



Monitoring Report

CARBON OFFSET UNIT (CoU) PROJECT



Title: 90 MW Sugarcane Bagasse based co-generation Energy BEVAP Bioenergia

Version 1.0

Date July 11, 2025

First CoU Issuance Period: 12 years

Date: Jan 01, 2013 to Dec 31, 2024



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

Monitoring Report	
Title of the project activity	90 MW Sugarcane Bagasse based co-generation Energy BEVAP Bioenergia
UCR Project Registration Number	530
Version	Version 1
Completion date of the MR	July 11, 2025
Monitoring period number and duration of this monitoring period	Monitoring Period Number: 1 Duration of this monitoring Period: (first and last days included (01/01/2013 to 31/12/2024)
Project participants	BEVAP BIOENERGIA (OWNER) FASTCARBON (AGGREGATOR)
Host Party	Brazil
Applied methodologies and standardized baselines	CDMUNFCCC Methodology ACM0006: Electricity and heat generation from biomass (Ver.16) &UCR Standard for Emission Factor
Sectoral scopes	01- Energy industries (renewable -/ non-renewable sources)
Estimated amount of GHG emission reductions for this monitoring period in the registered PCN	2013: 66,557 CoUs (66,557 tCO ₂ eq)
	2014: 77,478 CoUs (77,478 tCO ₂ eq)
	2015: 94,601 CoUs (94,601 tCO ₂ eq)
	2016: 78,221 CoUs (78,221 tCO ₂ eq)
	2017: 72,419 CoUs (72,419 tCO ₂ eq)
	2018: 96,934 CoUs (96,934 tCO ₂ eq)
	2019: 83,090 CoUs (83,090 tCO ₂ eq)
	2020: 56,530 CoUs (56,530 tCO ₂ eq)
	2021: 65,529 CoUs (65,529 tCO ₂ eq)
	2022: 38,466 CoUs (38,466 tCO ₂ eq)
	2023: 31,496 CoUs (31,496 tCO ₂ eq)
	2024: 42,346 CoUs (42,346 tCO ₂ eq)
Total:	803,667 CoUs (803,667 tCO ₂ eq)

SECTION A. Description of project activity

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

a) Purpose of the project activity and the measures taken for GHG emission reductions >>

The project titled “90 MW Sugarcane Bagasse based co-generation Energy BEVAP Bioenergia” is composed of a sugar cane plant, located in the city of João Pinheiro in the state of Minas Gerais, Brazil.

The Bevap project was born with 3 machines registered with Bevap, with powers of 25/25/30 MW (see ordinance PRT2009126 MME).

Subsequently, Bevap decided to create Enervale, which, in lending, acquired the right to use the condensation machine (UG3), purchasing steam from Bevap.

Subsequently, the UG1 turbine underwent retrofitting, changing its power from 25 MW to 30 MW. With this, they established the two generating UTEs, granted by resolutions REA20112925 (Bevap – 60MW) and REA20123439 (Enervale – 30 MW).

Unit	Installed Capacity	Location	Commercial Operation Date
UTE Bioenergética Vale do Paracatu (BEVAP), UG01	30 MW	João Pinheiro, Minas Gerais	February 15, 2011
UTE Bioenergética Vale do Paracatu (BEVAP), UG02	30 MW	João Pinheiro, Minas Gerais	October 29, 2011
UTE Enervale	30 MW	João Pinheiro, Minas Gerais	July 26, 2012

The details of the registered project are as follows:

Purpose of the project activity:

The purpose of the activity is to generate electricity using renewable biomass (sugarcane bagasse, which is the residue from the juice extraction process for the production of ethanol and sugar), and, thus, reduce GHG emissions by displacing fossil fuel in grid-based electricity.

It is a grid-connected biomass cogeneration power plant with a high-pressure steam-turbine configuration. The high-pressure boilers are fired by bagasse to generate steam which in turn is fed to the steam turbine to generate power. The power co-generation units generate biomass-based power for captive consumption of the sugar plant and the sale of surplus power to the Brazilian electricity grid.

The UCR Project activity is the construction and operation of power plants/units that use renewable energy sources and supplies renewable electricity to the grid. The UCR project activity is thus the displacement of electricity that would be provided to the grid by more-GHG-intensive means and

provides long-term benefits to the mitigation of climate change. The UCR project activity qualifies under the environmental additional positive list of pre-approved project types under the UCR carbon incentive model for issuance of voluntary carbon credits.

The activity currently consumes more of 800 thousand tons of biomass for generation clean energy and produces more than 270,000 MWh of electrical energy per year and, of this total, and 150,000 MWh are injected into the Brazilian electrical system, enough to supply a city of approximately 69,000 inhabitants, and thereby contributes to climate change mitigation efforts.

João Pinheiro Plant:

Bevap is a sugarcane processing industry and operates on three major business fronts: production and marketing of crystal sugar and VHP, anhydrous and hydrated ethanol, and cogeneration of electricity. The company's competitiveness is structured around a strategy that seeks to promote innovative and sustainable operations, based on the highest standards of corporate governance, the adoption of best practices in agricultural management, food production and renewable fuels. The company's development is based on its socio-environmental responsibility, promoting human development and environmental preservation, increasingly aligned with the dynamism of the ESG agenda and the demands of customers and business partners.

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

1. Implementation Status of the Project Activity

The BEVAP Bioenergia project is a 90 MW sugarcane bagasse-based cogeneration energy system composed of:

UTE Bioenergética Vale do Paracatu (BEVAP), UG01: 30 MW, operational since February 15, 2011.
UTE Bioenergética Vale do Paracatu (BEVAP), UG02: 30 MW, operational since October 29, 2011.
UTE Enervale: 30 MW, operational since July 26, 2012.

The project is fully implemented and operational, supplying renewable electricity to the Brazilian national grid and for captive consumption within the industrial units.

2. Installed Technology and Equipment

The project activity is a grid-connected biomass cogeneration power plant, using high-pressure steam turbine technology. The process follows the Rankine cycle for efficient energy conversion, with the main steps as follows:

Combustion of Sugarcane Bagasse: Biomass residue from sugarcane processing is burned in high-pressure boilers.

Steam Generation: The combustion process generates steam at high temperatures and pressure.

Electricity Generation: The steam drives high-efficiency extraction-condensing steam turbines, which are connected to alternators to produce electricity.

Main Components:

Boilers (Sermatec):

Nº 01 and Nº 02: 2 x 200 TPH (tons per hour), 67 kgf/cm², 510°C.

Turbines (TGM Turbinas):

Nº 01 and Nº 02: 2 units, 25,846 kW, 63 bar, 500°C.

Nº 03: 31,047 kW, 63 bar, 500°C.

Alternators (WEG):

Nº 01 and Nº 02: 2 units, 31,250 kW each, 13,800 V, 60 Hz.

Nº 03: 1 unit, 37,500 kW, 13,800 V, 60 Hz.

Auxiliary Systems:

Fuel and ash handling equipment.

Water-cooled condenser system.

Electrical and automation systems.

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

The BEVAP Bioenergia project consists of one biomass cogeneration plants that have been operational for several years, supplying renewable electricity to the Brazilian national grid and for captive consumption. The relevant dates for the project activity are as follows:

Unit	License Date	Commercial Operation Date
UTE Bioenergética Vale do Paracatu (BEVAP), UG01	October 26, 2010	February 15, 2011
UTE Bioenergética Vale do Paracatu (BEVAP), UG02	October 26, 2010	October 29, 2011
UTE Enervale	October 26, 2010	July 26, 2012

UCR Project ID: UCR ID Number: 530

Start Date of Crediting Period: Jan 01, 2013.

End Date of Crediting Period: Dec 31, 2024.

Monitoring Period: Jan 01, 2013 to Dec 31, 2024.

The project has been in continued operation since its commissioning, consistently generating renewable energy and contributing to greenhouse gas (GHG) emission reductions through the displacement of fossil fuel-based electricity.

d) Total GHG emission reductions achieved or net anthropogenic GHG removals by sinks achieved in this monitoring period>>

The total GHG emission reductions achieved in this monitoring period is as follows:

Summary of the Project Activity and ERs Generated for the Monitoring Period	
Start date of this Monitoring Period	Jan 01, 2013
Carbon credits claimed up to	Dec 31, 2024
Total ERs generated (tCO _{2eq})	803,667 tCO _{2eq}
Leakage	0

e) Baseline Scenario>>

The electricity supplied to the grid by the BEVAP Bioenergia (project activity) that would have otherwise been generated by fossil-fuel-fed powerplants connected to the national grid, which are carbon intensive sources of electricity generation.

A.2. Location of project activity>>

Country: Brazil
District: João Pinheiro
State: Minas Gerais
Zip Code: 38770-000

Latitude: -17.0622°
Longitude: -46.1836°



A.3. Parties and project participants >>

Party (Host)	Participants
Brazil	Owner: Bioenergética Vale do Paracatu – BEVAP Bioenergia Rodovia MG-181 - Km 85 Estrada da Fazenda São Geraldo João Pinheiro – MG Zip Code: 38770-970 https://www.bevapbioenergia.com.br/ Aggregator: FastCarbon Consultoria e Negócios Ltda Rua Viradouro, 63, conjunto 61, Itaim Bibi São Paulo/SP Zip Code: 04538-110 https://fastcarbon.com.br

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

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

TYPE: II - Larger renewable energy or energy efficiency projects. (Biomass Energy)

CATEGORY: CDMUNFCCC Methodology ACM0006: Electricity and heat generation from biomass (Ver.16) &UCR Standard for Emission Factor

Applied Standardized Baselines:

The project follows the UCR Standard for Emission Factor, using the combined margin emission factor for the Brazilian electricity grid, as defined by the UNFCCC methodology:

Tool to calculate the emission factor for an electricity system (Version 7.0)

The grid emission factor is calculated as per the methodology defined in this tool.

