PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: 73.5 MW Sugarcane Bagasse based co-generation Energy GRUPO OLHO D'ÁGUA

Version 1.0

Date May 30, 2026

First CoU Issuance Period: 12 years

Date: Jan 01, 2013 to Dec 31, 2025

Project Concept Note (PCN)
CARBON OFFSET UNIT (CoU) PROJECT

BASIC INFORMATION	
Title of the project activity	73.5 MW Sugarcane Bagasse based co-generation Energy GRUPO OLHO D'ÁGUA
Scale of the project activity	Large Scale
Completion date of the PCN	May 30, 2026
Project participants	GRUPO OLHO D'ÁGUA (OWNER) FASTCARBON (AGGREGATOR)
Host Party	BRAZIL
Applied methodologies and standardized baselines	CHOOSE METHODOLOGY 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)
SDG Impacts:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16 and 17
Estimated amount of total GHG emission reductions	13,776 CoUs/yr (13,776 tCO_{2eq}/yr)

SECTION A. Description of project activity

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

The project titled "73.5 MW Sugarcane Bagasse based co-generation Energy GRUPO OLHO D'ÁGUA" is composed of three sugar cane plants:

- Usina Central Olho D'Água (USICODA), located in the city of Camutanga in the state of Pernambuco, Brazil.
- COMVAP – Açúcar e Álcool Ltda, located in the city of União in the state of Piauí, Brazil.
- Usina GIASA II, located in the city of Pedras de Fogo in the state of Paraíba, Brazil (acquired in 2019).

GIASA II received authorization through AUTHORITATIVE RESOLUTION No. 220, of May 5, 2004, to establish itself as a Self-Producer of Electrical Energy with an installed capacity of 14,900 kW, comprising four steam turbogenerators: two units of 1,200 kW each (in operation since 1997 and 1980, respectively), one unit of 2,500 kW (in operation since 1993), and one unit of 10,000 kW (in operation since August 5, 2003), located at the company's industrial facilities and headquarters, utilizing sugarcane bagasse as fuel.
Subsequently, through DISPATCH No. 1,028, of May 22, 2006, the facility was restructured to comprise two generating units: one of 10,000 kW capacity (in operation since August 5, 2003) and a second of 20,000 kW capacity, totaling **30,000 kW** of installed capacity.
Through DISPATCH No. 2,279, of October 3, 2006, it received authorization to commence commercial operations.

COMVAP received authorization through AUTHORITATIVE RESOLUTION No. 1,576, of September 23, 2008, to establish itself as a Self-Producer of Electrical Energy, composed of four turbogenerators: one of 800 kW, one of 1,000 kW, one of 3,000 kW, and one of 4,000 kW, totaling 8,800 kW of installed capacity, utilizing sugarcane bagasse as fuel.
Subsequently, through DISPATCH No. 353, of January 29, 2009, it received authorization to commence commercial operations. Subsequently, through DISPATCH No. 1,071, of April 5, 2016, it increased its installed capacity from 8,800 kW to 18,000 kW by replacing the generating units of 800 kW (UG1) and 1,000 kW (UG2) with generating units of 6,000 kW (UG1) and 5,000 kW (UG2), now consisting of four generating units with the following capacities: 6,000 kW (UG1), 5,000 kW (UG2), 3,000 kW (UG3), and 4,000 kW (UG4), respectively, totaling 18,000 kW.
Finally, through DISPATCH No. 1,620, of June 8, 2021, it modified the composition of its generating units so that UG5, with 8,500 kW of installed capacity, replaced UG3, with 3,000 kW of installed capacity, which now operates solely as a contingency unit, increasing its total capacity from 18,000 kW to **23,500 kW**.

USICODA (Central Olho D'Água) received authorization through AUTHORITATIVE RESOLUTION No. 2,858, of April 12, 2011, to establish itself as a Self-Producer of Electrical Energy with an installed capacity of 25,000 kW, consisting of two turbogenerators of 10,000 kW each and one of 5,000 kW, utilizing sugarcane bagasse as fuel.
Subsequently, through DISPATCH No. 944, of April 7, 2015, it received authorization to commence commercial operations.
Later, through DISPATCH No. 873, of March 22, 2019, it expanded its capacity from 25,000 kW to **30,000 kW**.

Unit	Installed Capacity	Location	Commercial Operation Date
UTE GIASA II	20 MW	Pedras do Fogo, Paraíba	October 4, 2006 (Dispatch nº 2,279 – ANEEL)
UTE COMVAP	23.5 MW	União, Piauí	January 30, 2009 (Dispatch nº 353 - ANEEL) July 25, 2023 (Dispatch nº 2,168 - ANEEL) July 2, 2024 (Dispatch nº 1,958 - ANEEL)
UTE USICODA (Central Olho D'Água)	30 MW	Camutanga, Pernambuco	April 8, 2015 (Dispatch nº 944 - ANEEL)

Below are the current operating licenses for energy production and commercialization:

UTE GIASA – Operating License – L.O. nº 2578/2021 (Expiry date: August 23, 2026)

UTE COMVAP – Operating License – L.O. nº D000021/21 (Expiry date: January 14, 2025) with the Protocol for Request to Renew the operating license Nº 107365-4/2024, from the date of September 26, 2024

UTE USICODA – Operating License – L.O. nº 05.24.06.004413-7 (Expiry date: June 27, 2028)
Purpose of the project activity:

The primary purpose of this Carbon Offset Unit (CoU) project is to quantify and certify greenhouse gas (GHG) emission reductions achieved through renewable energy generation and sustainable biomass utilization practices implemented across the three sugarcane mills operated by Grupo Olho D'Água in northeastern Brazil. The project aims to contribute to climate change mitigation by displacing fossil fuel-based energy with clean, renewable electricity generated from sugarcane biomass through cogeneration systems, while simultaneously promoting circular economy principles within the sugar-ethanol production chain.

By monetizing carbon credits generated through these emission reduction activities, the project will strengthen the financial viability of continued investments in renewable energy infrastructure, advanced sustainability practices, and environmental protection initiatives across all three operational facilities.

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.

Grupo Olho D'Água operates three integrated sugarcane biorefinery facilities strategically located in the states of Pernambuco, Paraíba and Piauí, Brazil.

Collectively, these facilities process over 4.1 million tons of sugarcane annually, producing sugar, ethanol, and renewable electricity. The group employs approximately 8,500 workers during harvest season and 4,500 during off-season periods.

Grupo Olho D'Água operates across multiple business segments in the sugarcane value chain. The group comprises three integrated industrial units (USICODA, GIASA, and COMVAP) with a combined processing capacity of approximately 4.1 million tons of sugarcane annually across 50,000 hectares of agricultural land, of which 70% is under efficient irrigation systems.

Primary Business Segments:

Sugar Production

- Produces high-quality VHP (Very High Polarization) sugar and refined sugar (crystal and demerara grades)
- Supplies both domestic and international markets
- Integrated production across all three units

Ethanol Production

- Produces anhydrous ethanol (for fuel blending) and hydrated ethanol (fuel-grade)
- Annual production capacity: approximately 175 million liters
- Certified under RenovaBio program, generating CBIOs (Créditos de Biogás) for carbon credit monetization
- Serves the Brazilian fuel market and export markets

Renewable Bioelectricity Generation

- Operates biomass cogeneration power plants utilizing sugarcane bagasse (residual fiber)
- Generates renewable electricity to supply industrial operations
- Exports surplus electricity to the national grid, reducing fossil fuel dependence
- Contributes to Brazil's renewable energy matrix

Organic Fertilizers and Circular Economy Products

- Produces vinhaça (liquid residue from ethanol distillation), enriched in potassium, for agricultural application
- Manufactures filter cake (solid residue) as organic fertilizer
- Implements fertigation programs to optimize nutrient cycling and reduce chemical fertilizer dependency
- Supports sustainable agricultural practices across sugarcane cultivation areas

Advanced Bioproducts

- Develops bioplastic from bagasse as a sustainable alternative to conventional petroleum-based plastics
- Produces biogas from organic residues, contributing to renewable energy diversification
- Valorizes all sugarcane by-products, minimizing waste and maximizing resource efficiency

Spirits Production (Complementary)

- COMVAP unit produces cachaça (sugarcane spirit) and other distilled beverages
- Niche market segment with artisanal positioning

USINA GIASA II

USICODA – Olho D' Água

COMVAP

A.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:

- Direct and indirect employments: over 8,500 employees during harvest season and 4,500 during off-season people in agricultural, industrial, and administrative areas, providing stable income and livelihood to a significant portion of the local population.
- Human Capital Development: Offered more than 30,000 hours of training to its employees in 2025, aimed at protecting and qualifying its human capital, fostering professional growth and skill enhancement.
- Ethical and Safe Operations: Operates under values that encourage commitment to safety, ethics, and personal and professional development. It applies rigorous workplace safety policies across all processes, prioritizing employee well-being.

