A1/229A2, Nova Esperança – PR, de ora em diante denominada simplesmente **CONTRATANTE**, têm justo e contratado o presente Contrato de Prestação de Serviços, mediante as condições expressas nas cláusulas seguintes.

I – DO OBJETO

CLÁUSULA PRIMEIRA: A empresa **CONTRATADA** atua no ramo de prestação de serviços de coleta, transporte, tratamento e destinação final de resíduos líquidos industriais, comerciais e de prestação de serviços, e passará, doravante, a dedicar-se a essa atividade junto à **CONTRATANTE**, nos parâmetros definidos pela ABNT – Associação Brasileira de Normas Técnicas.

Parágrafo Primeiro: O tratamento e destinação final dos resíduos recebidos, observadas as licenças ambientais deferidas em favor da **CONTRATADA** e seus prepostos, bem como os instrumentos legais e normativos que disciplinam o transporte, tratamento e destinação final de resíduos líquidos, ficará sob responsabilidade da **CONTRATADA**, a qual se encontra licenciada e devidamente instalada no endereço supracitado.

Parágrafo Segundo: O presente contrato é especifico aos serviços de recebimento, tratamento e destinação final dos efluentes líquidos gerados nos processos industriais da **CONTRATANTE**

EMTRE – Empresa Maringaense de Tratamento de Efluentes Ltda.
Rua Pion. Miguel J. Martinez, 859
Parque Ind. Mario Bulhões da Fonseca
Fone/Fax:(44) 3266-7863
Cep: 87.065-660

COCAMAR Letter of Consent for Disposal treated Wastewater

Maringá, 07 de agosto de 2018.

CARTA DE ANUÊNCIA

Declaramos para fins de Licenciamento Ambiental junto ao Instituto Ambiental do Paraná – Escritório Regional de Maringá, que a COCAMAR COOPERATIVA AGROINDUSTRIAL, CNPJ n° 79.114.450/0001-65, proprietária da propriedade situada à Estrada Atlantic s/n°, Chocadeira, sob matrícula n° 603, lotes 141 e 142, Gleba Ribeirão Atalaia, Presidente Castelo Branco/PR, concorda com a disposição final de efluente orgânico, volume 800 m^3/dia, em área de 141,5 ha de cultivo de eucaliptos, após o devido tratamento por biodigestão da EMTRE – Empresa Maringaense de Tratamento de Efluentes Ltda, CNPJ n° 13.374.868/0001-01, estrada Atlântic s/n°, Zona Rural, Presidente Castelo Branco/PR.