Reference: UNFCCC CDM Tool.

(<https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf>)

Applicability of Methodologies and Standardized Baselines

The project meets all applicability conditions of the selected methodology.

The project activity is a biomass (bagasse)-based cogeneration system, generating both electricity and process heat, and exporting surplus electricity to the grid.

The biomass used (sugarcane bagasse) is a residue from the sugar and ethanol production process and does not come from dedicated plantations.

The project does not involve co-firing of fossil fuels beyond the allowed limit ($\leq 25\%$) as per UCR protocol.

The project displaces grid electricity that would otherwise be generated using fossil fuels, thus contributing to GHG emission reductions.

The total installed capacity of 90 MW qualifies under the large-scale methodology ACM0006, and the emissions are capped accordingly.

The project fully complies with UCR and UNFCCC methodologies, ensuring robust and transparent emission reduction calculations.

A.5. Crediting period of project activity >>

Length of the crediting period corresponding to this monitoring period: 12 years – Jan 01, 2013-Dec 31, 2024

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

Name: Fábio Bressani Ribeiro

Company (Aggregator): FastCarbon

Mobile: +55 11 99884 6428

E-mail: fabio.bressani@fastcarbon.com.br

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity >>

a) Provide information on the implementation status of the project activity during this monitoring period in accordance with UCR PCN>>

BEVAP Bioenergia is operational since 2007 when it received the clearance (Operation License) from the Environmental Entity from the State of Goiás. The authorization for grid power injection from the National Electrical Energy Agency (ANEEL) for the first Generator Unit in February 15, 2011 for UG01, with 25MW and the second one October 29, 2011 for UG02, with 30MW. The third generating unit, Bioenergética Enervale, with 30 MW, was authorized on October 29, 2011.

Below are the orders, ordinances and resolutions that were obtained in chronological order, documents that are public and available for verification:

- PORTARIA Nº 126, DE 17 DE MARÇO DE 2009 - PRT 2009126 MME – PIE Concession for Bevap - REA20112925 – Capacity Reduction of BEVAP;
- Operating license 020/2010
- DESPACHO Nº 570, DE 14 DE FEVEREIRO DE 2011 - ANEEL Dispatch – Commercial Operation of UG1 Bevap;
- RESOLUÇÃO AUTORIZATIVA Nº 2.925, DE 31 DE MAIO DE 2011;
- DESPACHO Nº 4.230, DE 28 DE OUTUBRO DE 2011 - ANEEL Dispatch – Commercial Operation of UG 02;
- RESOLUÇÃO AUTORIZATIVA Nº 3.439, DE 10 DE ABRIL DE 2012 - PIE ENERVALE Concession – REA20123439;
- 31. LICENSE CERTIFICATE 067-2019 (OWNERSHIP CHANGED);

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

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

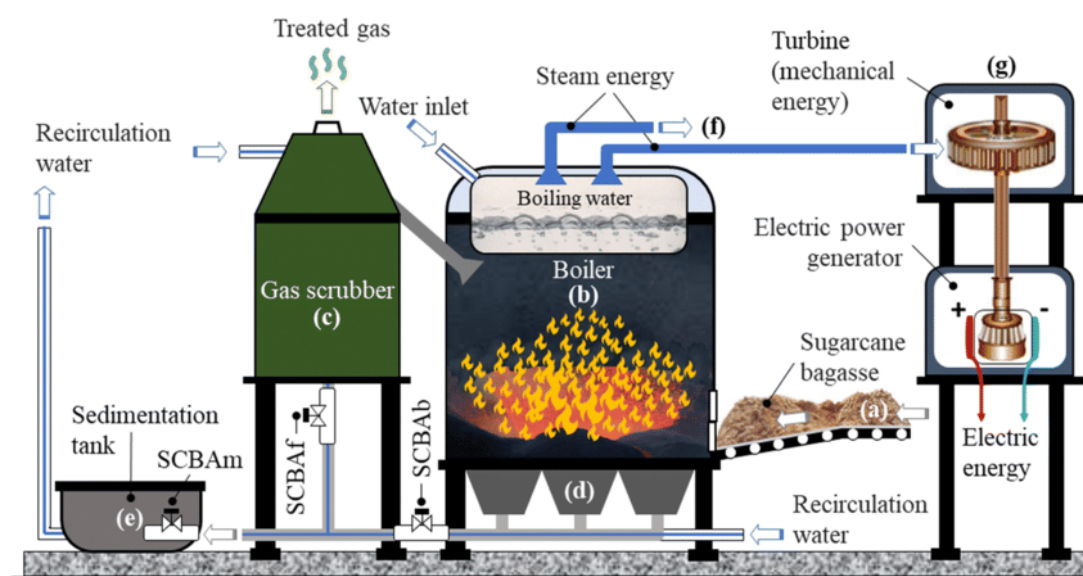
The primary technology for the project activity is direct combustion of biomass residues, and power generation using the Rankine cycle technology. Power generation through this method involves combustion of biomass residues directly in the boiler, which is capable to generate high-pressure high-temperature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

The main elements of the power plant are as follows.

- A boiler unit which converts the energy available in the fuels into thermal energy;
- A steam turbine unit which converts thermal energy into mechanical energy;
- An alternator unit, which converts mechanical energy into electrical power.

A number of other equipment components, as listed below, also form part of the biomass power plant.

- Fuel and ash handling equipment
- Water cooled condenser system for cooling the exhaust steam
- DM Water system and Air Compressor Plant
- Electrical systems and Automation system



João Pinheiro Plant:



Boilers



Powerhouse



Power Generator 1 and 2



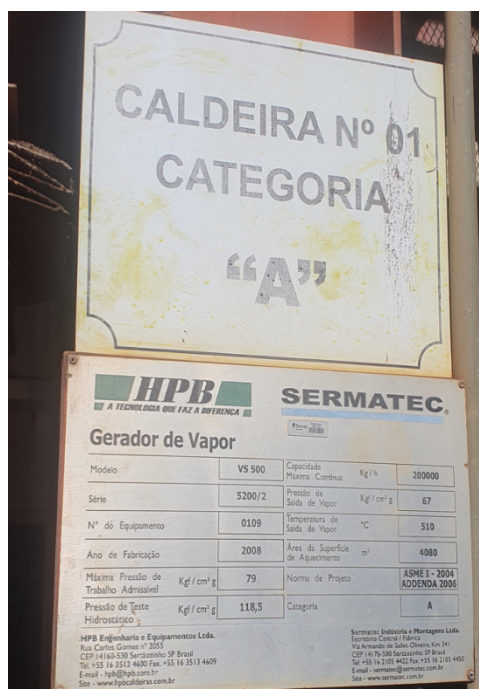
Power Generator 1, 2 and 3



Sugarcane bagasse stock

The system consists of three energy generating units, which are supplied by two boilers:

Boiler	Nº 01	Nº 02
Manufacturer	HPB Engenharia / Sermatec	Sermatec - Zanini
Capacity (Tons/h)	200	200
Serial number	5200/2 / 0109	7.6315
Year of manufacturer	2008	2010
Maximum allowable working pressure (kgf/cm ² g)	79	79
Hydrostatic Test Pressure (kgf/cm ² g)	118,5	118,5
Pressure (kgf/cm ²)	67	67
Degree of super heat °C (Steam)	510	510
Heating surface area (m ²)	4080	4080
Design Standard	ASME I -2004 ADDENDA 2006	ASME I -2004 ADDENDA 2005
category	A	A



Boiler nº 1



Boiler nº 2

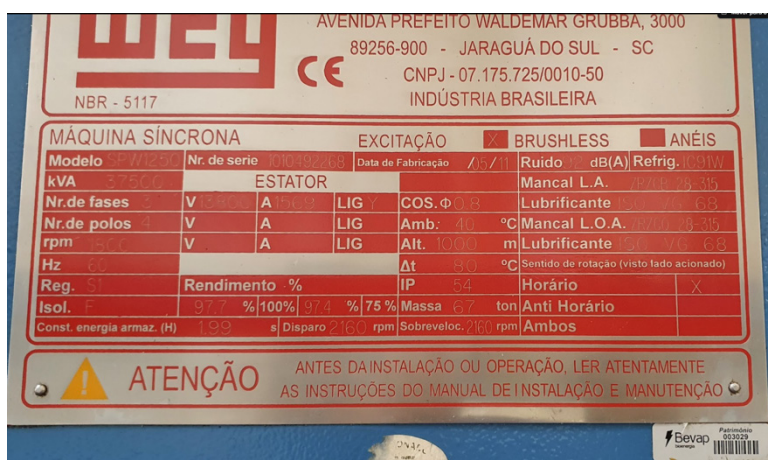
Alternator/ Generator	Nº 1	Nº 2	Nº 3
Year of manufacturer	July 2009	April 2011	May 2011
Manufacturer	WEG	WEG	WEG
Power Rated (kVA)	31,250	31,250	37,500
Serial Number	1004488514	1010184150	1010492268
Voltage (V)	13,800	13,800	13,800
Current (Amps)	1,307	2,092	2,092
Power Factor (cos φ)	0.80	0.80	0.80
Efficiency (25%, 50%, 75%, 100% of load)	75%, 97.5%, 100%, 97.8%	75%, 97.6%, 100%, 97.9%	75%, 97.4%, 100%, 97.7%
Generator Rated Speed (rpm)	1,800	1,800	1,800
Frequency (Hz)	60	60	60
Generator Model	SPW 1120	SPW 1120	SPW 1250