- Data Privacy and Protection: Committed to protecting the privacy and personal data of all individuals interacting with the company, including employees and third parties, through robust systems, websites, social media, applications, and physical facilities.

Environmental benefits:

- Renewable Energy Investment: Invests in renewable energy alternatives, contributing to a sustainable future and demonstrating corporate responsibility beyond direct operations.
- Carbon neutrality through ethanol production from sugarcane, significantly reducing greenhouse gas emissions compared to fossil fuels.
- Bonsucro certification, demonstrating compliance with global sustainability standards in sugarcane production across rigorous indicators.
- Vinhaça, a liquid residue from ethanol production, is effectively reused as an organic fertilizer in the sugarcane fields, enriching the soil.
- Filter cake, a solid residue, is also repurposed as an organic fertilizer, further reducing the need for synthetic chemical inputs.
- These practices significantly reduce the use of chemical fertilizers, promoting soil health and reducing environmental contamination.
- With the advancement of mechanized harvesting, sugarcane straw is left on the soil, acting as an organic fertilizer, protecting the soil against erosion, and maintaining crucial moisture levels.
- The project demonstrates a continuous reduction in water consumption per ton of sugarcane processed, indicating efficient water usage.
- Efficient irrigation systems are implemented across the agricultural areas, optimizing water application and minimizing waste.
- Bagasse serves as a valuable raw material for the production of bioplastic, offering a sustainable alternative to conventional petroleum-based plastics.
- Bagasse is also utilized for biogas production, further diversifying renewable energy sources.
- Both bioplastic and biogas production contribute directly to the reduction of the overall carbon footprint of the operations.
- The mechanization of sugarcane harvesting is progressively replacing the traditional practice of pre-harvest burning.
- This shift significantly reduces the emission of particulate matter and other pollutants into the atmosphere.
- Consequently, air quality in the surrounding regions is substantially improved, benefiting local communities and ecosystems.
- The plants actively monitor and respect the legally required percentage of protected areas within their operational zones and, when necessary, implement additional conservation measures.

- Full compliance with all applicable environmental licenses and legislation is rigorously ensured and maintained.
- Comprehensive monitoring and management programs are in place for atmospheric emissions, effluents, waste management, and water usage, ensuring continuous environmental performance improvement.

Economic benefits:

- Production of renewable biofuels (anhydrous and hydrated ethanol) and VHP sugar, contributing to Brazil's energy security and agricultural exports.
- Bioelectricity generation surplus sold to the national grid, providing additional revenue streams and energy reliability.
- Significant investments in local economy through direct employment, supplier contracts, and infrastructure development in region.
- Tax contributions at municipal and state levels, strengthening public services in health, education, and infrastructure.
- Implementation of modern agricultural and industrial processes aligned with international sustainability standards.
- Continuous innovation in bioenergy production, maximizing energy efficiency and resource optimization.
- Integration of sustainable farming technologies supporting long-term productivity and environmental stewardship.

Basic Education Program from kindergarten through 5th grade.

Initiatives to promote health services for the community

Vaccination campaigns

Lar Vicentinos Donation Campaign

Women in agriculture

Maintainer of Dr. José Hardman School

Award for the "Ideia Legal Vale Real" program

Grupo Olho D'Água contributes significantly to economic, environmental and social matters, however, it 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	Job creation (Approximately 8,500 employees during harvest season and 4,500 during off-season) and economic contribution to local communities through taxes, local hiring, and partnerships.
	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	Bonsucro certification ensures sustainable sugarcane production through practices that preserve soil health, biodiversity, and water resources. It guarantees that agricultural land is not displaced for energy production, maintaining coexistence with food crops. This certification increases rural productivity and profitability for local producers, directly supporting food security and sustainable agriculture in the region.
	3.3 - By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases 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	It operates an outpatient medical clinic and provides 24-hour nursing assistance. With daily care and a medical team composed of: 2 physicians, 1 nurse, 1 dentist, 3 nursing technicians, and 2 ambulance drivers available for employees. It promotes annual vaccination campaigns, leprosy, prostate cancer, breast cancer, diabetes, hypertension, and other disease awareness campaigns.

	4.1 - By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes 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 4.5 - By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations 4.6 - By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy	It offers a discount plan for employees through agreements with educational institutions such as SENAC, SESI, and SENAI, encouraging employees to study. It offers scholarships for employees in undergraduate and postgraduate programs. It has a Young Apprentices and Internship Program offering professional training opportunities for young people in the community. It has the New Horizons Program that offers technical training to employees, promoting professional qualification and strengthening the local workforce. It has a Trainee Program to provide first job opportunities for young people in the region. It maintains Dr. José Hardman School, focused on education from preschool to elementary school (5th grade), currently with 220 students, serving children of employees and the local community where the plant is located.
	5.1 - End all forms of discrimination against all women and girls everywhere 5.5 - Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life 5.6 - Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences	Implementation of a Code of Conduct Program focused on encouraging diversity and gender equality. The company values gender diversity and is committed to promoting an inclusive and equitable environment. To this end, it invests in creating affirmative action opportunities for women and their professional development, such as the Women in the Field Program.

	5.a - Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws	It promotes and encourages, through the Women in the Field program, the qualification and insertion of women from the community in agricultural activities of irrigation and planting.
	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 6.5 - By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate 6.6 - By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes 6.a - By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies	Water Resources Management: 15,000 hectares of irrigated sugarcane fields (10,000 hectares with advanced irrigation systems), R$ 74.2 million investments in irrigation projects, 70% of agricultural area (50,000 hectares) benefiting from irrigation Water Infrastructure: Construction of 2 reservoirs for water storage, Dam with capacity of 21 million m^3 (inaugurated April 2024) Reservoir with 20.7 billion liters (equivalent to Lagoa Rodrigo de Paz) Public Partnerships: Partnership with COMPESA (Pernambuco Sanitation Company) for water intake from Pau Amarelo reservoir; Contributes to regional drinking water supply Waste Reuse: Vinasse fertigation - potassium-rich residue reused as fertilizer; Reduces water pollution and optimizes resource use Climate Resilience: Investment in water infrastructure to address dry periods; PRORENOR program for resource management in drier climate conditions
	7.2 - By 2030, increase substantially the share of renewable energy in the global energy mix.	Clean Energy Generation

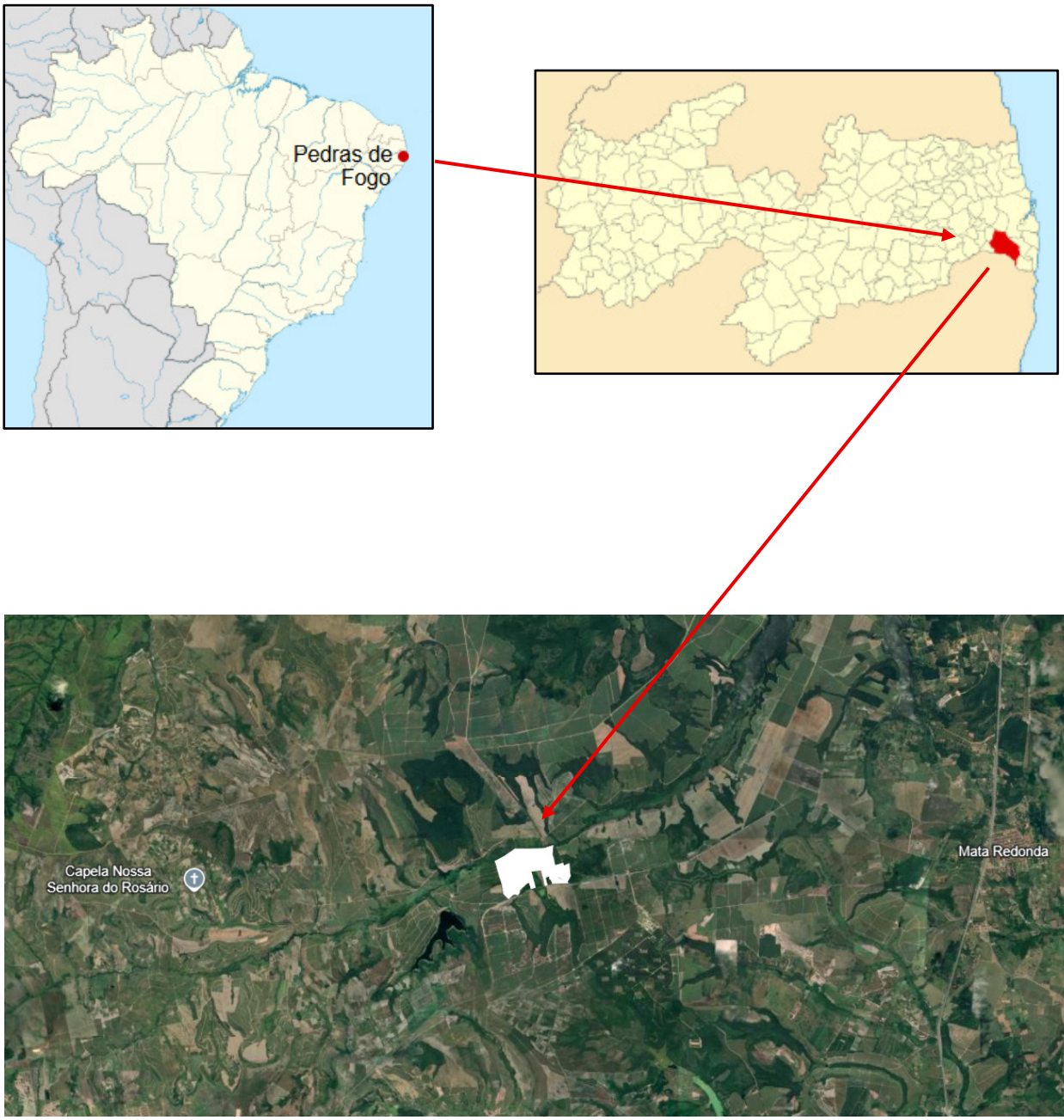
	8.3 - Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services. 8.7 - Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms 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	Legal Idea Vale Real Program: encourages employee creativity and innovation in production processes. Code of Conduct - Labor Protection: prohibition of forced labor and child labor, explicit prohibition in contracts with suppliers and service providers Employment and Labor Rights: Secure employment relationship in compliance with labor legislation, Health and safety promotion through provision of PPE and EPC (Personal Protective Equipment and Collective Protective Equipment), Normative training and educational campaigns
	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	Investment in transport infrastructure monitored by GPS.
	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 10.3 - Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard	Internal inclusion policies, support for hiring diverse suppliers and social projects to empower vulnerable communities.
	11.1 - By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums	Public-Private Partnerships: Partnership with COMPESA for water supply and contribution to regional water infrastructure

