



CENOL AND TELHA FORTE CERAMICS SWITCHING FUEL PROJECT



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Prepared by	Sustainable Carbon – Projetos Ambientais Ltda

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PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Carbono Social Serviços Ambientais LTDA. (Social Carbon Company) developed this project activity in 2009, and has changed its company name to Sustainable Carbon – Projetos Ambientais LTDA.

The project activity is the project of *Cenol* and *Telha Forte* Ceramics, which are two ceramic companies located in *São Miguel do Guamá* municipality, in the State of Pará, north of Brazil. Both ceramic companies produce structural ceramic pieces as bricks, mainly for the regional market in *Belém* and for the northeast region of the State.

The main goal of this project activity is to minimize the negative impacts of the deforestation of the Amazon biome by discouraging the exploration of the area. This Switching Fuel project is reducing the greenhouse gas (GHG) emissions through the substitution of native wood for renewable biomasses to generate thermal energy, considering that the GHG emissions generated from native wood combustion were not compensated by replanting. An opposite scenario occurs with the renewable biomasses employed in this project activity, which have carbon neutral lifecycle, generate thermal energy without stimulating deforestation.

Even though the use of native wood was a credible and more financially attractive scenario, considering the damage caused to the environment by the production of ceramic pieces, the factories implemented a carbon credit project at 01/03/2007. At this date, the ceramic acquired the first mechanic burners and started applying the Social Carbon Standard. Therefore, this project could only be feasible when considering the income derived from commercializing the resulting carbon credits. This move was originally unattractive due to the high investment costs of the adaptation of machineries to the new biomass and other barriers.

The project has been fully operational since the starting date of the first crediting period. During the revalidation process and the current monitoring period, Cenol was operating with 11 “Paulista” kilns and the Telha Forte Ceramics was operating with 8 “Paulista” kilns (which corresponds to 30% of production) and 2 “Mobile” kilns (which corresponds to 70% of production).

The emission reductions due to the switching of non-renewable to renewable biomasses were equal to **83,368 tCO₂e** during the monitoring period from 01/01/2022 to 31/05/2025.

In addition to reducing GHG emissions and alleviating pressure on the Amazon biome, the project generates income and delivers various social and environmental benefits to workers and the surrounding community. These include supporting community development through sponsorship of the local capoeira group, providing donations to community members, local churches, and institutions. Furthermore, the ceramics factories mitigates its environmental impacts by reusing waste in the production process, restoring degraded areas, and engaging in fish farming at the clay extraction site.

1.2 Audit History

Audit type	Period	Program	Validation/verification body name	Number of years
Validation (PD 1) - First Crediting Period	(01-November-2007–31-October-2017)	VCS	TÜV NORD CERT GmbH	10 years
Verification (MR 1)	(01-November-2007–30-September-2008)	VCS	TÜV NORD CERT GmbH	0.92 year
Verification (MR 2)	(01-October-2008–30-June-2009)	VCS	TÜV NORD CERT GmbH	0.75 year
Verification (MR 3)	(01-July-2009–31-January-2010)	VCS	Bureau Veritas Certification Holding SAS	0.58 year
Verification (MR 4)	(01-February-2010–28-February-2011)	VCS	Bureau Veritas Certification Holding SAS	1.08 years
Verification (MR 5)	(01-March-2011–30-April-2012)	VCS	TÜV Rheinland do Brasil Ltda.	1.17 years
Verification (MR 6)	(01-May-2012–31-October-2017)	VCS	ESPL- Earthood Services Private Limited	5.5 years
Validation (PD 2) - Second Crediting Period	(01-November-2017–31-October-2027)	VCS	ESPL- Earthood Services Private Limited	10 years
Verification (MR 7)	(01-November-2017–31-December-2020)	VCS	RINA Services SpA	3.17 years
Verification (MR 8)	(01-January-2021–31-December-2021)	VCS	ESPL- Earthood Services Private Limited	1 year
Verification (MR 9)	(01-January-2022–31-May-2025)	VCS	VERIFIT S.A.S	3.42 years

1.3 Sectoral Scope and Project Type

Sectoral scope ¹	1 - Energy (renewable / non-renewable)
Project activity type	Fuel switch from non-renewable biomass to renewable biomass.