Alternator/ Generator nº 1

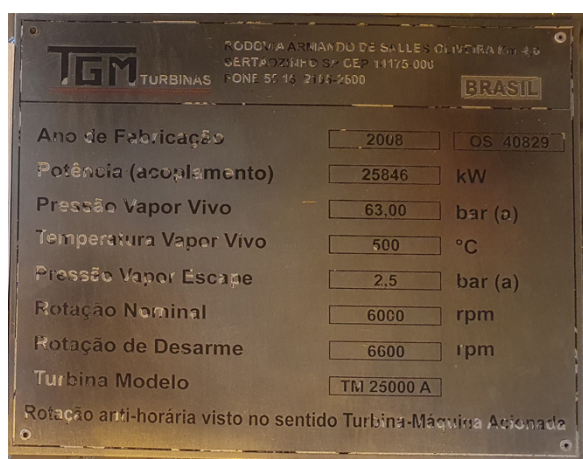


Alternator/ Generator nº 2

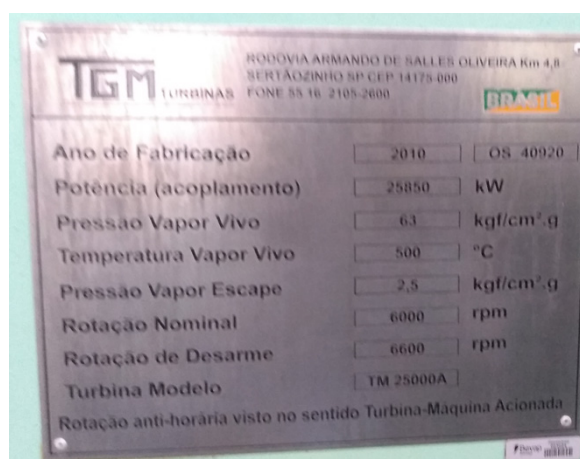


Alternator/ Generator nº 3

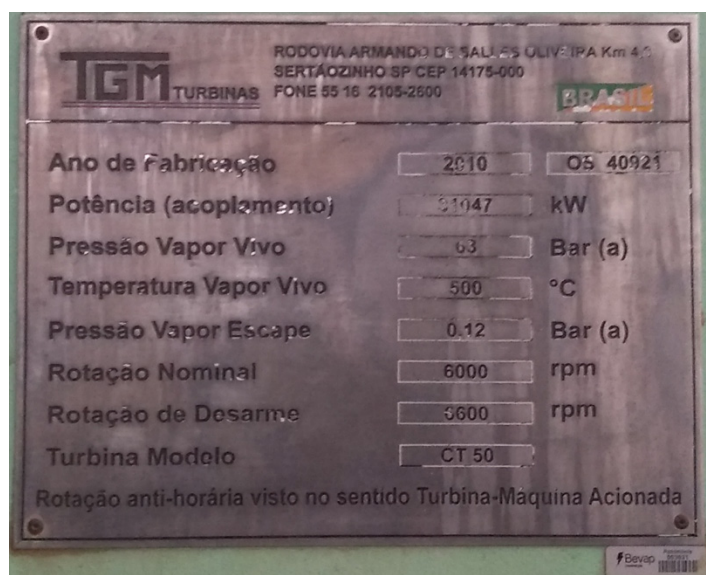
Turbine	Nº 1	Nº 2	Nº 3
Year of manufacturer	2008	2010	2010
Manufacturer	TGM Turbinas	TGM Turbinas	TGM Turbinas
Power Rated (kW)	25,846	25,850	31,047
Live Steam Pressure (Bar)	63	63	63
Live Steam Temperature (°C)	500	500	500
Steam Exhaust Pressure (Bar)	2.5	2.5	2.5
Turbine Rated Speed (rpm)	6,000	6,000	6,000
Turbine Disarm Speed (rpm)	6,600	6,600	6,600
Turbine Model	TM 25000 A	TM 25000 A	CT 50



Turbine nº 1



Turbine nº 2



Turbine nº 3

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

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

- **Social benefits:**

- The project activity contributes to employment generation in the local area. Currently, Bevap employs more than 1,840 people in the agricultural, industrial and administrative areas. The main strategy of Bevap's Human Resources area is to cultivate a people-driven work environment, developing and preparing employees to enhance performance with a focus on delivering results. The preparation of employees goes beyond strategic planning; it includes the benefits achieved by investments in human development. Bevap offered 86,168 training hours to its employees in the 2023/2024 Harvest.
- Bevap has a substantial impact on job creation and local revenues. In addition, generating business with producers of all sizes affects the purchasing power and quality of life of many families in the community. To further enhance the promotion of regional development, the company invests in specific projects and actions of a social nature. The projects offer access to education, professional training, culture, income generation and increase in the quality of life in the municipalities surrounding its operations: Brasilândia de Minas, Paracatu, Unaí and João Pinheiro.
- The Bevap Cultural Project fosters art and culture in the Northwest region of the state of Minas Gerais, especially in the cities of Brasilândia de Minas and João Pinheiro. Through various free cultural activities, the event provides opportunities for the community to participate in courses, workshops, conversation circles, artistic presentations, concerts, musicals, dance, theater, literature, painting, making musical instruments with recyclable materials and circus, through free activities for all ages. Bevap Cultural is a large event that integrates art and education with a strong economic impact on the municipalities where it is held.

- **Environmental benefits:**

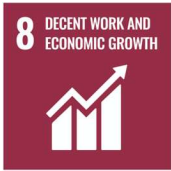
- Avoids global and local environmental pollution, leading to reduction of GHG emissions.
- Bevap considers environmental conservation to be a material and priority topic. The company invests in the best technological practices that support the mitigation of its impacts. It is an assiduous and active participant in associations and outside committees that guide the resources involved in its operations and consistently promotes actions that seek to foster environmental awareness of its internal and external audiences. The company offers the Green Line, an exclusive communication channel for registering issues related to the environment and sustainability. In the 2023/2024 Harvest period, the company registered 108 contacts, all properly handled and resolved.
- Promote the recovery of degraded areas and reforestation actions according to the characteristics of the region.
- Develop actions aimed at its different stakeholders that promote awareness of the conscious and rational use of natural resources.
- Perform pest control periodically, prioritizing good agronomic practices and focusing on safe food.
- Monitor and respect the legally required percentage of protected areas and, when necessary, implement appropriate environmental compensation.

- Ensure full compliance with all relevant environmental licenses and legislation applicable to its businesses.
- Monitor and manage plants and programs that address their atmospheric emissions, effluents, waste and water management.
- The focus on efficient water resource usage extends to the industrial plant as well. All the water from the initial processing of sugarcane is reused in other processes of the industry, such as closed cooling systems and the reuse of condensation, which in this harvest reached the recovery of 97% of the condensed water.
- All residues from its processing, bagasse, vinasse, filter cake and ash, are used as fertilizers or by-products. The company embraces this concept because, in addition to reusing productive waste that would otherwise require treatment or disposal, it reduces dependence on natural resources, ensuring continuity in its production processes.
- Bevap produces anhydrous ethanol and hydrated ethanol derived from sugar cane. Since these products are all plant-based, their biofuel is renewable and sustainable. In addition to the socio-economic benefits, ethanol is less harmful to the environment than fossil fuels, such as gasoline. That is why carbon emissions are lower, both in the manufacturing process and in final use. Nowadays, Bevap Bioenergia produces 86,000 m³ of fuel per year, distributed into anhydrous ethanol, used as an additive for gasoline, and hydrated ethanol, which is commercialized as final fuel for vehicles.
- **Economic benefits:**
 - Greater supply of cheap energy, ensuring the development of the region.
 - Ensure the growth of region where Bevap is installed, providing clean and cheaper energy, ensuring the creation of jobs and business opportunities.
 - Low-cost energy to consumers.
 - Clean technology development in Brazil.
 - Investments in new technologies.
 - Investment in responsible consumption and production actions.

Bevap contribute significantly to economic, environmental and social matters, however, stands out as it contributed to 16 SDG's.

SDG	Target	How was it achieved?
	1.1 - By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.90 a day	Income generation through the creation of more than 1,800 jobs and training of workers to the job.
	2.4 - By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality	The company adopts sustainable agricultural practices, such as the use of organomineral fertilizers and Integrated Pest Management, contributing to more sustainable agriculture.

	3.8 - Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all	Provides health plans for all employees, offers a medical outpatient clinic and provides the assistance of a nursing team 24 hours a day. In addition, three times a week, a doctor is available to employees and third parties workers for consultations, including electives
	4.3 - By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, at affordable prices, including university 4.4 - By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship	Investment in training and development programs, such as Plataforma Crescer, which offered 17,810 hours of training in the 2023/2024 Harvest. Offered training to more than 50 Brasilândia de Minas residents, promoting professional qualification and strengthening of the local workforce. The Young Apprentice Program offers professional training opportunities for young people in the community.
	5.5 - Ensure women's full and effective participation and equal opportunities for leadership at all levels of decisionmaking in political, economic and public life	The company values gender diversity and is committed to promoting an inclusive and equitable environment. To support this, it invests in creating affirmative opportunities for women and in their professional development. The female presence inspires other professionals and supports empowerment so that they can gain independence and take more charge of their lives.
	6.4 - By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity	Implements efficient water management practices, such as the use of automated irrigation systems and monitoring of water availability in waterways. All the water from the initial processing of sugarcane is reused in other processes of the industry, such as closed cooling systems and the reuse of condensation, which in this harvest reached the recovery of 97% of the condensed water.