	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 waste center for receiving and sorting solid waste with targets to increase recycling, in addition to reverse logistics.
	13.1 - Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries 13.2 - Integrate climate change measures into national policies, strategies and planning.	Produces ethanol, a fuel that is much less polluting than gasoline or diesel. Certifications such as RenovaBio and Bonsucro, which attest to compliance with environmental and sustainability, issuance of CBIOs; Investments in energy efficiency and GHG reduction.
	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.a - Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems	Conservation of approximately 5,000 hectares of native vegetation, monitoring of flora and fauna. The plant has a nursery for producing native seedlings from the region, and promotes reforestation in necessary areas every year. Biodiversity plan.
	16.5 - Substantially reduce corruption and bribery in all their forms 16.6 - Develop effective, accountable and transparent institutions at all levels 16.10 - Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements	Code of Conduct and a Whistleblowing Channel, promoting transparency and integrity in its operations.

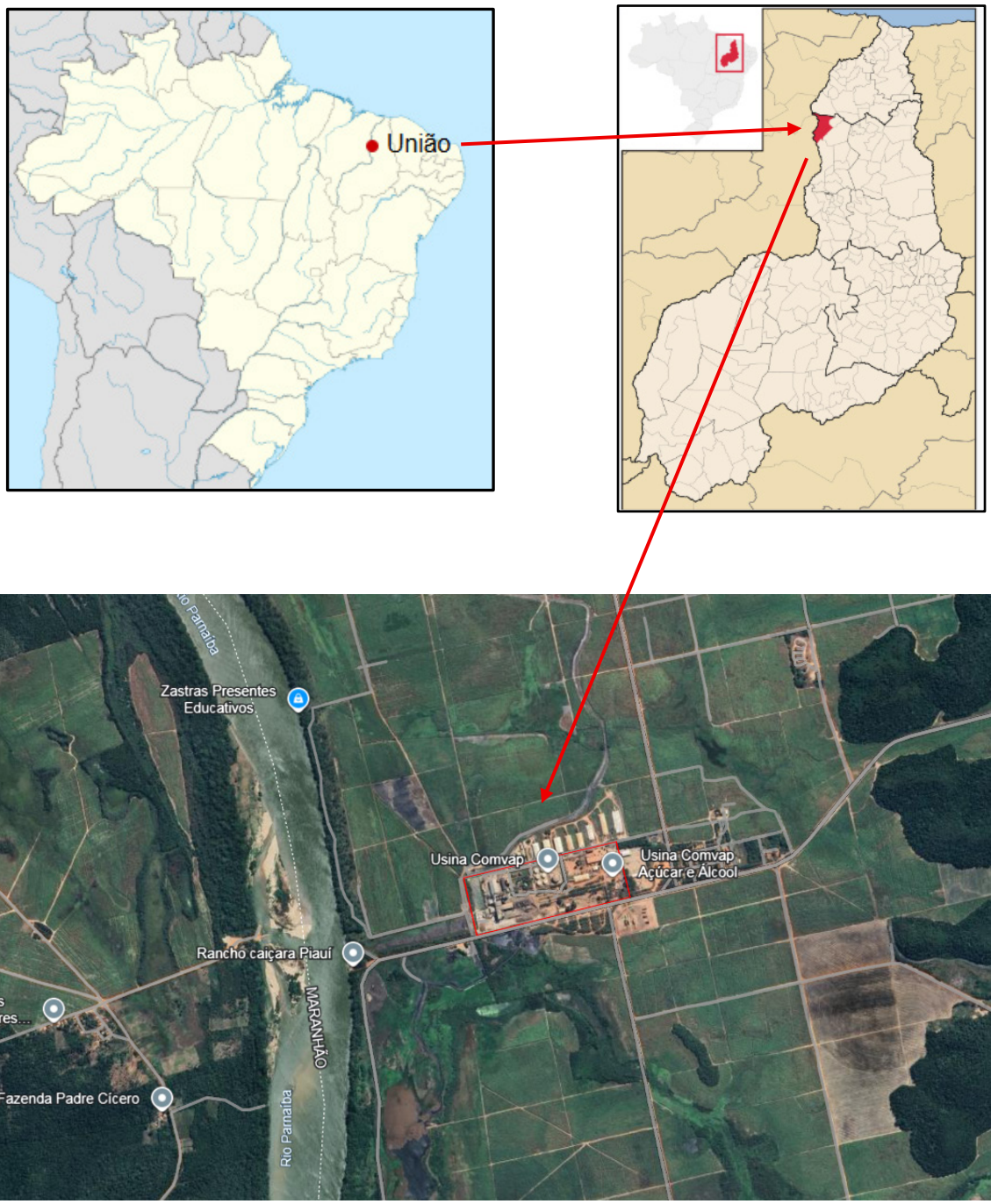
	17.6 - Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism 17.7 - Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed 17.9 - Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the Sustainable Development Goals, including through North-South, South-South and triangular cooperation 17.16 - Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries 17.17 - Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships	Public-Private Partnerships: COMPESA (Pernambuco Sanitation Company) - Partnership for water intake from Pau Amarelo reservoir (Dec 2024) Integrated Group Structure: - 3 plants operating with integrated management: Central Olho D'Água (PE), GIASA (PB), COMVAP (PI); - Long-term vision focused on generating value for employees, partners and communities Commercial and Strategic Partnerships: - Acquisition of GIASA Plant (2019) - Biosev/Louis Dreyfus (one of the world's largest sugarcane processors); - Integration of capacity: 1.3 million tons/year of processing; Technical Knowledge Transfer: - Technical visit by Caeté Plant (Carlos Lyra Group) to learn about pump house automation system (Apr 2025) - Sharing of innovations and best practices Recognition and Engagement: - Finalist in Sustainability category - Economic Movement Award; - Participation in dialogue with media and stakeholders (Clube Notícias - recent meeting on strategic partnerships in Piauí)