LAZARO PINHEIRO DOMICIANO

COCAMAR COOPERATIVA AGROINDUSTRIAL

6.5 List if Wastewater Suppliers, Distance to Previous Disposal Site and to the Project.

Company	CNPJ:	City:	Dist. Project: (km)	Dist. Previus Project: (km)
COCAMAR COOPERATIVA AGROINDUSTRIAL	79.114.450/0001-65	Maringá – PR	28,2	19,4
CARMEL IND. E COM. DE SOBREMESAS LTDA	28.620.040/0001-55	Maringá – PR	24,8	46,3
POLI-NUTRI ALIMENTOS S.A.	60.210.515/0003-00	Maringá – PR	31,4	20,0
CIA. IGUACU DE CAFE SOLUVEL	76.255.926/0001-90	Cornélio Procópio – PR	198,0	126,0
JAGUAFRANGOS IND. E COM. DE ALIMENTOS LTDA	85.090.033/0001-22	Jaguapitã – PR	101	112,0
SEARA ALIMENTOS LTDA	02.914.460/0283-22	Campo Mourão – PR	117	153,0
SEBO PARANAENSE LTDA	22.066.791/0001-95	Nova Esperança – PR	27,9	93,3
BALDISSERA CENT DE TRAT. DE RESID. SOLIDOS, IND	17.338.173/0001-17	Guarapuava - PR	92,9	615,0
GONÇALVES E TORTOLA S/A	85.070.068/0039-72	São Manoel - PR	78,3	21,8
GONCALVES & TORTOLA S/A	85.070.068/0001-08	Maringá – PR	28,7	69,1
STEVIAFARMA INDUSTRIAL S/A	78.363.322/0001-92	Maringá – PR	26,5	42,9
BALDISSERA CENT DE TRAT. DE RESID. SOLIDOS, IND	17.338.173/0001-17	Guarapuava – PR	80	615,0
CTR ITAMBÉ - SANEAMENTO LTDA	10.139.979/0001-37	Itambé - PR	67,9	70,1
KURICA AMBIENTAL S A FILIAL	07.706.588/0002-23	Londrina – PR	145	63,8
TRANSRESIDUOS AMBIENTAL S/A.	77.371.789/0017-89	Maringá – PR	22,9	111,0
PARANÁ AMB. GESTÃO GLOBAL DE RESÍDUOS LTDA	07.911.409/0001-09	Cascavel – PR	30,7	336,0
TRANSRESIDUOS AMBIENTAL S/A.	77.371.789/0017-89	Maringá – PR	30,7	11,0
AMBIENTAL SUL BRASIL	08.738.827/0001-09	Sarandi – PR	43,3	59,0
ARX SANEAMENTO AMBIENTAL EIRELI	59.171.074/0001-33	Assis - SP	40	40,0
BBR AGRO SUPLEMENTOS LTDA.	31.158.176/0001-08	Apucarana – PR	97,9	3,2
FARIMAX IND. E COM. DE FARINHAS EIRELI	28.927.997/0001-49	Sabaudia – PR	79,8	46,6
MARCOS ROPELATTO - ME	17.205.148/0001-65	Paranacity – PR	54,1	113,0
ROMAGNOLI OLEOS VEGETAIS LTDA - EPP	01.998.797/0001-20	Centenário do Sul – PR	101	114,0
VALE RIO AGRO INDUSTRIAL LTDA	02.098.620/0001-30	Apucarana – PR	94,7	40,0
AGROBRASILCHEMICAL - COMERCIAL LTDA	18.773.359/0001-67	Mandaguari – PR	67,7	31,3
AGROQUÍMICA BRASINHA LTDA	05.696.101/0001-62	Nova Esperança PR	27,8	81,3
BR BIO - COMERCIO DE OLEOS LTDA	22.925.207/0001-00	Apucarana – PR	97,8	40,0
LATINA AGRO IND. E COM. DE FERTILIZANTES LTDA	06.287.157/0001-26	Maringá - PR	33,7	72,4
M RIBEIRO SUBPRODUTOS BOVINOS EIRELI	10.459.464/0001-14	Apucarana – PR	97,8	50,9
DIANE PIEROBOM BARTIERI	27.459.088/0001-60	Maringá – PR	36,6	76,2
LATINA AGRO IND. E COM. DE FERTILIZANTES LTDA	06.287.157/0001-26	Maringá – PR	33,7	21,8
SUPER EVOLUTION DO BRASIL EIRELI EPP	00.089.393/0001-51	Maringá – PR	30,7	20,0

SOLABIA BIOTECNOLOGICA LTDA	03.402.014/0001-20	Maringá – PR	39,3	30,4
SYDEBRA FABR. DE PROD. FARMOQUIMICOS LTDA	26.700.656/0001-00	Atalaia – PR	20,9	92,4
WEGMED CAMINHOS MEDICINAIS LTDA	11.933.999/0001-48	Arapongas – PR	105	77,6
S. ALTOÉ TRANSPORTE EIRELI	14.299.733/0001-83	Iguaraçu – PR	30,7	33,4
HIDROGEL AMBIENTAL LTDA	18.770.566/0001-68	Arapongas PR	98,9	36,8
ZERO RESIDUOS LTDA	13.157.214/0001-18	Ponta Grossa – PR	30,8	297,0
BSC QUIMICA LTDA	07.920.916/0002-90	Maringá – PR	31,4	19,4
ISPL – IND. SULAMERICANA DE PROD DE LIMP LTDA	01.125.487/0001-00	Maringá – PR	18,2	50,2
FEITO BRASIL IND. DE PRODUTOS ARTESANAIS LTDA	06.244.957/0001-60	Mandaguaçu – PR	30,7	58,5
QUIMICAGIL IND. E COM. DE PROD DE LIMPEZA LTDA	01.353.037/0001-66	Terra Boa – PR	95,9	91,2
IPC – IND. PARANAENSE DE COSMETICOS LTDA	03.149.136/0001-56	Mandaguaçu – PR	24,6	63,7
E. S. DE JESUS – EQ. DE SEGURANCA EIRELI ME	24.952.817/0001-28	Mandaguaçu – PR	11	57,9
IPC – IND. PARANAENSE DE COSMETICOS LTDA	03.149.136/0001-56	Mandaguaçu – PR	22,7	40,0
POOLTECNICA QUIMICA LTDA.	72.441.454/0001-09	Maringá - PR	24,6	23,2