	7.2 - By 2030, increase substantially the share of renewable energy in the global energy mix.	Clean Energy Generation
	8.3 - Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services. 8.8 - Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment	Generation of 1,840 jobs. The company implemented programs such as PAS (Safe Attitude Program) and Befit, aiming to improve the health and safety of employees. The company created the Human and Organizational Development (DHO) area. This initiative reflects the company's commitment to promote employee well-being and strengthen organizational culture.
	9.1 - Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all 9.4 - By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities	A modern industry installed in an area of 130 hectares and uses advanced technology in its operations, such as the Industrial Operations Center (COI) and the Agricultural Operations Center (COA). Bevap employs autopilot equipment in its operations, aiming to reduce trampling and soil compaction.
	10.2 - By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status	Bevap signed the UN Declaration of Women's Empowerment Principles, with the aim of empowering women and promoting gender equality, thus ensuring the effective strengthening of economies, boosting business, improving the quality of life of women, men and children, and for sustainable development.

	11.a - Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning	Internet for All: the company guaranteed internet access to several municipalities in the region with the installation of a 4G antenna.
	12.2 - By 2030, achieve the sustainable management and efficient use of natural resources 12.5 - By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse	Waste management practices, including a dedicated center for receiving and sorting solid waste.
	13.2 – Integrate climate change measures into national policies, strategies and planning.	it has certifications such as RenovaBio and ISCC, which attest to compliance with environmental and sustainability criteria. Furthermore, the production of biofuels and renewable energy contributes to the reduction of greenhouse gas emissions.
	15.1 - By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements. 15.2 - By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally. 15.5 – Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species	In the last 7 years, more than 55,400 seedlings were planted in a total area of interventions that exceeded 12 hectares. More than 18,000 hectares of Legal Reserves and Permanent Protection Areas All species that were critically endangered or threatened with extinction no longer fall within this level of risk.
	16.6 - Develop effective, accountable and transparent institutions at all levels	Code of Ethics and Conduct and a Reporting Channel, promoting transparency and integrity in its operations.

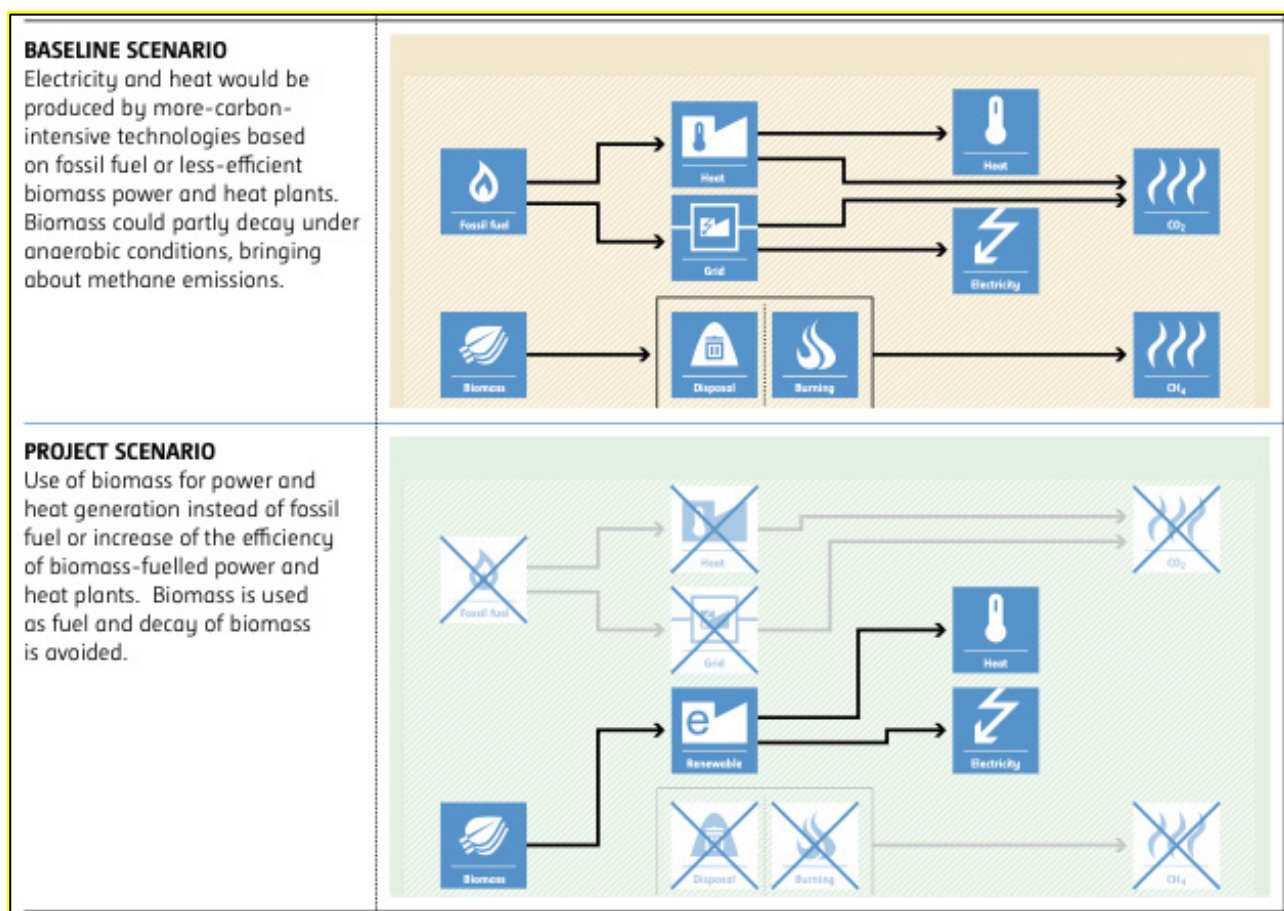
17 PARTNERSHIPS FOR THE GOALS 	17.17 - Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships	The company maintains partnerships with institutions such as the State Forestry Institute (IEF) for restoration and reforestation initiatives.
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B.3. Baseline Emissions>>

The baseline scenario identified in this Monitoring Report of the project activity is:

- The project activity involves generating clean energy from biomass source and supply it to the national grid. In the absence of the project activity, the equivalent amount of power would have been supplied by national grid-connected power plants and by the addition of other-more-GHG-intensive generation sources.

ACM0006 Electricity and heat generation from biomass



Thus, this project activity was a voluntary investment which replaced equivalent amount of electricity from the Brazilian grid. The project proponent was not bound to incur this investment as it was not mandatory by national and sectoral policies. Thus, the continued operation of the project activity would continue to replace fossil fuel-based power plants and fight against the impacts of climate change. The Project Proponent hopes that carbon revenues from 2013-2024 accumulated as a result of carbon credits generated will help repay the investments and help in the continued maintenance of this project activity.

B.4. Debundling>>

This “90 MW Sugarcane Bagasse based co-generation Energy BEVAP Bioenergia” project is not a debundled component of a larger project activity.

There is no registered large-scale UCR project activity or a request for registration by another small-scale project activity:

- By the same project participants;
- In the same project category and technology/measure; and
- Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point.

SECTION C. Application of methodologies and standardized baselines

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

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

TYPE II - Larger renewable energy or energy efficiency projects. (Biomass Energy)

CATEGORY - ACM0006: “Electricity and heat generation from biomass” Version 16.0 & UCR Standard for Emission Factor

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

This methodology is applicable to project activities that operate biomass (co-gen) fired power and heat plants.

The project activity is a power generation project using a biomass (bagasse) and displaces CO₂ emissions from electricity generation in power plants that are displaced due to the project activity. Since the project activity utilizes biomass (bagasse) for the generation of power and supplies it to the local grid, it displaces fossil fuel, and hence it meets the primary applicability criteria of the methodology.

The project activity is a power plant that encompasses cogeneration plants, i.e. power plant in which at least one heat engine simultaneously generates both process heat and power. The total installed capacity of project activity is 90 MW which is acceptable as per the applied large scale methodology.

The installation of a new biomass residue fired power generation unit, which are places existing power generation capacity fired with fossil fuel as in the project plant (power capacity expansion projects) is also included in this methodology.
For the purposes of this methodology, heat does not include waste heat, i.e. heat that is transferred to the environment without utilization, for example, heating flue gas, heat transferred to cooling towers or any other heat losses.
The biomass used by the project plant is not stored for more than one year. The biomass used by the project plant is not processed chemically or biologically (e.g. through esterification, fermentation, hydrolysis, pyrolysis, bio-or chemical degradation, etc.) prior to combustion.
The Project Activity uses biomass residues from a production process (e.g. production of sugar and ethanol), and the implementation of the project does not result in an increase of the processing capacity of (the industrial facility generating the residues) raw input (e.g. sugar and ethanol) or in other substantial changes (e.g. product change) in this process.
The project activity unit does not co-fire fossil fuel and/or does not exceed the limit of 25% co-firing fossil fuel criteria as per the UCR Protocol for such projects.
Bio-mass generated power is used for direct grid supply and for meeting the captive need facility. The project activity is involving the grid-connected bagasse based electricity generation capacity involving the installation of facilities for all owing the export of electricity to the regional grid.
Bio-mass is not sourced from dedicated plantations. The existing installed turbo-generators are fired by bagasse, a by-product of the sugarcane processing and ethanol, a biomass residue
Bagasse is burnt in boilers as generated from the sugar mill and does not require any specific technology for its preparation before combustion. No fuel preparation equipment has been installed at site for preparation of bagasse. Hence no significant energy quantities are required to prepare the biomass residues for fuel combustion.
The project activity also does not include any GHG emissions related to the decomposition or burning of biomass. The baseline heat emissions for the project activity are not included in the project boundary nor does it claim for emission reductions from heat.