A.3. Location of project activity >>

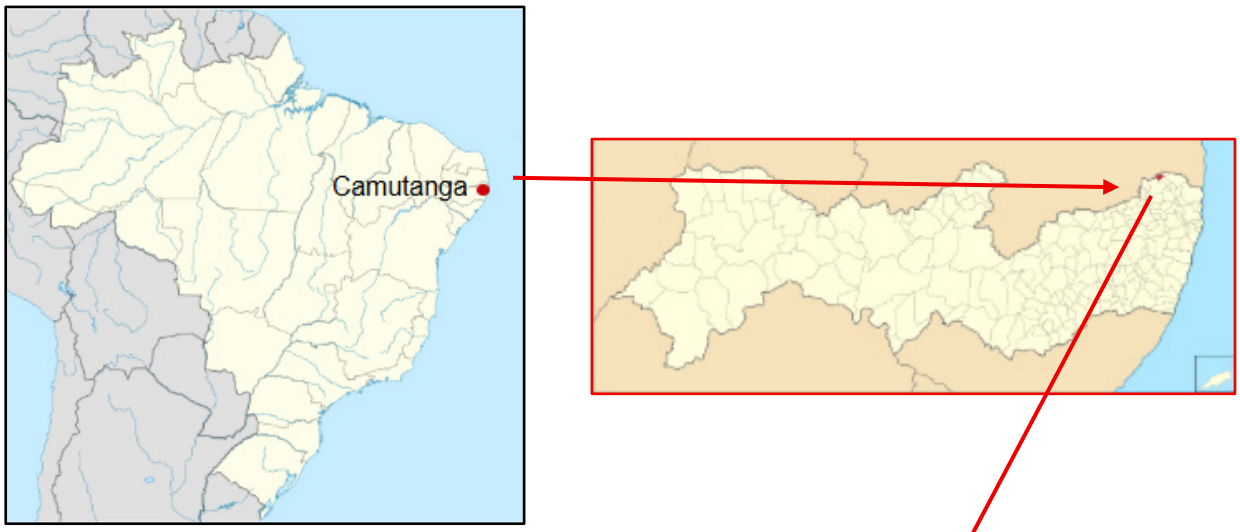
UTE: GIASA II
Country: Brazil
District: Pedras de Fogo
State: Paraíba
Address: Fazenda Ibura, S/N, Zona Rural
Zip Code: 58328-000
Latitude: -7.4040°
Longitude: -35.1160°



UTE: COMVAP
Country: Brazil
District: União
State: Piauí
Address: Fazenda Sítio S/N, Zona Rural
Zip Code: 64120-000
Latitude: -4,5833°
Longitude: -42,8500°



UTE: USICODA (Usina Central Olho D'Água)
Country: Brazil
District: Camutanga
State: Pernambuco
Address: Rodovia PE-082, S/N, Zona Rural
Zip Code: 55930-000
Latitude: -7.3667°
Longitude: -35.2717°



A.4. Technologies/measures >>

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

UTE GIASA II

The system consists of two power-generating (UG8 and UG9) units supplied by three boilers (3, 4 and 5):

Boilers 3 and 4

Boiler 5

Medium Voltage Panels

Protection and Control Panels

Generator UG8

Generator UG8 - Turbine under preventive maintenance

Generator UG9 under preventive maintenance

Boiler	**Nº 3**	**Nº 4**	**Nº 5**
Manufacturer	EQUIPALCOOL	EQUIPALCOOL	EQUIPALCOOL
Capacity (Tons/h)	50	75	110
Serial number	007/93	70 V-2-S	061/ 02
Year of manufacturer or Expansion	1993	2001	2002
Maximum allowable working pressure (kgf/cm^2)	25	58	74
Hydrostatic Test Pressure (kgf/cm^2)	37.5	87	111
Pressure (kgf/cm^2)	20	48	62
Degree of super heat ºC (Steam)	300	420	450
Heating surface area (m^2)	1,500	2,300	3,300
Design Standard	ASME I -2007	ASME I -1998	ASME I -2001
category	A	A	A

Boiler nº 3

Boiler nº 5

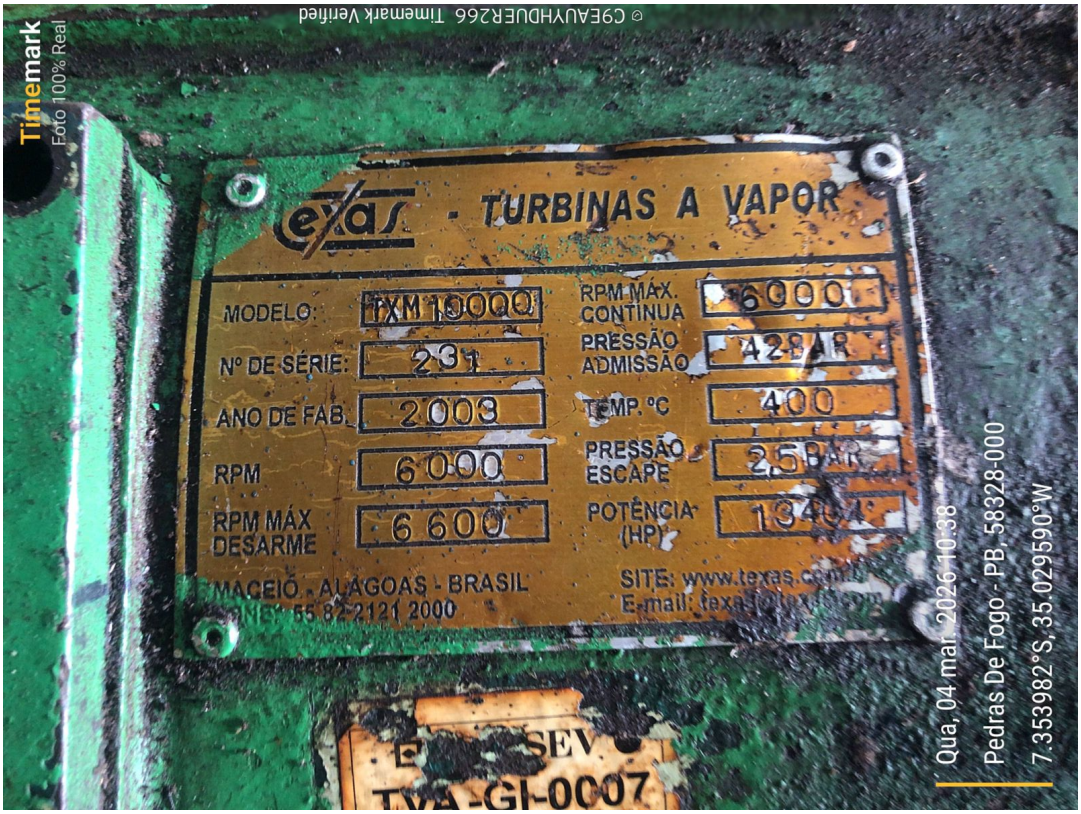
Boiler nº 4

Alternator/ Generator	UG 8	UG 9
Year of manufacturer	June, 2003	November, 2005
Manufacturer	WEG	WEG
Power Rated (kVA)	12,500	25,000
Serial Number	117583	1004469221
Voltage (V)	13,800	13,800
Current (Amps)	523	1045.96
Power Factor (cos φ)	0.80	0.80
Efficiency (75%, 100% of load)	Not specified	97.4%, 97.7%
Generator Rated Speed (rpm)	1,800	1,800
Frequency (Hz)	60	60
Generator Model	SPW900	SPW1120

Alternator/ Generator UG 8

Alternator/ Generator UG 9

Turbine	UG 8	UG 9
Year of manufacturer	2003	2005
Manufacturer	TEXAS	NG
Power Rated (HP) / (kW)	13,404 HP	20,000 kW
Live Steam Pressure (Bar)	42	63
Live Steam Temperature (ºC)	400	450
Steam Exhaust Pressure (Bar)	2.5	2.5
Turbine Rated Speed (rpm)	6,000	6,512
Turbine Disarm Speed (rpm)	6,600	7,163
Turbine Model	TXM 10000	H3/800S/P0

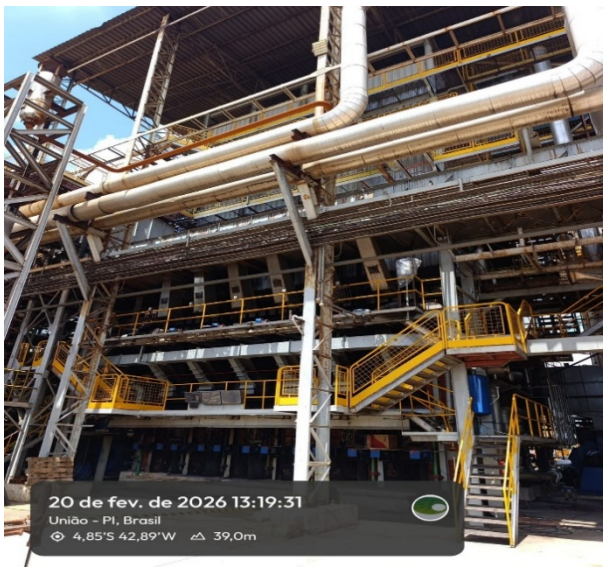


Turbine UG 8

Turbine UG 9

UTE COMVAP

The system consists of four power-generating (UG1, UG2, UG4 and UG5) units supplied by two boilers (1 and 2). Generator 2 is used only for electricity generation for self-consumption and does not export.