1.4 Project Proponent

Organization name	Cenol and Telha Forte Ceramics: Industrial Establishment: Cenol Cerâmica do Norte Ltda Industrial Establishment: Cerâmica Telha Forte Ltda
Contact person	Mr. Francisco Valdir, Mrs. Camila Moura secretary and Mrs. Rosângela Siqueira
Title	Mr. Francisco Valdir, Director and owner: Information about the ceramic companies, detailed information on process and production lines, environmental challenges, technological challenges, research and development history, ceramics devices market challenges. Mrs. Camila Moura secretary and Mrs. Rosângela Siqueira healthy technician, both Monitoring data responsible: General data and information on inputs and outputs of the ceramic companies, detailed information on the acquisition of renewable biomasses and how this data is kept by the controller's office.
Address	BR 010, Km 1808 São Miguel do Guamá - Pará - Brazil Postal Code: 68.660-000
Telephone	+55 91 3446-2341
Email	fortetelha@yahoo.com.br

Organization name	Sustainable Carbon - Projetos Ambientais Ltda
Contact person	Eliane Seiko Maffi Yamada

¹ Projects, activities, or methodologies may be developed under any of the 16 VCS sectoral scopes: <https://verra.org/programs/verified-carbon-standard/vcs-program-details/#sectoral-scopes>

	Aline de Paulo Costa Glenda Fauth Mariana Vieira da Costa Thaís de Almeida Rocha
Title	Eliane Seiko Maffi Yamada: Technical Director Aline de Paulo Costa: Technical Coordinator Glenda Fauth: Technical Analyst Mariana Vieira da Costa: Technical Analyst Thaís de Almeida Rocha: Technical Analyst
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1.5 Other Entities Involved in the Project

No other entity is involved in this project activity.

1.6 Project Start Date

Project start date	01-March-2007 ²
Justification	On this date, the project began reducing or removing GHG emissions, i.e. the ceramics factories started using renewable biomass as fuel, and started monitoring the socioenvironmental impact. At this date, the ceramic factories acquired the first mechanic burners.

1.7 Project Crediting Period

Crediting period	☐ Seven years, twice renewable
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² According to version 05 of the VCS PD, available at: < <https://registry.terra.org/app/projectDetail/VCS/54>>. Last visit on: June 24th, 2025.

	☐ Ten years, fixed ☒ Other - Ten years, twice renewable. The crediting period is in line with the VCS 2007 Standard ³ , which was in force at the validation of the first crediting period.
Start and end date of first or fixed crediting period	First Crediting Period – 01-November-2007 to 31-October-2017 Second Crediting Period – 01-November-2017 to 31-October-2027

1.8 Project Location

According to the applied methodology, the project boundaries for the project are the physical, geographical areas of the renewable energy generation. Thus, the ceramics limits.

Cenol and Telha Forte ceramics are in Brazil, in the State of Pará which is indicated in Figure 01.

Cenol and Telha Forte Ceramics

Rodovia BR 010 – KM 1808 – Bairro Industrial

São Miguel do Guamá - Pará, Brazil

Postal Code: 68.660-000

Geodetic Coordinates (SAD69):

Cenol Ceramic: 1° 36' 19.8" S 47° 29' 19.2" W

Telha Forte Ceramic: 1° 36' 00.1" S 47° 29' 04.0" W

Table 1: Localization of the ceramic's companies

Ceramic	City	State	Ceramic Company Coordinates
Cenol	São Miguel do Guamá	Pará	1° 36' 19.8" S 47° 29' 19.2" W
Telha Forte	São Miguel do Guamá	Pará	1° 36' 00.1" S 47° 29' 04.0" W

³ Document available at: <https://verra.org/wp-content/uploads/VCS-2007.pdf>. Last visited on: June 24th, 2025.



**Figure 1: Geographic location of São Miguel do Guamá which has the following coordinates:
1°37'09.22"S and 47°28'33.68"W.**

1.9 Title and Reference of Methodology

Type (methodology, tool or module).	Reference ID, if applicable	Title	Version
Methodology	AMS-I.E.	AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User	Version 07.0 ⁴
TOOL	TOOL12	Project and leakage emissions from transportation of freight	01.1.0 ⁵
TOOL	TOOL16	Project and leakage emissions from biomass	04.0 ⁶
TOOL	TOOL30	Calculation of the fraction of non-renewable biomass	01.0 ⁷

⁴ This version of the methodology is available at:
<<https://cdm.unfccc.int/methodologies/DB/9LFOR81TCT5FLI1AJYP46CQY802J79>>. Last visit on: June 24th, 2025.