C.3 Applicability of double counting emission reductions >>

The project is not registered in any other GHG mechanism. Hence, there will not be any double counting possibility.

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

BEVAP Bioenergia is not certified for i-RECs generation.

BEVAP Bioenergia is also certified by Renovabio, which is the Brazilian National Biofuels Program, created to encourage the production and use of sustainable biofuels, such as ethanol and biodiesel, replacing gasoline and diesel, which are more polluting fossil fuels. The lower the carbon intensity of the biofuel, the greater the difference in relation to fossil fuels, resulting in certificates called CBIOS, which can be traded. The impact of exported energy on the number of CBIOS is very small compared to other factors such as agricultural and industrial efficiency, and it's not the focus of Renovabio certification. Exported energy is just one of many factors considered.

Although RenovaBio and the carbon credit certification system have similar objectives with regard to decarbonization, they are different programs and work in different ways, with their own regulations and mechanisms. However, to adopt a conservative position and avoid double counting, the percentage of Carbon Credits will be deducted here in this program, in the same proportion in which the exported energy boosted the generation of CBIOS, in the respective periods in which they were generated:

UTE Bioenergética Vale do Paracatu: May, 2020 to December, 2024: resulting in a reduction of 9,445 CoUs.

UTE Enervale: May, 2020 to December, 2024: resulting in a reduction of 2,388 CoUs

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

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

- All plants generation power located at the project site.
- All power plants connected physically to the electricity system (grid) that the projects plant is connected to.
- The means of transportation of biomass to the project site if the feedstock is biomass residues, the site where the biomass residues would have been left for or dumped.

Leakage Emissions (LE_y)

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

Hence $LE_y = 0$

Scenario	Source	GHG	Included?	Justification/Explanation
Baseline	Grid Connected Electricity Generation	CO ₂	Yes	Main emission source
		CH ₄	No	Not identified in the baseline methodology
		N ₂ O	No	Not identified in the baseline methodology
Project Activity	Sugarcane Bagasse based co-generation Activity	CO ₂	No	Zero-emissions grid connected electricity generation from renewable energy
		CH ₄	No	Zero-emissions grid connected electricity generation from renewable energy
		N ₂ O	No	Zero-emissions grid connected electricity generation from renewable energy

Project Emissions (PE_y)

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

N₂O Excluded simplification. conservative

This is

- CO₂ emissions from transportation of biomass residue to the project site
- CO₂ emissions from on-site consumption of fossil fuels due to project activity
- CO₂ emissions from electricity consumption at the project site that is attributable to the project activity and
- CH₄ emissions from combustion of biomass.

Where,

PET_y = are the CO₂ emissions during the year y due to transport of the biomass to the project plant in tons of CO₂,

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

PEEC_y = are the CO₂ emissions during the year y due to electricity consumption at the project site that is attributable to the project activity in tons of CO₂,

GWPC_{H4} = is the Global Warming Potential for methane valid for the relevant commitment period and,

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

Hence,

$PET_y = 0$, $PEFF_{CO_2,y} = 0$, $PEEC_{y,y} = 0$ and, $PE_{Biomass,CH_4,y} = 0$.

Therefore, $PE_y = 0$.

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

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

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

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

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

The actual emission reduction achieved during the first issuing period shall be submitted as a part of monitoring and verification. For an ex-ante estimation for the period from 2013 to 2024, the following calculation has been submitted:

Emission Reductions are calculated as follows:

$ER_y = BE_y - PE_y - LE_y$ Where:

ER_y = Emission reductions in year y (tCO_2/y)

BE_y = Baseline Emissions in year y ($t CO_2/y$)

PE_y = Project emissions in year y (tCO_2/y)

LE_y = Leakage emissions in year y (tCO_2/y)

Estimated Annual Baseline Emission Reduction: $BE_y = EG_{PJ,y} \times EF_{grid,y}$

BE_y = Baseline emissions in year y ($t CO_2$)

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)

$EF_{grid,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" ($t CO_2/MWh$)

As determined by “Tool to calculate the emission factor for an electricity system – Version 7.0” for Brazil ([am-tool-07-v7.0](#)), the combined margin should be calculated using the “Weighted average CM”, as it follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times wOM + EF_{grid,BM,y} \times wBM \quad \text{Equation (16)}$$

Where:

$EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (t CO₂/MWh)

$EF_{grid,OM,y}$ = Operating margin CO₂ emission factor in year y (t CO₂/MWh)

wOM = Weighting of operating margin emissions factor (per cent)

wBM = Weighting of build margin emissions factor (per cent)

Since the project is a biomass co-generation project:

$$wOM = 0.5$$

$$wBM = 0.5$$

Since the project is a biomass co-generation project:

$$PE_y = 0$$

$$LE_y = 0$$

So as result $ER_y = BE_y$

For the Build and Operation margin emission factor, was considered the public data for the years from 2013 to 2024 available in the Ministry of Science, Technology and Innovation website: (<https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/sirene/dados-e-ferramentas/fatores-de-emissao>).

EMISSION FACTOR OF THE MONITORING PERIOD - EF _{grid,CM}						
Month	2013	2014	2015	2016	2017	2018
	tCO ₂ eq/MWh	tCO ₂ eq/MWh	tCO ₂ eq/MWh	tCO ₂ eq/MWh	tCO ₂ eq/MWh	tCO ₂ eq/MWh
January	0.439600	0.455900	0.425300	0.376700	0.272350	0.351100
February	0.433550	0.447600	0.416850	0.380650	0.258800	0.346450
March	0.430450	0.433100	0.416000	0.393100	0.294750	0.356000
April	0.436150	0.436750	0.400900	0.393600	0.296650	0.321400
May	0.427150	0.428400	0.401100	0.396850	0.305700	0.341550
June	0.439650	0.432050	0.416900	0.397450	0.293700	0.403050
July	0.424500	0.431850	0.411950	0.393450	0.304000	0.367950
August	0.414050	0.441250	0.404900	0.396250	0.306500	0.365900
September	0.431150	0.447850	0.393050	0.399150	0.304400	0.354400
October	0.430200	0.443200	0.399350	0.388050	0.301250	0.357600
November	0.439750	0.442400	0.403300	0.389900	0.302350	0.251200
December	0.440750	0.439400	0.400150	0.380150	0.305300	0.239650

EMISSION FACTOR OF THE MONITORING PERIOD - EF _{grid,CM}						
Month	2019	2020	2021	2022	2023	2024
	tCO ₂ eq/MWh	tCO ₂ eq/MWh	tCO ₂ eq/MWh	tCO ₂ eq/MWh	tCO ₂ eq/MWh	tCO ₂ eq/MWh
January	0.228000	0.330300	0.327047	0.274800	0.169218	0.234330
February	0.329650	0.311850	0.328147	0.257638	0.142219	0.213642
March	0.304750	0.241100	0.309847	0.216516	0.171215	0.165105
April	0.305750	0.197150	0.303097	0.121441	0.193484	0.123467
May	0.290700	0.227700	0.322447	0.153626	0.170904	0.167863
June	0.259750	0.286850	0.323997	0.233720	0.284879	0.208541
July	0.346700	0.245550	0.318197	0.222800	0.270277	0.301296
August	0.316600	0.248650	0.337697	0.241800	0.232837	0.326885
September	0.331300	0.213300	0.344547	0.258218	0.195022	0.328852
October	0.319500	0.335100	0.338797	0.246976	0.216998	0.349990
November	0.337000	0.319000	0.343568	0.215184	0.267454	0.302327
December	0.350850	0.354250	0.317738	0.160342	0.236986	0.275043

The official power generation data of the UTE Bioenergética Vale do Paracatu (BEVAP) and UTE ENERVALE during the Monitoring Period, was informed by CCEE (Electric Energy Trading Chamber) digitally through their website/system:

ELECTRICITY GENERATED IN THE MONITORING PERIOD
UTE Bioenergética Vale do Paracatu (BEVAP):

ELECTRICITY GENERATED IN THE MONITORING PERIOD - EG						
Month	2013	2014	2015	2016	2017	2018
	MWh	MWh	MWh	MWh	MWh	MWh
January	0	0	7,781	6,107	0	4,854
February	0	0	22	0	0	14,434
March	0	0	0	0	0	333
April	2,488	1,830	5,803	14,824	4,447	6,412
May	14,988	16,356	17,303	24,139	20,149	18,179
June	18,557	20,513	21,890	22,885	22,128	21,234
July	25,344	20,492	19,438	19,392	22,900	23,684
August	22,702	20,424	23,760	22,932	20,504	21,039
September	21,871	20,795	20,791	23,650	17,717	20,386
October	25,723	18,274	18,828	23,139	19,213	18,831
November	24,155	6,659	815	12,266	11,396	17,278
December	7,330	453	0	505	84	24,955
Total	163,156	125,797	136,431	169,838	138,537	191,618