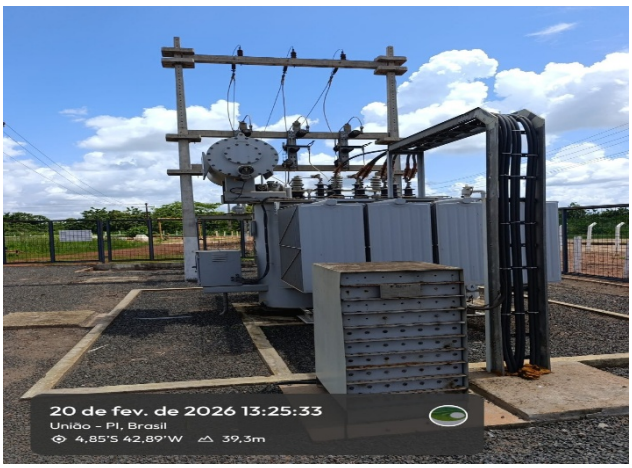


Boiler 1

Boiler 2

Power House 1 and 2

10 MVA Step-up Substation



10 MVA Transformer

Medium Voltage Distribution Panels

Alternator/ Generator UG 1

Generator Circuit Breaker Panel – UG 1

Alternator/ Generator UG 4

Generator Excitation & Protection System – UG4

Alternator/ Generator UG 5

Generator Circuit Breaker Panel – UG5

Generator Excitation & Protection System – UG5

TGM Turbine Panel – UG5

Turbine – UG5

Generator Lubrication System – UG5

Boiler	Nº 1	Nº 2
Manufacturer	M. DEDINI / ENGEVAP	M. DEDINI / ENGEVAP
Capacity (Tons/h)	120	120
Serial number	084/19	70 V-2-S
Year of manufacturer or Expansion	1980 / 2018-2019	1979 / 2018
Maximum allowable working pressure (kgf/cm^2)	28	25
Hydrostatic Test Pressure (kgf/cm^2)	42	39
Pressure (kgf/cm^2)	23	21
Degree of super heat ºC (Steam)	350	350
Heating surface area (m^2)	3,000	2,421
Design Standard	ASME I - 2013	ASME I
category	A	A

Boiler nº 1


M. DEDINI S.A. METALÚRGICA
PIRACICABA-EST. DE SÃO PAULO-BRASIL
CAPACIDADE DA CALDEIRA
NATUREZA DO VAPOR
PRESSÃO DE TRABALHO
PRESSÃO MAX. DE TRAB. PERMITIDA
PRESSÃO DE PROVA HIDRÁULICA
ÁREA DE SUPERF. DE VAPORIZAÇÃO
CALDEIRA TIPO OU MODÊLO
Nº DE REGISTRO
ANO DE FABRICAÇÃO
DESTINATÁRIO
CBSERV
CONSULTORIA LTDA.
CALDEIRA TIPO CBS-120 ANO 05/2018
NÚMERO DO EQUIPAMENTO 02
CAPACIDADE PRODUTIVA MÁXIMA CONTÍNUA 120 T/H
PICO 2 HORAS 132 T/H
PRESSÃO DE CONSTRUÇÃO (POSTERIOR) 25/42 Kgf/cm²
PRESSÃO DE OPERAÇÃO 21 Kgf/cm²
PRESSÃO DE PROVA HIDROSTÁTICA 39 Kgf/cm²
TEMPERATURA DO VAPOR 350°C
SUPERFÍCIE DE AQUECIMENTO: RADIAÇÃO 496 m²
CONVECÇÃO 1.925,5 m²
TOTAL 2.421,5 m²
NORMA DE CONSTRUÇÃO ASME-Seção 1
CONSTRUÇÃO Engevap
MONTAGEM MR Consultoria
PROPRIETÁRIO Comvap
20 de fev. de 2026 13:21:00
União - PI, Brasil
4,85'S 42,89'W 39,3m


CBSERV
CONSULTORIA LTDA.
Combustion and boiler service
Rua Maestro Cardim, 887 Paraíso, CEP 01323-001, São Paulo, SP
CNPJ: 043.814.946/0001-02
CALDEIRA TIPO CBS-120 ANO 05/2018
NÚMERO DO EQUIPAMENTO 02
CAPACIDADE PRODUTIVA MÁXIMA CONTÍNUA 120 T/H
PICO 2 HORAS 132 T/H
PRESSÃO DE CONSTRUÇÃO (POSTERIOR) 25/42 Kgf/cm²
PRESSÃO DE OPERAÇÃO 21 Kgf/cm²
PRESSÃO DE PROVA HIDROSTÁTICA 39 Kgf/cm²
TEMPERATURA DO VAPOR 350°C
SUPERFÍCIE DE AQUECIMENTO: RADIAÇÃO 496 m²
CONVECÇÃO 1.925,5 m²
TOTAL 2.421,5 m²
NORMA DE CONSTRUÇÃO ASME-Seção 1
CONSTRUÇÃO Engevap Engenharia e Equip. Ltda
MONTAGEM MR Consultoria
PROPRIETÁRIO Comvap Açúcar e Álcool Ltda
12 de mar. de 2026 09:01:18
4,85'S 42,89'W 39,3m

Boiler nº 2

Alternator/ Generator	UG 1	UG 4	UG 5
Year of manufacturer	Not Available	1992	May, 2020
Manufacturer	TOSHIBA	SIEMENS	WEG
Power Rated (kVA)	7,500	5,000	18,750
Serial Number	0220041000	43838	1053153599
Voltage (V)	13,800	13,800	13,800
Current (Amps)	314	209	784.4
Power Factor (cos φ)	0.80	0.80	0.80
Efficiency (75%, 100% of load)	Not specified	Not Available	97.2%, 97.5%
Generator Rated Speed (rpm)	1,800	1,800	1,800
Frequency (Hz)	60	60	60
Generator Model	TABL	IFJ7805	ST40

Alternator/ Generator UG 1

Alternator/ Generator UG 4

Alternator/ Generator UG 5

Turbine	UG 1	UG 4	UG 5
Year of manufacturer	Not Available	1987	2020
Manufacturer	ENGECROL	M. DEDINI	TGM
Power Rated (kW)	6,000	3,300	15,990
Live Steam Pressure (Bar)	21	63	42
Live Steam Temperature (ºC)	350	450	410
Steam Exhaust Pressure (Bar)	1.5	5.2	1.5
Turbine Rated Speed (rpm)	5,880	8,400	6,000
Turbine Disarm Speed (rpm)	6,400	9,000	6,600
Turbine Model	E-70MVF	DME-450-I	TM 15000

Turbine UG 1

M.DEDINI S.A.
METALÚRGICA

TURBINA A VAPOR DEDINI

01. GENERALIDADES

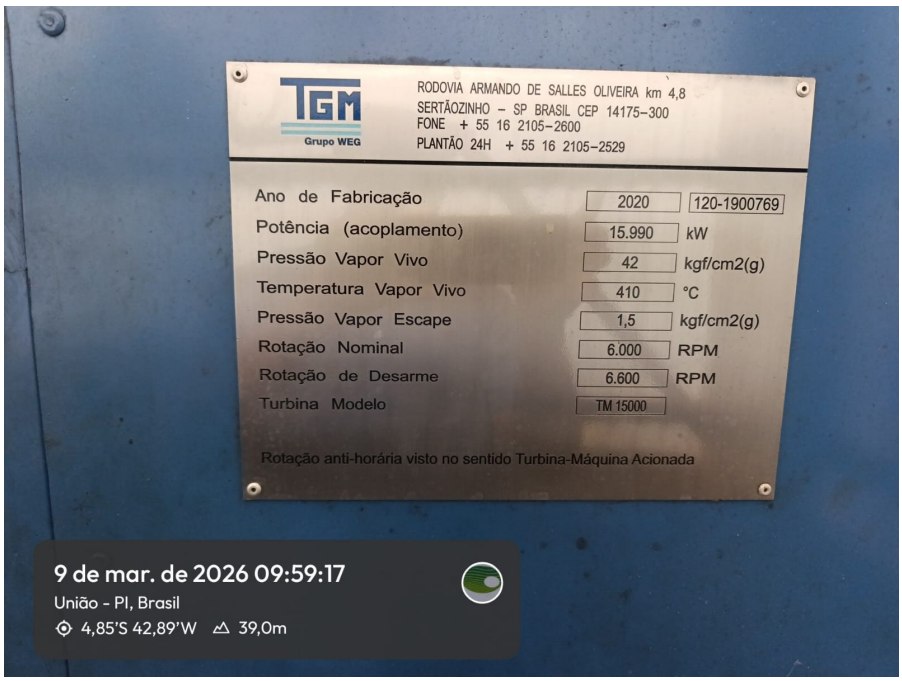
- Quantidade	01
- Modelo	DME-450-I
- Potência (1)	3300 kw
- Acionado	ALTERNADOR
- Rotação do acionado	1800 rpm

02. DADOS DO PROJETO

- Tipo	Multi-válvula, Multi-estágios impulso e contrapressão
- Partição da carcaça	Horizontal
- Rotor tipo	"built up"(rígido)
- Diâmetro médio da palhetagem	450 mm
- 1a. rotação crítica	9000 rpm
- Rotação de projeto do rotor	8400 rpm
- Número de estágios	04
- Número de válvulas de regulagem	02 (duas)
- Número de válvulas de fecho rápido ..	01 (uma)
- Vedação do eixo tipo	Labirinto
- Tipo do mancal radial	"three lobe"
- Tipo do mancal axial	"tilting pad"
- Regulador de velocidade tipo	Hidráulico
- Regulador de velocidade modelo	RD-2045
- Regulador classe NEMA	C
- Lubrificação tipo	Forçada
- Pressão do vapor na entrada	31 ATA
- Temperatura do vapor na entrada	350°C
- Pressão do vapor no escape	5,2 ATA

(1) Nos bornes do Alternador - a eficiência para o gerador é de 0,95 a 100% da carga.