6.6 Extract of Agreement Between EMTRE and COCAMAR for Biogas Production and Electricity Generation.

PARCERIA COMERCIAL E OPERACIONAL FIRMADA ENTRE COCAMAR COOPERATIVA AGROINDUSTRIAL E EMTRE – EMPRESA MARINGAENSE DE TRATAMENTO DE EFLUENTES LTDA, EM 19/02/2019

Que entre si celebram:

COCAMAR COOPERATIVA AGROINDUSTRIAL, pessoa jurídica de direito privado com sede à Estrada Oswaldo de Moraes Corrêa, nº 1.000, lote 3, saída para Campo Mourão, Maringá-PR., inscrita no CNPJ sob o nº 79.114.450/0001-65, Inscrição Estadual 701.028.59-70, neste ato representada por seus procuradores infra-assinados, doravante denominada **COOPERATIVA.**

EMTRE – EMPRESA MARINGAENSE DE TRATAMENTO DE EFLUENTES LTDA, pessoa jurídica de direito privado com sede na Rua Pioneiro Miguel Jordão Martines nº 859, Parque Industrial Mário Bulhões da Fonseca, na cidade de Maringá-PR, inscrita no CNPJ sob o nº 13.374.868/0001-01, Inscrição Estadual 90.615.740-31, neste ato representada por seus procuradores infra-assinados, doravante denominada EMTRE.

CONSIDERANDO QUE:

1. A **COOPERATIVA** tem interesse de aquisição de energia oriunda de fontes alternativas de geração;
2. A **COOPERATIVA** tem ainda interesse em dar destino ambientalmente adequado a resíduos provenientes de seus processos industriais;
3. A EMTRE possui expertise, licenciamento e corpo técnico habilitado para a destinação de resíduos industriais, como os gerados pela **COCAMAR**;
4. A EMTRE possui expertise e corpo técnico habilitado em produção de Biogás proveniente do tratamento de resíduos líquidos e geração de energia através desse biogás;
5. As partes têm interesses comuns e que se complementam.

Resolvem as Partes firmar o presente instrumento, o qual se regerá pelas cláusulas e condições abaixo.

CLÁUSULA PRIMEIRA – OBJETO

O objeto do presente Instrumento é o estabelecimento de Parceria Comercial/Operacional entre as partes para a destinação de resíduos industriais da **COOPERATIVA** e Terceiros pela EMTRE, produção de Biogás pela EMTRE e geração de energia elétrica pela COCAMAR com a consequente comercialização do biogás para a **COOPERATIVA**, e questões operacionais das referidas operações, de acordo com as condições estabelecidas no presente instrumento.