ELECTRICITY GENERATED IN THE MONITORING PERIOD - EG						
Month	2019	2020	2021	2022	2023	2024
	MWh	MWh	MWh	MWh	MWh	MWh
January	22	740	0	1	0	0
February	0	0	0	0	0	0
March	0	0	5,565	0	11,638	163
April	6,290	7,623	14,863	9,719	7,660	9,627
May	21,964	21,786	20,894	27,984	12,823	22,679
June	23,618	26,573	21,425	28,918	16,686	27,135
July	20,589	28,415	18,438	29,370	25,419	27,310
August	17,669	28,163	18,103	20,155	28,377	20,059
September	16,381	26,615	17,346	21,388	25,266	25,755
October	17,190	19,532	13,140	4,532	24,970	12,846
November	16,374	8,453	17,345	767	9,131	18,595
December	27,290	7,632	14,730	0	0	4,862
Total	167,389	175,532	161,847	142,833	161,970	169,031

The impact of exported energy on the amount of CBIOS UTE Bioenergética Vale do Paracatu (BEVAP):

		2020 - 2023		2022-2024	
		Anhydrous	Hydrated	Anhydrous	Hydrated
CBIOS	NEEA with exported eletricity	NA	70,70	65,38	65,03
	NEEA without exported eletricity	NA	67,70	62,51	62,16
	Increase	NA	4,431%	4,591%	4,617%
	Average	4,431%		4,604%	
	Factor	0,95569		0,95396	

Exported Eletricity less proportion of CBIOS:

ELECTRICITY GENERATED IN THE MONITORING PERIOD - EG					
Month	2020	2021	2022	2023	2024
	MWh	MWh	MWh	MWh	MWh
January	740	0	1	0	0
February	0	0	0	0	0
March	0	5,318	0	11,102	156
April	7,623	14,204	9,288	7,307	9,183
May	20,820	19,968	26,744	12,232	21,635
June	25,395	20,475	27,636	15,918	25,885
July	27,156	17,621	28,068	24,248	26,053
August	26,915	17,300	19,262	27,071	19,135
September	25,436	16,577	20,404	24,103	24,569
October	18,667	12,558	4,323	23,821	12,254
November	8,078	16,576	731	8,711	17,739
December	7,294	14,077	0	0	4,638
Total	168,125	154,675	136,458	154,513	161,248

Since $ER_y = BE_y = EG \times EF_{grid}$, it is achieved the following results for the emissions reductions ER_y :

EMISSION REDUCTION - ER_y						
Month	2013	2014	2015	2016	2017	2018
	tCO ₂ eq	tCO ₂ eq	tCO ₂ eq	tCO ₂ eq	tCO ₂ eq	tCO ₂ eq
January	0	0	3,309	2,300	0	1,704
February	0	0	9	0	0	5,001
March	0	0	0	0	0	118
April	1,085	799	2,327	5,835	1,319	2,061
May	6,402	7,007	6,940	9,580	6,160	6,209
June	8,158	8,862	9,126	9,096	6,499	8,558
July	10,758	8,849	8,007	7,630	6,962	8,714
August	9,400	9,012	9,621	9,087	6,285	7,698
September	9,429	9,313	8,172	9,440	5,393	7,225
October	11,066	8,099	7,519	8,979	5,788	6,734
November	10,622	2,946	329	4,782	3,446	4,340
December	3,231	199	0	192	26	5,980
Total	70,152	55,088	55,358	66,920	41,876	64,344

EMISSION REDUCTION - ER_y						
Month	2019	2020	2021	2022	2023	2024
	tCO ₂ eq	tCO ₂ eq	tCO ₂ eq	tCO ₂ eq	tCO ₂ eq	tCO ₂ eq
January	5	244	0	0	0	0
February	0	0	0	0	0	0
March	0	0	1,648	0	1,901	26
April	1,923	1,503	4,305	1,128	1,414	1,134
May	6,385	4,741	6,439	4,109	2,091	3,632
June	6,135	7,285	6,634	6,459	4,535	5,398
July	7,138	6,668	5,607	6,254	6,554	7,850
August	5,594	6,692	5,842	4,658	6,303	6,255
September	5,427	5,425	5,712	5,269	4,701	8,080
October	5,492	6,255	4,254	1,068	5,169	4,289
November	5,518	2,577	5,695	157	2,330	5,363
December	9,575	2,584	4,473	0	0	1,276
Total	53,193	43,975	50,609	29,101	34,996	43,301

ELECTRICITY GENERATED IN THE MONITORING PERIOD

UTE Enervale:

ELECTRICITY GENERATED IN THE MONITORING PERIOD - EG						
Month	2013	2014	2015	2016	2017	2018
	MWh	MWh	MWh	MWh	MWh	MWh
January	0	0	4,020	0	158	11,760
February	0	0	8,977	0	5,767	0
March	0	0	0	0	0	2,769
April	0	0	3,929	0	9,008	7,345
May	7	3,581	14,856	2,581	10,444	14,443
June	386	8,071	17,258	2,521	10,948	15,287
July	94	7,327	12,010	2,604	13,953	17,073
August	1,275	7,416	13,486	6,253	17,101	15,701
September	0	10,813	16,254	6,323	14,826	17,394
October	0	7,018	16,475	8,795	14,445	14,030
November	0	11,953	15,216	11,850	14,534	6,306
December	6,947	14,340	157	10,279	17,141	0
Total	8,708	70,519	122,637	51,206	128,324	122,108

ELECTRICITY GENERATED IN THE MONITORING PERIOD - EG						
Month	2019	2020	2021	2022	2023	2024
	MWh	MWh	MWh	MWh	MWh	MWh
January	0	15,097	0	10,330	0	0
February	14,802	7,576	0	0	0	0
March	2,060	190	0	0	0	0
April	3,982	0	40	0	0	0
May	8,639	0	10,747	0	0	0
June	8,004	0	185	0	0	0
July	16,614	0	17,177	0	0	0
August	17,348	0	14,942	15,139	0	0
September	16,963	0	18,738	9,643	0	0
October	16,540	12,096	8,048	16,246	0	11,235
November	15,892	15,129	0	5,973	0	0
December	863	8,732	0	0	0	0
Total	121,708	58,820	69,877	57,331	0	11,235

The impact of exported energy on the amount of CBIOS UTE Enervale:

		2020 - 2023		2022-2025	
		Anhydrous	Hydrated	Anhydrous	Hydrated
CBIOS	NEEA with exported eletricity	NA	70,70	65,38	65,03
	NEEA without exported eletricity	NA	67,70	62,51	62,16
	Increase	NA	4,431%	4,591%	4,617%
	Average	4,431%		4,604%	
	Factor	0,95569		0,95396	

Exported Eletricity less proportion of CBIOS:

ELECTRICITY GENERATED IN THE MONITORING PERIOD - EG					
Month	2020	2021	2022	2023	2024
	MWh	MWh	MWh	MWh	MWh
January	15,097	0	9,873	0	0
February	7,576	0	0	0	0
March	190	0	0	0	0
April	0	39	0	0	0
May	0	10,271	0	0	0
June	0	177	0	0	0
July	0	16,415	0	0	0
August	0	14,280	14,468	0	0
September	0	17,908	9,199	0	0
October	11,560	7,692	15,498	0	10,718
November	14,458	0	5,698	0	0
December	8,345	0	0	0	0
Total	57,227	66,781	54,736	0	10,718

Since $ER_y = BE_y = EG \times EF_{grid}$, it is achieved the following results for the emissions reductions ER_y :

EMISSION REDUCTION - ERy						
Month	2013	2014	2015	2016	2017	2018
	tCO2eq	tCO2eq	tCO2eq	tCO2eq	tCO2eq	tCO2eq
January	0	0	1,710	0	43	4,129
February	0	0	3,742	0	1,493	0
March	0	0	0	0	0	986
April	0	0	1,575	0	2,672	2,361
May	3	1,534	5,959	1,024	3,193	4,933
June	170	3,487	7,195	1,002	3,215	6,161
July	40	3,164	4,947	1,024	4,242	6,282
August	528	3,272	5,461	2,478	5,241	5,745
September	0	4,843	6,388	2,524	4,513	6,164
October	0	3,110	6,579	3,413	4,352	5,017
November	0	5,288	6,137	4,620	4,394	1,584
December	3,062	6,301	63	3,908	5,233	0
Total	3,802	31,000	49,755	19,993	38,591	43,362

EMISSION REDUCTION - ERy						
Month	2019	2020	2021	2022	2023	2024
	tCO2eq	tCO2eq	tCO2eq	tCO2eq	tCO2eq	tCO2eq
January	0	4,987	0	2,713	0	0
February	4,879	2,363	0	0	0	0
March	628	46	0	0	0	0
April	1,218	0	12	0	0	0
May	2,511	0	3,312	0	0	0
June	2,079	0	57	0	0	0
July	5,760	0	5,223	0	0	0
August	5,493	0	4,822	3,498	0	0
September	5,620	0	6,170	2,375	0	0
October	5,285	3,874	2,606	3,828	0	3,751
November	5,356	4,612	0	1,226	0	0
December	303	2,956	0	0	0	0
Total	39,131	18,837	22,202	13,640	0	3,751

EMISSION REDUCTION – Ery: UTE Bioenergética Vale do Paracatu (BEVAP) plus UTE Enervale:

EMISSION REDUCTION - ERy						
Month	2013	2014	2015	2016	2017	2018
	tCO2eq	tCO2eq	tCO2eq	tCO2eq	tCO2eq	tCO2eq
January	0	0	5,019	2,300	43	5,833
February	0	0	3,751	0	1,493	5,001
March	0	0	0	0	0	1,104
April	1,085	799	3,902	5,835	3,991	4,422
May	6,404	8,541	12,899	10,604	9,352	11,142
June	8,327	12,350	16,321	10,097	9,714	14,720
July	10,798	12,013	12,955	8,654	11,203	14,996
August	9,927	12,285	15,081	11,565	11,526	13,443
September	9,429	14,155	14,560	11,964	9,906	13,389
October	11,065	11,210	14,098	12,392	10,139	11,751
November	10,622	8,234	6,465	9,403	7,840	5,924
December	6,292	6,500	63	4,099	5,259	5,980
Total	73,949	86,087	105,113	86,913	80,466	107,705