Turbine UG 4


TGM
Grupo WEG
RODOVIA ARMANDO DE SALLES OLIVEIRA km 4,8
SERTÃOZINHO – SP BRASIL CEP 14175–300
FONE + 55 16 2105–2600
PLANTÃO 24H + 55 16 2105–2529
Ano de Fabricação 2020 120-1900769
Potência (acoplamento) 15.990 kW
Pressão Vapor Vivo 42 kgf/cm2(g)
Temperatura Vapor Vivo 410 °C
Pressão Vapor Escape 1,5 kgf/cm2(g)
Rotação Nominal 6.000 RPM
Rotação de Desarme 6.600 RPM
Turbina Modelo TM 15000
Rotação anti-horária visto no sentido Turbina-Máquina Acionada
9 de mar. de 2026 09:59:17
União - PI, Brasil
4,85'S 42,89'W 39,0m

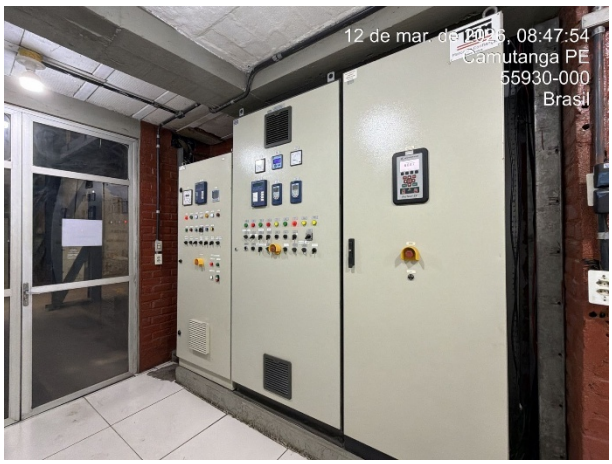
Turbine UG 5

UTE OLHO D'ÁGUA (USICODA)

The system consists of three power-generating (UG1, UG2 and UG3) units supplied by four boilers:

Boilers

Medium Voltage Panel



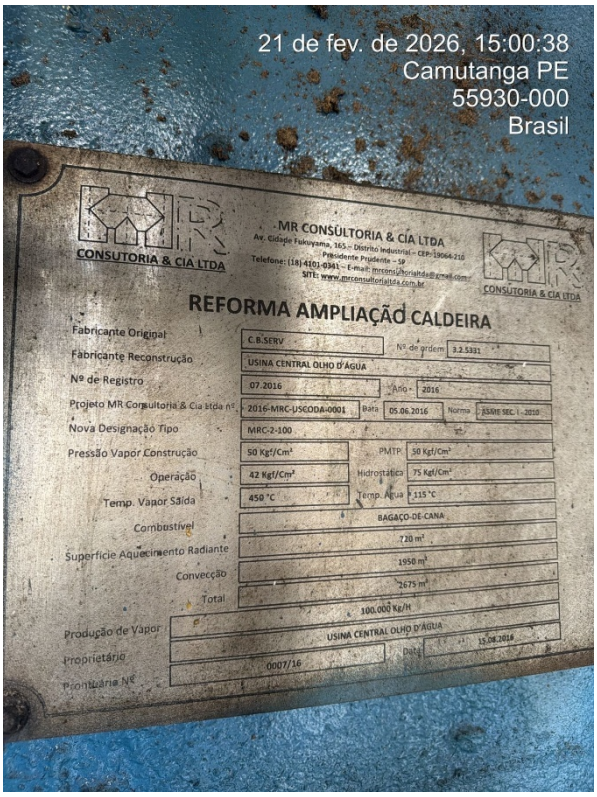
Turbine Control Panels

Alternator/ Generator UG 1

Alternator/ Generator UG 2

Alternator/ Generator UG 3

Boiler	Nº 1	Nº 2	Nº 3	Nº 4
Manufacturer	C.B. SERV	M. DEDINI	M. DEDINI / SGE	ZANINI
Capacity (Tons/h)	100	60	75	36
Serial number	0001/ 2016	7 71252		70 V-2-S
Year of manufacturer or Expansion	2016	1977	2006	1971
Maximum allowable working pressure (kgf/cm^2)	50	25	28	23
Hydrostatic Test Pressure (kgf/cm^2)	75	37.5	42	Not available
Pressure (kgf/cm^2)	42	21	23	20
Degree of super heat ºC (Steam)	450	270	350	270
Heating surface area (m^2)	2,675	1,800	2,100	1,200
Design Standard	ASME I -2010	ASME I	ASME I -2001	ASME I
category	A	A	A	A



Boiler nº 1

Boiler nº 2

Boiler nº 3

Boiler nº 4

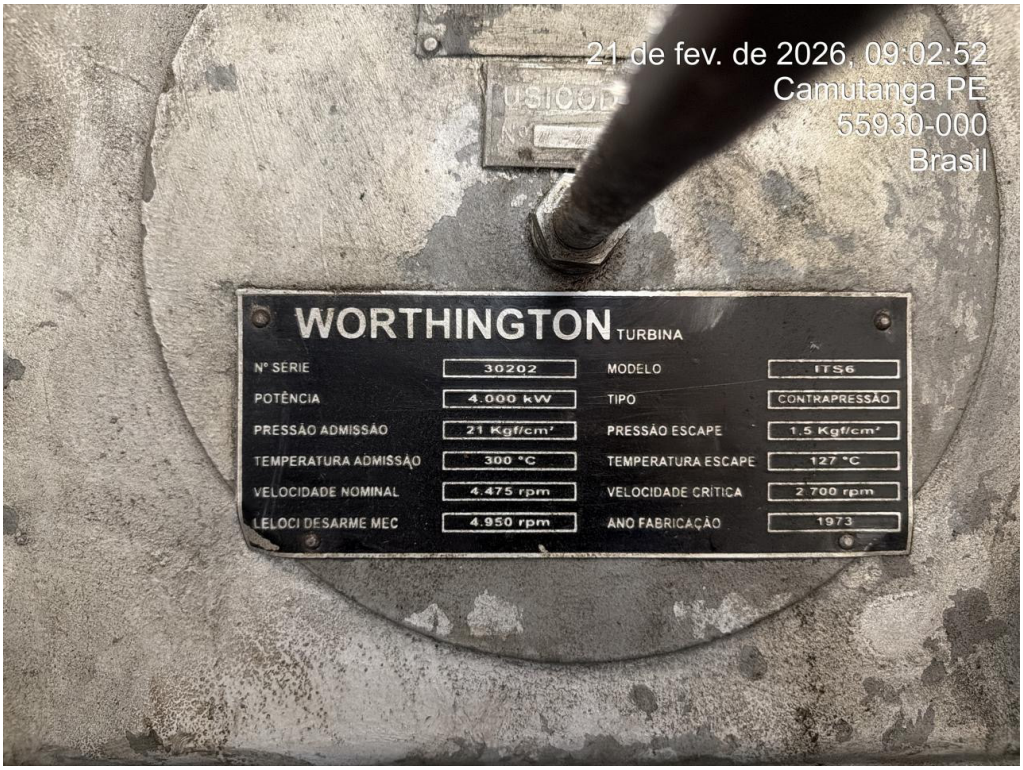
Alternator/ Generator	**UG 1**	**UG 4**	**UG 5**
Year of manufacturer	1973	July, 2003	June, 2017
Manufacturer	WEG	WEG	WEG
Power Rated (kVA)	6,250	12,500	18,750
Serial Number	156994 06 06	118649	1036353871
Voltage (V)	13,800	13,800	13,800
Current (Amps)	261.5	523	784.4
Power Factor (cos φ)	0.80	0.80	0.80
Efficiency (75%, 100% of load)	Not specified	97.1%, 97.3%	97.2%, 97.5%
Generator Rated Speed (rpm)	1,800	1,800	1,800
Frequency (Hz)	60	60	60
Generator Model	SPW 710	SPW 900	ST40 1000