⁵ Project and leakage emissions from transportation of freight Available at:
<<https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-12-v1.1.0.pdf>> Last visit on: June 24th, 2025.

⁶ Project and leakage emissions from biomass Available at:
<<https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-16-v4.pdf>> Last visit on: October 21st, 2025.

⁷ Calculation of the fraction of non-renewable biomass. Available at:
<<https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-30-v1.pdf>> Last visit on: October 21st, 2025.

1.10 Double Counting and Participation under Other GHG Programs

1.10.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program?

☐ Yes ☒ No

1.10.2 Registration in Other GHG Programs

Was the project registered or seeking registration under any other GHG programs?

☐ Yes ☒ No

1.11 Double Claiming, Other Forms of Credit, and Scope 3 Emissions

1.11.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the *VCS Program Definitions* for definitions of emissions trading program and binding emission limit.

☐ Yes ☒ No

1.11.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the *VCS Program Definitions* for definition of GHG-related environmental credit system.

☐ Yes ☒ No

1.11.3 Supply Chain (Scope 3) Emissions

Do the project activities affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☒ Yes ☐ No

Is the project proponent(s) or authorized representative a buyer or seller of the product(s) (goods or services) that are part of a supply chain?

☒ Yes ☐ No

Has the project proponent(s) or authorized representative posted a public statement on their official public communication channel, which is WhatsApp (specifically, the number +55 91 9160-5009), saying, "Carbon credits may be issued through the Verified Carbon Standard project

54 for the greenhouse gas emission reductions or removals associated with Cerâmicas Cenol and Telha Forte ceramic products (tiles and bricks).”

☒ Yes

☐ No

1.12 Sustainable Development Contributions

The project continuously contributes to the sustainable development of the host country by replacing the use of native wood with renewable biomass, significantly reducing greenhouse gas emissions and helping to prevent deforestation.

In addition, Cenol and Telha Forte support the well-being of their workers and the surrounding community through a range of initiatives. These include annual vaccination campaigns in partnership with the local health department, regular donations of food baskets to vulnerable families, and continuous improvements to workplace infrastructure—such as the construction of a bicycle rack, renovation of bathrooms, creation of a training auditorium, and implementation of thermal comfort measures for employees.

The initiatives are aligned with Agenda 21, the Brazilian Sustainable Development Criteria, and the Sustainable Development Goals (SDGs), contributing specifically to:

- SDG 2 – Zero Hunger
- SDG 3 – Good Health and Well-being
- SDG 7 – Affordable and Clean Energy
- SDG 8 – Decent Work and Economic Growth
- SDG 13 – Climate Action

In the previous monitoring period, the project’s contributions to SDGs 7, 8, 12 and 13 have been indirect and qualitatively assessed through the SocialCarbon methodology, a co-benefits methodology previously applied in the project. These initiatives and results can be reviewed in previous monitoring reports.

During this monitoring period, no activities were implemented that relate directly, nor quantitatively, to SDG 12. However, the initiatives implemented during this monitoring period contributed to SDGs 2, 3, 7, 8 and 13, as explained in Table 2.

The project proponents keep systematic records of these activities, allowing Sustainable Carbon to monitor and report on progress transparently.

Table 2: Sustainable Development Contributions

Row number	SDG target	SDG indicator	Net impact on SDG indicator	Current project contributions	Contributions over project lifetime
1)	2.1	Number of basic food baskets donated.	Implemented activities to increase.	During the monitored period, 26 basic food baskets were distributed and R\$ 1,000.00 were donated to support Christmas dinner for people in vulnerable situations.	Throughout the project's lifetime, 781 basic food baskets were donated to the community.
2)	3.0	Number of vaccination campaigns carried out.	Implemented activities to increase.	During the monitored period, one vaccination campaign was carried out, with 75 meningococcal vaccines, 4 hepatitis B, 3 yellow fever, 68 tetanus, and 1 influenza vaccine administered.	Since the beginning of the project, the ceramics companies Cenol and Telha Forte have carried out at least two vaccination campaigns. These campaigns included the administration of vaccines such as yellow fever, influenza, tetanus, and hepatitis, aiming to prevent diseases and promote the well-being of workers.
3)	7.0	Amount of native wood from deforestation displaced by project activity (hectares).	Implemented activities to increase.	During this monitoring period, the project activity displaced the use of 606 hectares of native wood by using renewable biomass.	Over the project lifetime, the use of 3,117 hectares of native forest was replaced by renewable biomass.