EMISSION REDUCTION - ERy						
Month	2019	2020	2021	2022	2023	2024
	tCO2eq	tCO2eq	tCO2eq	tCO2eq	tCO2eq	tCO2eq
January	5	5,231	0	2,713	0	0
February	4,879	2,363	0	0	0	0
March	628	46	1,648	0	1,901	26
April	3,141	1,503	4,317	1,128	1,414	1,134
May	8,896	4,741	9,750	4,109	2,091	3,632
June	8,214	7,285	6,691	6,459	4,535	5,398
July	12,898	6,668	10,830	6,254	6,554	7,850
August	11,087	6,692	10,665	8,156	6,303	6,255
September	11,047	5,425	11,882	7,645	4,701	8,080
October	10,777	10,129	6,860	4,895	5,169	8,040
November	10,874	7,189	5,695	1,383	2,330	5,363
December	9,878	5,540	4,473	0	0	1,276
Total	92,323	62,812	72,811	42,741	34,996	47,052

For the current monitoring period no biomass residue was collected from outside, thus for this monitoring period, the value of this parameter is zero (*PEy*), however, using the UCR principles of conservativeness in emission reductions quantification, prevention of over-generation of credits and based on stakeholder comments on project emissions, transport emissions are calculated by applying a net-to-gross adjustment of 10%, i.e. multiply the emission reductions determined based on the applied methodology by 0.9 to determine the final amount of emission reductions.

	2013	2014	2015	2016	2017	2018
	tCO ₂ eq	tCO ₂ eq	tCO ₂ eq	tCO ₂ eq	tCO ₂ eq	tCO ₂ eq
Total	66,557	77,478	94,601	78,221	72,419	96,934

	2019	2020	2021	2022	2023	2024
	tCO ₂ eq	tCO ₂ eq	tCO ₂ eq	tCO ₂ eq	tCO ₂ eq	tCO ₂ eq
Total	83,090	56,530	65,529	38,466	31,496	42,346

Total amount of emission reductions was 803,667 tCO₂eq for the monitoring period, **already considering the deduction the proportion of CBIOs.**

Total emission reductions: $ER_y = 803,667 \text{ tCO}_2 / \text{year}$ (803,667 CoUs /year)

C.6. Prior History>>

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

Bevap Bionenergia is also certified by Renovabio, which is Brazilian National Biofuels Program, created to encourage the production and use of sustainable biofuels, such as ethanol and biodiesel, replacing gasoline and diesel, which are more polluting fossil fuels. It certifies companies based on the environmental efficiency of production, allowing them to issue CBIOs (Decarbonization Credits), which can be sold. Although RenovaBio and the carbon credit certification system have similar objectives when it comes to decarbonization, they are different programs and work in different ways, with their own regulations and mechanisms.

The CBIO is a financial instrument generated **exclusively** by the production of **biofuels**, in this case, **ethanol**. On the other hand, the carbon credits proposed in this project are generated by surplus **renewable energy exported** to the electricity grid.

- Law No. 13,576/2017 (RenovaBio Law, https://www.planalto.gov.br/ccivil_03/_ato2015-2018/2017/lei/113576.htm): Establishes the National Biofuels Policy, **focusing on the production and use of biofuels**, without mentioning the generation of carbon credits for surplus energy.

- ANP Resolution No. 758/2018 (<https://atosoficiais.com.br/anp/resolucao-n-758-2018-regulamenta-a-certificacao-da-producao-ou-importacao-eficiente-de-biocombustiveis-de-que-trata->

[o-art-18-da-lei-no-13-576-de-26-de-dezembro-de-2017-e-o-credenciamento-de-firmas-inspetoras?origin=instituicao&q=Resolu%C3%A7%C3%A3o%20ANP%20n%C2%BA%20758/2018](#)): Regulates the certification of efficient production of biofuels, treating electrical energy as a co-product, **but not as a direct source of CBIOS**.

- Technical Note nº 62/2018/SBQ/ANP: Details the methodology for calculating CBIOS, reaffirming that exported electrical energy is considered only as a co-product.

In the Renovabio program, the RenovaCalc tool is used, which uses exported energy as one of the factors to calculate the plant's Energy-Environmental Efficiency Rating (NEEA), that is an indicator of the efficiency of the production process, specifically in the industrial phase. A higher NEEA indicates a more efficient process, which generally results in a lower carbon intensity. Impact on CBIOS: the amount of CBIOS generated is based on the difference between the carbon intensity of the biofuel and that of the equivalent fossil fuel. The lower the carbon intensity of the biofuel, the greater the difference compared to fossil fuel, resulting in more CBIOS generated.

Role of Exported Energy in generating CBIOS:

Exported electrical energy is considered a beneficial co-product. It "credits" the process, effectively reducing the carbon intensity attributed to the biofuel. This is because exported renewable energy replaces potentially more carbon-intensive energy on the grid.

If a plant exports more renewable energy, its NEEA tends to improve. A better NEEA generally results in a lower carbon intensity for the ethanol produced. With lower carbon intensity, the gap with fossil fuel increases. Consequently, more CBIOS are generated per unit of biofuel produced.

Whereas the impact of exported energy on the amount of CBIOS is generally marginal compared to other factors such as agricultural and industrial efficiency, exported energy is just one of the many factors considered in the NEEA calculation. However, to adopt a conservative position and avoid double counting, percentage of Carbon Credits will be deducted here in this program, in the same proportion in which the exported energy boosted the generation of CBIOS, in the respective periods in which they were generated:

$$NEEA = \left(\frac{EF_{fossil} - EF_{bio}}{EF_{fossil}} \right) \times 100$$

Where:

- EF_{fossil} = **Emission Factor of the reference fossil fuel** (gCO₂eq/MJ)
- EF_{bio} = **Emission Factor of the assessed biofuel** (gCO₂eq/MJ)

The EF_{bio} is obtained by considering all emissions from the biofuel's life cycle, including:

- Biomass production
- Transportation
- Industrial processing
- Distribution

Since the NEEA formula depends on the difference between EF_{fossil} and EF_{bio} , any reduction in EF_{bio} (through fossil fuel replacement or clean energy exports) boosts the efficiency score and allows for the issuance of more CBIOS per liter of ethanol.

The number of CBIOS (Decarbonization Credits) generated by a biofuel producer is calculated using the following formula:

$$CBIOS = \frac{V_{bio} \times LCV \times NEEA \times D}{10^3}$$

Where:

- V_{bio} = **Volume of biofuel** produced and sold (in cubic meters, m³)
- **LCV** = **Lower Calorific Value** of the biofuel (MJ/L)
- **NEEA** = **Energy-Environmental Efficiency Score** (%)
- **D** = **Density** of the biofuel (kg/L)

So, we can conclude that NEEA is directly proportional to the generation of CBIOS. Since exported energy is one of the factors that improves the NEEA score, to be conservative, we will calculate how much the exported energy contributes to the increase in the NEEA score. Then, we will deduct this percentage from the Carbon Credits that will be generated here in this program, during the same period in which CBIOS were generated, for the issuance of carbon credits.

NEEA with exported eletricity	X
NEEA without exported eletricity	Y
Increase (%)	$\frac{(X - Y)}{Y}$
Adjustment Factor	$1 - \frac{(X - Y)}{Y}$

The table shows the calculation of the adjustment factor to account for the impact of exported electricity on the NEEA score and, consequently, on CBIOS.

- **NEEA with exported electricity (X)** → Efficiency score considering exported electricity.

- **NEEA without exported electricity (Y)** → Efficiency score without considering exported electricity.

- **Increase (%)** → The impact of exported electricity on NEEA is given by:

$$\frac{(X - Y)}{Y}$$

This represents **how much the exported electricity increased the NEEA score**.

Adjustment Factor → To adjust the exported electricity for carbon credit generation without double counting with CBIOS, we apply the factor:

$$1 - \frac{(X - Y)}{Y}$$

This factor can be used to **discount the fraction of Carbon Credits**, regarding exported energy that has already contributed to increasing NEEA, and respectively the CBIOS.

This percentage calculation will be applied in the specific period of issuance of the CBIO and credit year.

C.7. Monitoring period number and duration>>

First Monitoring Period: 12 years – Jan 01, 2013 to Dec 31, 2024

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

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

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

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

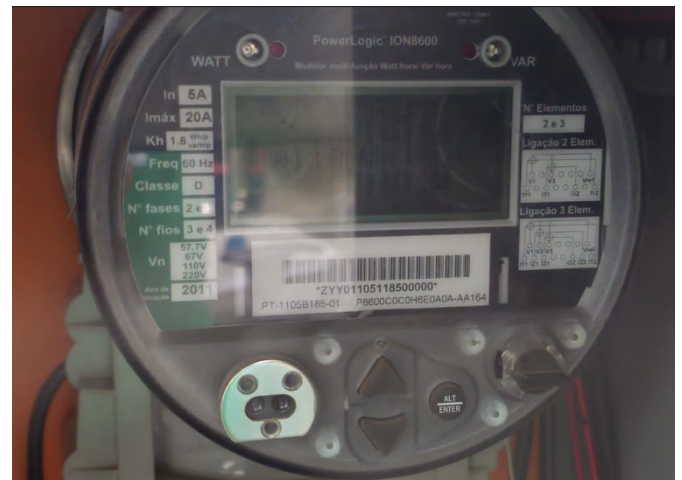
C.10. Monitoring plan>>

All energy generation data is acquired through CCEE meters installed in BEVAP substation.