Alternator/ Generator UG 1

Alternator/ Generator UG 2

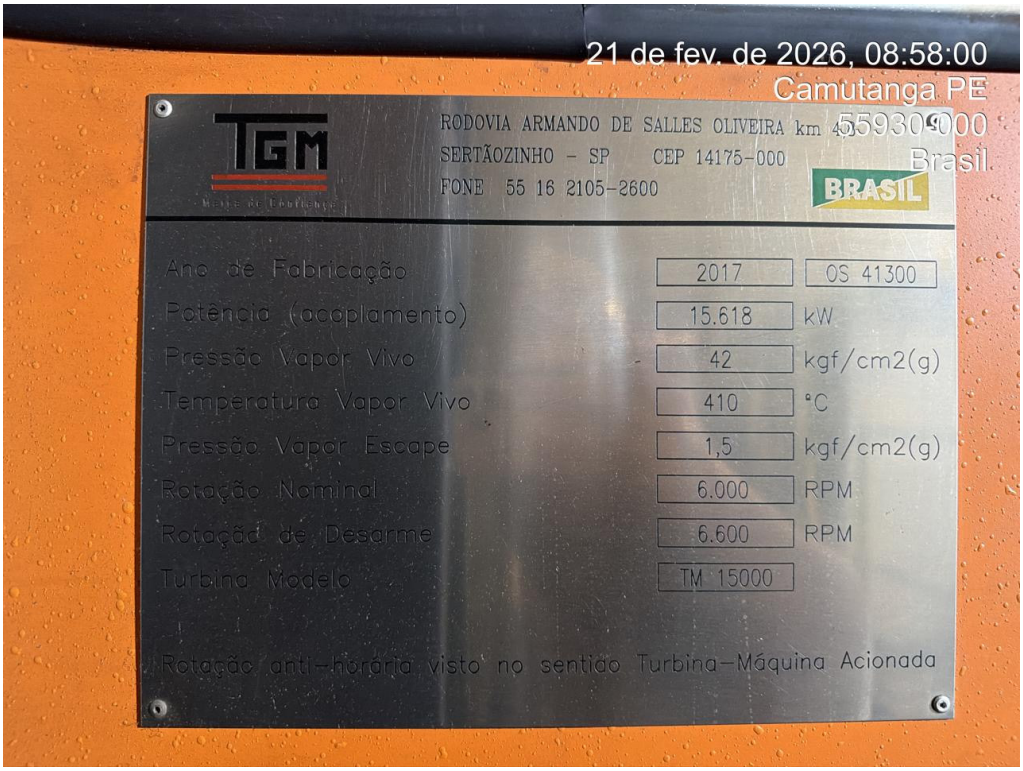
Alternator/ Generator UG 3

Turbine	UG 1	UG 2	UG 3
Year of manufacturer	1973	2003	2017
Manufacturer	WORTHINGTON	ENGETURB-DRESSER	TGM
Power Rated (kW)	4,000	10,000	15,618
Live Steam Pressure (Bar)	21	42	42
Live Steam Temperature (ºC)	300	420	410
Steam Exhaust Pressure (Bar)	1.5	1.5	1.5
Turbine Rated Speed (rpm)	4,475	5,500	6,000
Turbine Disarm Speed (rpm)	4,950	5,950	6,600
Turbine Model	ITS6	E-5T	TM 15000



Turbine UG 1

Turbine UG 2



Turbine UG 3

A.5. Parties and project participants >>

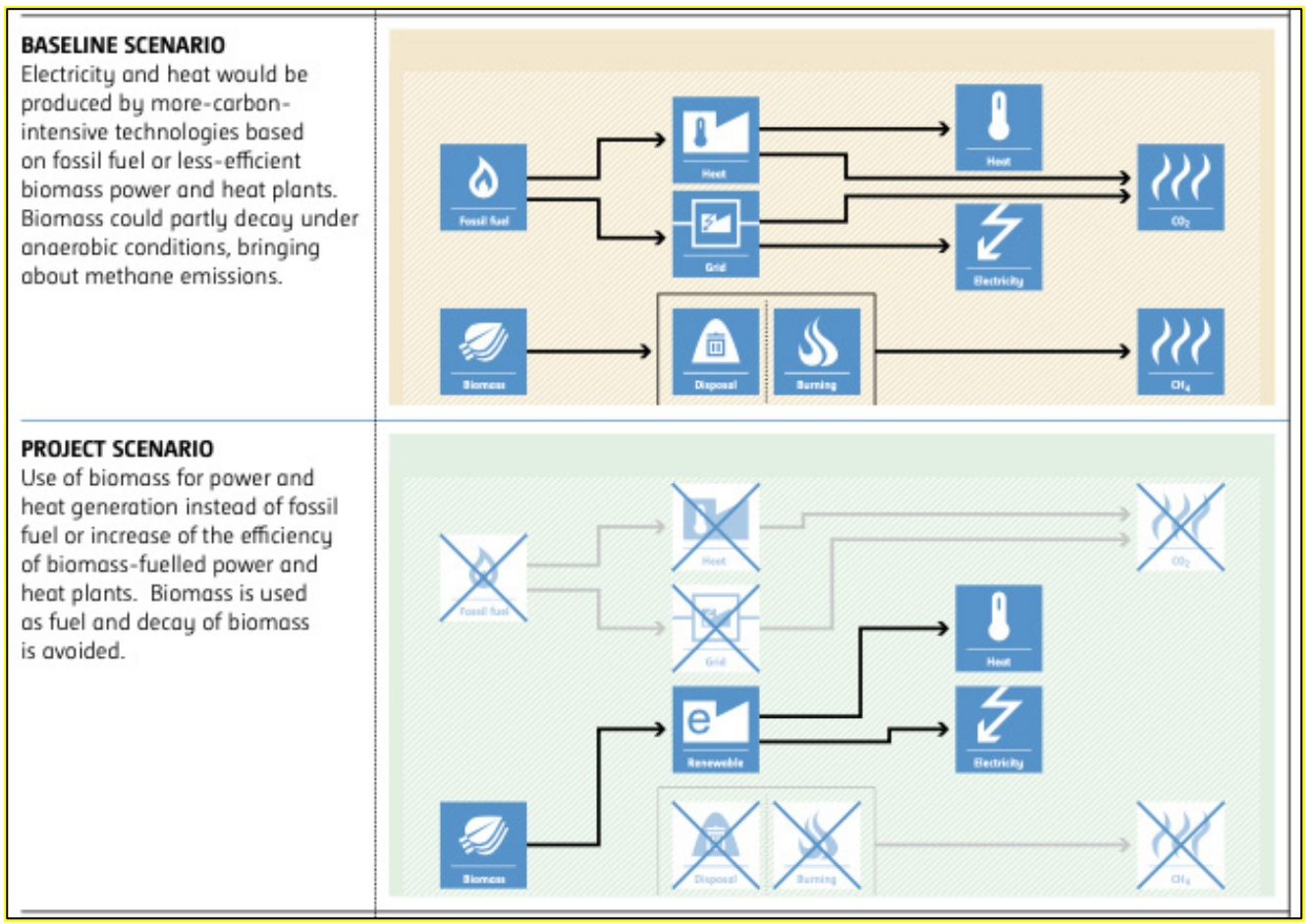
Party (Host)	Participants
Brazil	**Owner:** GRUPO OLHO D'ÁGUA Rodovia PE-082, km 14, S/N, Zona Rural, Camutanga - PE Zip Code: 55930-000 https://www.grupoolhodagua.com.br/ **Aggregator:** FastCarbon Consultoria e Negócios Ltda Rua Viradouro, 63, conjunto 61, Itaim Bibi São Paulo/SP Zip Code: 04538-110 https://fastcarbon.com.br

A.6. Baseline Emissions>>

The approved baseline methodology has been referred from the indicative simplified baseline and monitoring methodologies for selected large scale UNFCCC CDM project activities that involve generation of power and heat in thermal power plants, including cogeneration plants using biomass.

Typical activities under ACM0006 are new plants, capacity expansions, energy efficiency improvements or fuel switch projects.

ACM0006 Electricity and heat generation from biomass



A.7. Debundling>>

This "73.5 MW Sugarcane Bagasse based co-generation Energy GRUPO OLHO D'ÁGUA" 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 B. Application of methodologies and standardized baselines

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

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

TYPE I - Renewable Energy Projects

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

B.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 73.5 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.

B.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.