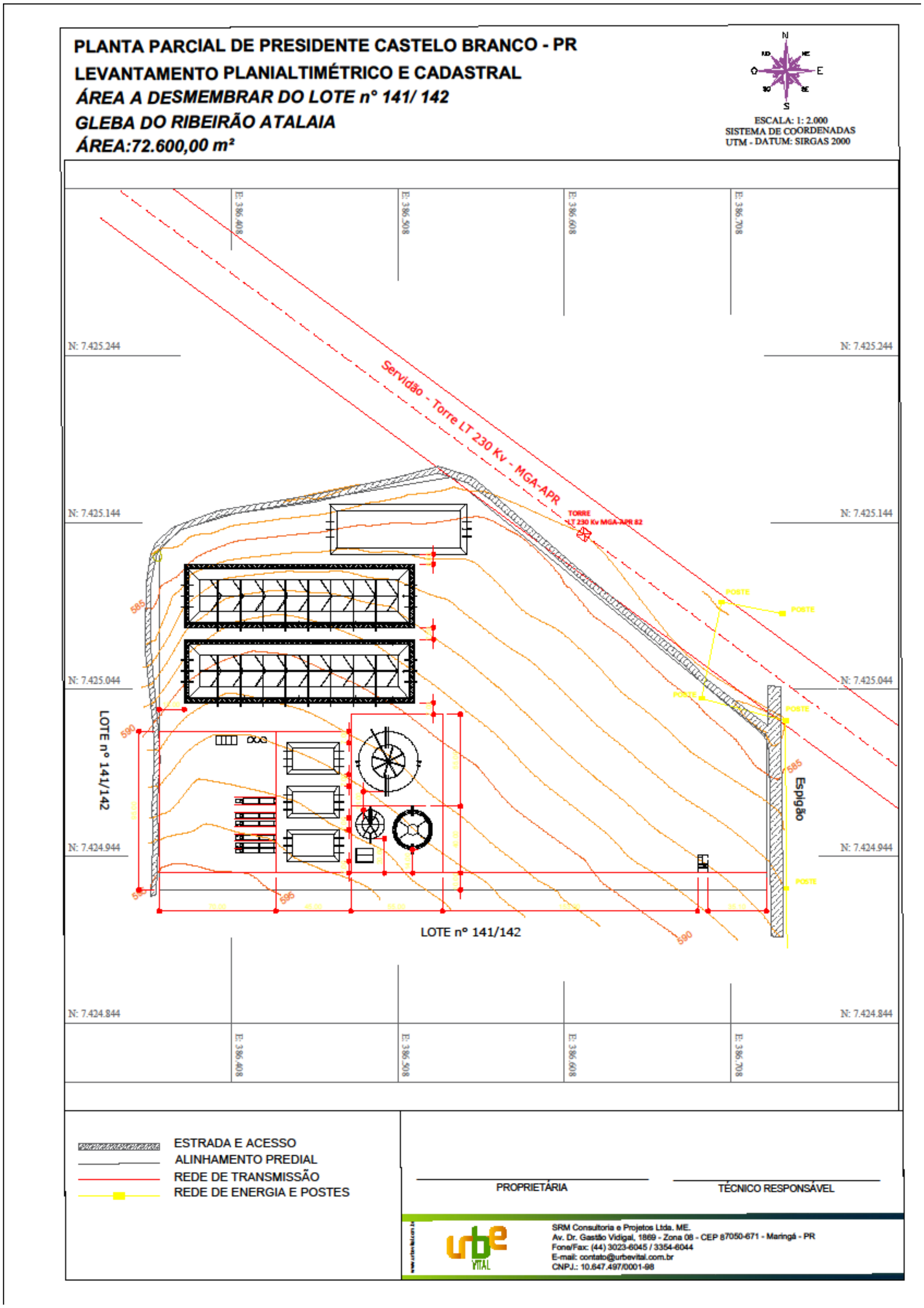
CLÁUSULA SEGUNDA – DA VENDA DO IMÓVEL

Para o desenvolvimento de suas atividades a **EMTRE** necessitará de uma área para a instalação de sua sede e planta de geração de Biogás.