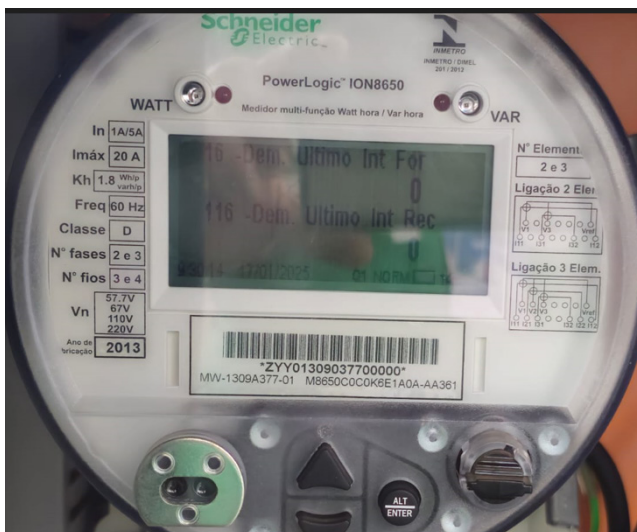
Meter	Serial Number	Specification
1	PT-1201A390-01 (Main)	Schneider Power Logic ION8600 3 Phases 57.7 ~ 220 V 5.0 A (max 20 A) 60 Hz Class D kh 1,8 Wh-varh/pulse Year of manufacturer: 2012 Last Calibration: 05/09/2022
2	PT-1105B185-01 (Check)	Schneider Power Logic ION8600 3 Phases 57.7 ~ 220 V 5.0 A (max 20 A) 60 Hz Class D kh 1,8 Wh-varh/pulse Year of manufacturer: 2011 Last Calibration: 05/09/2022
3	MW-1309A377-01 (Main)	Schneider Power Logic ION8650 3 Phases 57.7 ~ 220 V 1.0 / 5.0 A (max 20 A) 60 Hz Class D kh 1,8 Wh-varh/pulse Year of manufacturer: 2013 Last Calibration: 05/09/2022
4	MW-1309A724-01 (Check)	Schneider Power Logic ION8650 3 Phases 57.7 ~ 220 V 1.0 / 5.0 A (max 20 A) 60 Hz Class D kh 1,8 Wh-varh/pulse Year of manufacturer: 2013 Last Calibration: 05/09/2022



Meter 1 (UTE Enervale Main)



Meter 2 (UTE Enervale Check)



Meter 3 (UTE BEVAP Main)



Meter 4 (UTE BEVAP Check)

The meters are locked and can be manipulated only under CCEE or ONS authorization. All generation data is available digitally and can be checked by the Bevap personnel through CCEE system at CCEE website.

Parameters being monitored or used in emission reductions determination:

Data/Parameter	EF _{grid,y}
Data unit	tCO ₂ e/MWh
Description	CO ₂ emission factor of the grid electricity in year y
Source of data Value(s) applied	https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/sirene/dados-e-ferramentas/fatores-de-emissao
Measurement methods and procedures	As per the requirements in “Tool to calculate the emission factor for an electricity system”
Monitoring frequency	Monthly
Purpose of data	To estimate baseline emissions

Data / Parameter:	EG _{pi,y}
Data unit:	MWh
Description:	Quantity of net electricity generation and export supplied by the project plant/unit to the grid in year y
Source of data:	The data provided by the Câmara de Comercialização de Energia Elétrica – CCEE (Electric Energy Trading Chamber)
Measurement procedures (if any):	This parameter is monitored using bidirectional energy meter
Monitoring frequency:	Continuous monitoring, hourly measurement and at least monthly recording
QA/QC procedures:	The meters and current transformers will be subjected to periodic calibrations/audits from ANEEL and CCEE to certify that electric energy injected in the grid data is reliable and precise, in a way to guarantee the reliability of the national grid and energy supply. As determined by government entity ONS (National Electric System Operator), in the "Submodule 6.16 - Maintenance of the billing measurement system" item 1.1.2, the calibration of the meters must occur every 5 years.

ANNEX I – Emission Factor

CONSTRUCTION MARGIN

Average Emission Factor (tCO ₂ /MWh) - ANNUAL	
2013	0.2713
OPERATION MARGIN	
Average Emission Factor (tCO ₂ /MWh) - MONTHLY	
2013	MONTH
	January February March April May June July August September October November December
	0.6079 0.5958 0.5896 0.6010 0.5830 0.6080 0.5777 0.5568 0.5910 0.5891 0.6082 0.6102

CONSTRUCTION MARGIN

Average Emission Factor (tCO ₂ /MWh) - ANNUAL	
2014	0.2963
OPERATION MARGIN	
Average Emission Factor (tCO ₂ /MWh) - MONTHLY	
2014	MONTH
	January February March April May June July August September October November December
	0.6155 0.5989 0.5699 0.5772 0.5605 0.5678 0.5674 0.5862 0.5994 0.5901 0.5885 0.5825

CONSTRUCTION MARGIN

Average Emission Factor (tCO ₂ /MWh) - ANNUAL	
2015	0.2553
OPERATION MARGIN	
Average Emission Factor (tCO ₂ /MWh) - MONTHLY	
2015	MONTH
	January February March April May June July August September October November December
	0.5953 0.5784 0.5767 0.5465 0.5469 0.5785 0.5686 0.5545 0.5308 0.5434 0.5513 0.5450

CONSTRUCTION MARGIN

Average Emission Factor (tCO ₂ /MWh) - ANNUAL	
2016	0.1581
OPERATION MARGIN	
Average Emission Factor (tCO ₂ /MWh) - MONTHLY	
2016	MONTH
	January February March April May June July August September October November December
	0.5953 0.6032 0.6281 0.6291 0.6356 0.6368 0.6288 0.6344 0.6402 0.6180 0.6217 0.6022

CONSTRUCTION MARGIN

Average Emission Factor (tCO ₂ /MWh) - ANNUAL	
2017	0.0028
OPERATION MARGIN	
Average Emission Factor (tCO ₂ /MWh) - MONTHLY	
2017	MONTH
	January February March April May June July August September October November December
	0.5419 0.5148 0.5867 0.5905 0.6086 0.5846 0.6052 0.6102 0.6060 0.5997 0.6019 0.6078

CONSTRUCTION MARGIN

Average Emission Factor (tCO ₂ /MWh) - ANNUAL	
2018	0.1370
OPERATION MARGIN	
Average Emission Factor (tCO ₂ /MWh) - MONTHLY	
2018	MONTH
	January February March April May June July August September October November December
	0.5652 0.5559 0.5750 0.5058 0.5461 0.6691 0.5989 0.5948 0.5718 0.5782 0.3654 0.3423

CONSTRUCTION MARGIN

Average Emission Factor (tCO ₂ /MWh) - ANNUAL	
2019	0.1020
OPERATION MARGIN	
Average Emission Factor (tCO ₂ /MWh) - MONTHLY	
2019	MONTH
	January February March April May June July August September October November December
	0.3540 0.5573 0.5075 0.5095 0.4794 0.4175 0.5914 0.5312 0.5606 0.5370 0.5720 0.5997

CONSTRUCTION MARGIN

Average Emission Factor (tCO ₂ /MWh) - ANNUAL	
2020	0.0979
OPERATION MARGIN	
Average Emission Factor (tCO ₂ /MWh) - MONTHLY	
2020	MONTH
	January February March April May June July August September October November December
	0.5627 0.5258 0.3843 0.2964 0.3575 0.4758 0.3932 0.3994 0.3287 0.5723 0.5401 0.6106

CONSTRUCTION MARGIN

Average Emission Factor (tCO ₂ /MWh) - ANNUAL	
2021	0.0540
OPERATION MARGIN	
Average Emission Factor (tCO ₂ /MWh) - MONTHLY	
2021	MONTH
	January February March April May June July August September October November December
	0.6001 0.6023 0.5657 0.5522 0.5909 0.5940 0.5824 0.6214 0.6351 0.6236 0.6331 0.5815

CONSTRUCTION MARGIN

Average Emission Factor (tCO ₂ /MWh) - ANNUAL	
2022	0.0270
OPERATION MARGIN	
Average Emission Factor (tCO ₂ /MWh) - MONTHLY	
2022	MONTH
	January February March April May June July August September October November December
	0.5226 0.4883 0.4060 0.2159 0.2803 0.4404 0.0419 0.4566 0.4894 0.4670 0.4034 0.2937

CONSTRUCTION MARGIN

Average Emission Factor (tCO ₂ /MWh) - ANNUAL													
2023	0.0467												
OPERATION MARGIN													
Average Emission Factor (tCO ₂ /MWh) - MONTHLY													
2023	MONTH												
	January	February	March	April	May	June	July	August	September	October	November	December	
	0.2917	0.2377	0.2957	0.3403	0.2951	0.5231	0.4939	0.4190	0.3433	0.3873	0.4882	0.4273	

CONSTRUCTION MARGIN

Average Emission Factor (tCO ₂ /MWh) - ANNUAL													
2024	0.0523												
OPERATION MARGIN													
Average Emission Factor (tCO ₂ /MWh) - MONTHLY													
2024	MONTH												
	January	February	March	April	May	June	July	August	September	October	November	December	
	0.4164	0.3750	0.2779	0.1946	0.2834	0.3648	0.5503	0.6015	0.6054	0.6477	0.5524	0.4978	