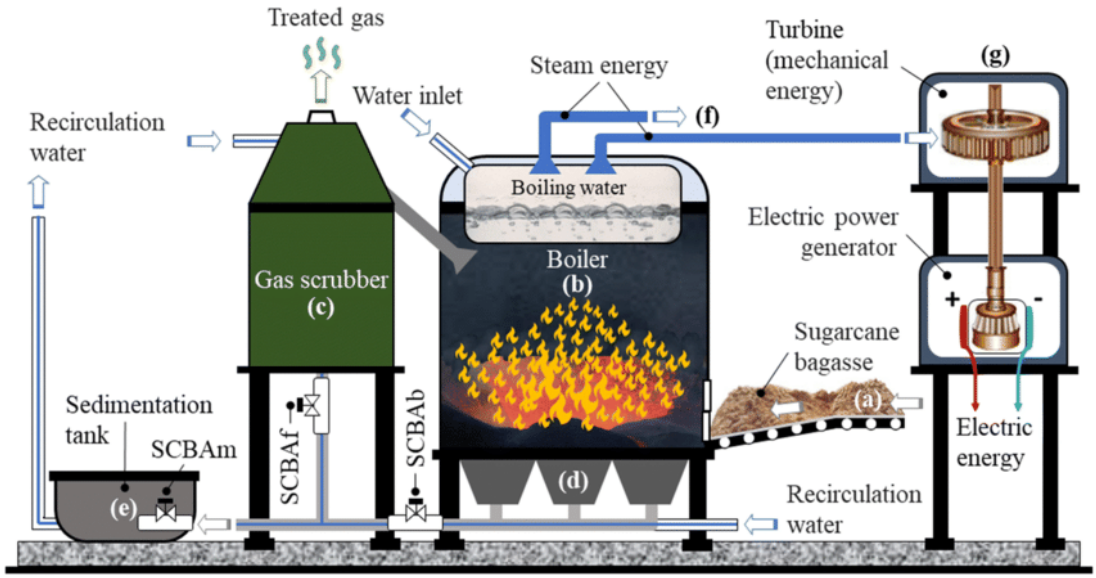
Grupo Olho D'Água is also certified by Renovabio, which is the Brazilian National Biofuels Program, created to encourage the production and use of sustainable biofuels, such as ethanol and biodiesel, replacing gasoline and diesel, which are more polluting fossil fuels. The lower the carbon intensity 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.

B.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_2O	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_2O	No	Zero-emissions grid connected electricity generation from renewable energy

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

N_2O Excluded simplification. conservative

This is

- CO_2 emissions from transportation of biomass residue to the project site
- CO_2 emissions from on-site consumption of fossil fuels due to project activity
- CO_2 emissions from electricity consumption at the project site that is attributable to the project activity and
- CH_4 emissions from combustion of biomass.

Where,

PET_y = are the CO_2 emissions during the year y due to transport of the biomass to the project plant in tons of CO_2,

$PEFF_{CO2,y}$ = are the CO_2 emissions during the year y due to fossil fuels co-fired by the generation facility in tons of CO_2,

PEEC,y = are the CO_2 emissions during the year y due to electricity consumption at the project site that is attributable to the project activity in tons of CO2,

GWPCH4 = 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,
$PET_y = 0$, $PEFF_{CO2}$, $y = 0$, $PEEC,y = 0$ and, $PE_{Biomass},CH4,y = 0$.

Therefore, $PE_y = 0$.

B.5. Establishment and description of baseline scenario (UCR Standard or Methodology) >>

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 2025, the following calculation has been submitted:

Emission Reductions are calculated as follows:

ERy = BEy – PEy – LEy Where:
ERy = Emission reductions in year y (tCO_2/y)
BEy = Baseline Emissions in year y ($t\ CO_2/y$)
PEy = Project emissions in year y (tCO_2/y)
LEy = Leakage emissions in year y (tCO_2/y)

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

BEy = 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:

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

Where:

$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year y (t CO_2/MWh)
$EF_{grid,OM,y}$ = Operating margin CO_2 emission factor in year y (t CO_2/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

For the Build and Operation margin emission factor, was considered the public data for the year of 2023 available in the Ministry of Science, Technology and Innovation website

OM = 0.3785

BM = 0.0467

Resulting in $EF_{grid,CM,y}$ = 0.2126

Estimated power generation per year as 72,000 MWh,

Resulting in *BEy* = 15,307 tCO_2

Since the project is a biomass co-generation project:

PEy = 0
LEy = 0

So as result *ERy* = *BEy*

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.

ERy = 15,307 x 0.9 = 13,776 tCO_2 / year

Estimated Annual emission reductions: ERy = 13,776 tCO_2 / year (13,776 CoUs /year)

B.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.

Grupo Olho D'Água 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/l13576.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** (gCO_2eq/MJ)
- EF_{bio} = **Emission Factor of the assessed biofuel** (gCO_2eq/MJ)

The $\boldsymbol{EF_{bio}}$ 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:

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

Where:

- V_{bio} = **Volume of biofuel** produced and sold (in cubic meters, m^3)
- **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.

B.7. Changes to start date of crediting period >>

Crediting period start: Jan 01, 2013.
There is no change in the start date of crediting period.

B.8. 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.

B.9. Monitoring period number and duration>>

First Issuance Period: 12 years – Jan 01, 2013 to Dec 31, 2025

B.8. Monitoring plan>>

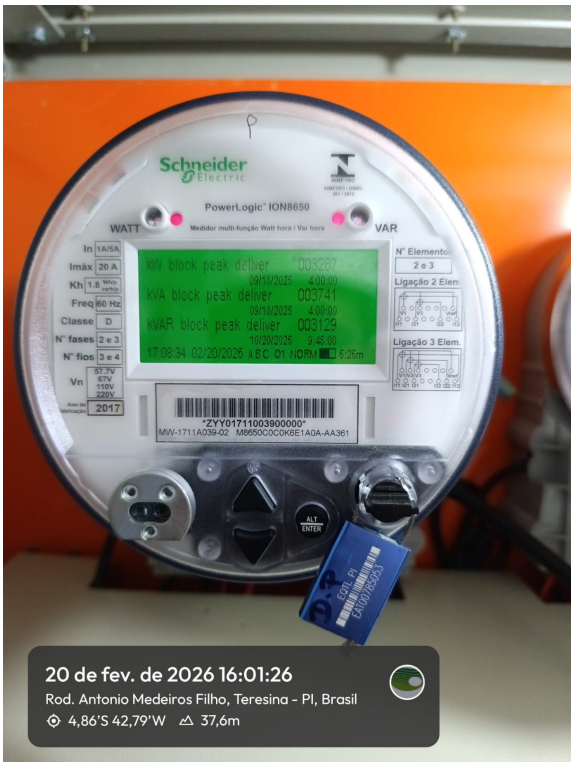
All energy generation data is acquired through CCEE meters installed in Grupo Olho D'Água substation.

Meter	Serial Number	Specification
1	36016959 (Main) UTE GIASA	ACTARIS SL7000 3 Phases 57.7 ~ 100 V-3x240/415V 5 A (max 10 A) 60 Hz Class CL 0.2s Rip = 10,000 imp/ kWh Year of manufacturer: 2005 Last Calibration: may 15, 2026 Installation Code: PBMRO-UTEGI01P
2	37103647 (Check) UTE GIASA	ACTARIS SL7000 3 Phases 57.7 ~ 100 V-3x240/415V 5 A (max 10 A) 60 Hz Class CL 0.2s Rip = 10,000 imp/ kWh Year of manufacturer: 2006 Last Calibration: may 14 ,2026 Installation Code: PBMRO-UTEGI01R

3	MW-1711A039-02 (Main) UTE - COMVAP	Schneider Power Logic ION8650 3 Phases 57.7 ~ 220 V 1 A /5 A (max 20 A) 60 Hz Class D kh 1,8 Wh-varh/pulse Year of manufacturer: 2017 Last Calibration: May 12, 2026 Installation Code: PIMAIAUTCVP01P
4	MW-1711A082-02 (Check) UTE - COMVAP	Schneider Power Logic ION8650 3 Phases 57.7 ~ 220 V 1 A /5 A (max 20 A) 60 Hz Class D kh 1,8 Wh-varh/pulse Year of manufacturer: 2017 Last Calibration: May 12, 2026 Installation Code: PIMAIAUTCVP01R
5	3142890037 (Main) UTE Olho D'Água (USICODA)	Landis+Gyr E750 8701-A 3 Phases 120V, 220 V 2,5 A / 10 A 60 Hz Class D kh 0,6 Wh-varh/pulse Year of manufacturer: dec, 2014 Last Calibration: May 13, 2026 Installation Code: PEYCODUCODA01P
6	3142890045 (Check) UTE Olho D'Água (USICODA)	Landis+Gyr E750 8701-A 3 Phases 120V, 220 V 2,5 A / 10 A 60 Hz Class D kh 0,6 Wh-varh/pulse Year of manufacturer: dec, 2014 Last Calibration: May 13, 2026 Installation Code: PEYCODUCODA01R

Meter 1 (UTE GIASA - Main)

Meter 2 (UTE GIASA - Check)



Meter 3 (UTE COMVAP - Main)

Meter 4 (UTE COMVAP - Check)

Meter 5 (UTE Olho D'Água USICODA Main)

Meter 6 (UTE 3 – Olho D'Água USICODA - 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 Grupo Olho D'Água personnel through CCEE system at CCEE website.

Parameters being monitored or used in emission reductions determination:

Data/Parameter	$EF_{grid,y}$
Data unit	tCO2e/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:	$EG_{pj,y}$
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.