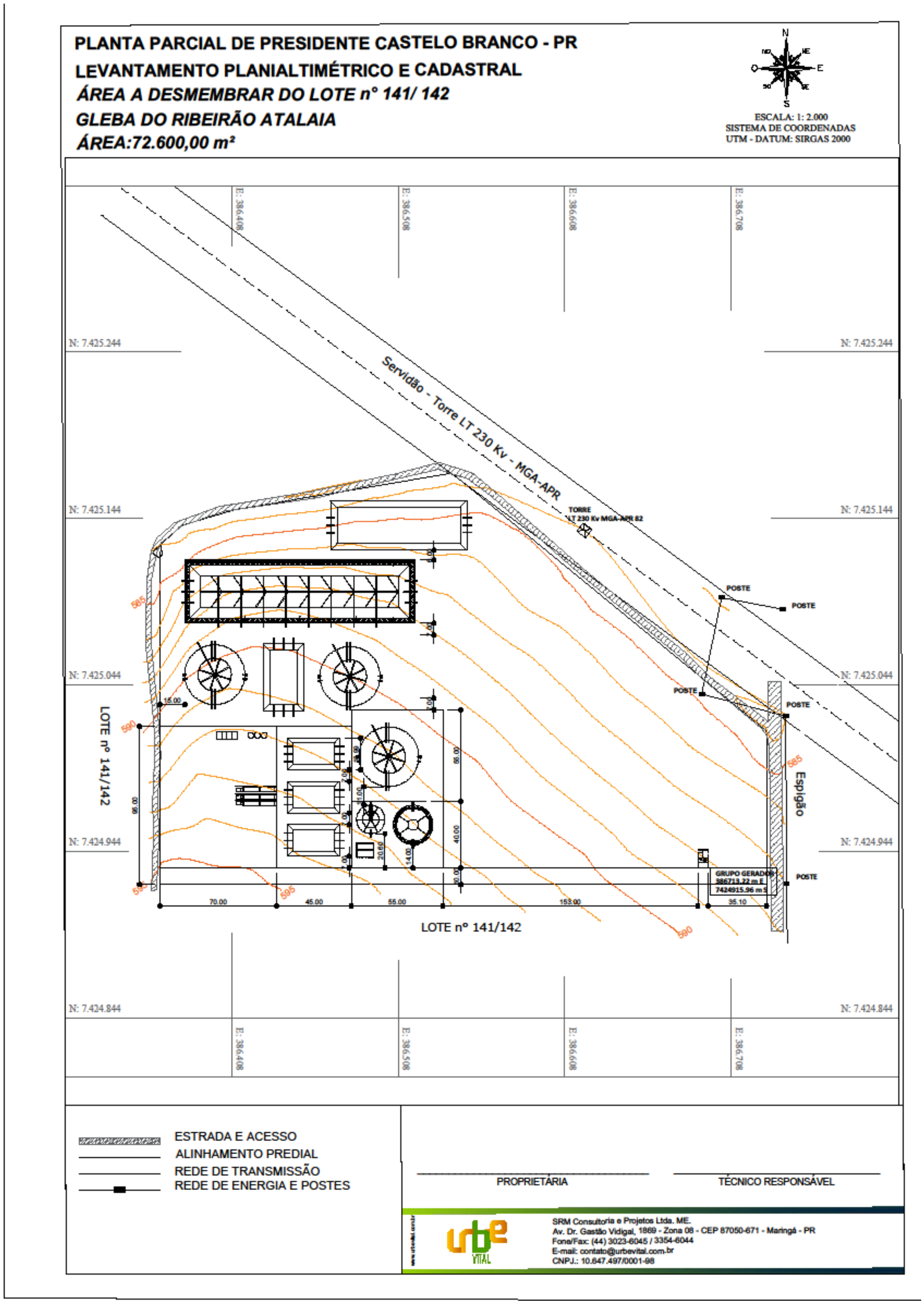
A **COOPERATIVA** tem a possibilidade de vender à EMTRE uma área com 03 (três) alqueires Paulistas, destacados de uma área maior pertencente à parte dos Lotes 141 e

1

6.7 Wastewater Treatment Unit Layout Plan



Power Generators Layout Plan



6.8 Technical References

1. *United Nations Climate Change - UNFCCC CDM Methodologies (AMS-III.H. Small-scale Methodology Methane recovery in wastewater treatment. Version 19.0)*
2. *United Nations - Department of Economic and Social Affairs Sustainable Development (Sustainable Development Goals)*
3. Cervi, R., Esperancini, M., and Bueno, O. Viabilidade econômica da utilização do biogás produzido em granja suinícola para geração de energia elétrica. Engenharia Agrícola, Jaboticabal, v.30, n.5, p.831-844, set./out. 2010.