4)	8.0	Number of structural improvements carried out to promote safety and well-being in the workplace.	Implemented activities to increase.	During the period, at least two infrastructure improvements were made at the ceramics facility at the request of employees. A bicycle rack was built, and the restrooms were renovated.	Since the beginning of the project, the ceramics facility has carried out seven significant structural improvements, such as the renovation of the administrative office, the expansion of the garage roof, the construction of a training auditorium, the installation of a machine maintenance workshop, the implementation of measures to improve workers' thermal comfort, including the distribution of special socks for use with shorts in high-heat areas, as well as the construction of a bicycle rack and the renovation of the restrooms implemented during the current monitoring period.
5)	13.0	Tonnes of greenhouse gas emissions avoided.	Implemented activities to increase.	The project's activity avoided the emission of 83,368 tCO ₂ into the atmosphere by replacing native wood with renewable biomass.	The project has avoided the release of 616,999 tCO ₂ into the atmosphere over its lifetime.

During the monitoring period, the ceramic factory carried out the actions mentioned above, which contribute to the listed SDGs, but also implemented additional initiatives that reinforce its commitment to local and environmental development, as outlined below:

- Financial donations for the purchase of medicines and medical exams for community members.
- Educational partnership with Escola Estadual Irmã Carla to support local education and community development.
- Implementation of the “Green Roof Project,” which included the planting of trees within the company’s premises.
- Financial support for the factory’s employee football team.
- Monthly financial donations to the Centro de Recuperação Gente Livre that provide direct support to people in vulnerable situations.
- Financial contributions to the Associação de Capoeira Raízes da Angola, which support culture and social inclusion.
- Organization of celebrations and events, including year-end parties with gifts, employee birthday celebrations, and seasonal initiatives such as Easter food basket donations and toy donations on Children’s Day.
- Monthly donations of bricks, medicines and financial aid to community members in need.
- Financial and material support to the local parish, including contributions to the youth guard program (2023), the Passion of Christ event (2024), and the parish festival (2022).
- Donations to the Projeto Anjos Protetores.
- Direct assistance to two community members, José Nunes and France, through the provision of food baskets and medical care.
- Donations (both food baskets and financial aid) to the Associação de Moradores do Bairro Humarizal (AMBU), which organizes community projects such as the Solidarity Soup initiative, capoeira classes, and educational programs for children.

1.13 Commercially Sensitive Information

None of the information exposed to the Validation and Verification Body was withheld from the public version of the report.

2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1 Stakeholder Engagement and Consultation

2.1.1 Stakeholder Identification

Stakeholder Identification	Stakeholders were identified at validation and there were no changes since then. The stakeholders considered in this project are the Ceramic sector syndicate, the Ceramic company employees, the São Miguel do Guamá Industries Syndicate (SICOM), local development agencies, such as SEBRAE (Brazilian Service to Support Micro and Small Companies) and SENAI (National Service for Industrial Training), environmental agencies, non-governmental organizations (NGOs), ceramic companies in São Miguel do Guamá, and the local community.
Legal or customary tenure/access rights	The project activity is being developed in two ceramic industries, Cenol and Telha Forte, both located on private property. The stakeholders were aware of the project at the validation period, and no legal or customary tenure/access rights were held by the stakeholders.
Stakeholder diversity and changes over time	The project involves stakeholders ranging from government agencies to residents of the local community. Therefore, it can be considered that the project covers the social, economic, and cultural diversity of its various stakeholders. No changes have been identified among the stakeholders involved with the project. Any significant future changes will be reported in this section.
Expected changes in well-being	During the project revalidation, the risks and impacts were analyzed and described in section "5. Safeguards" of the VCS PD version 07. The only negative impact identified is that the project activity generates ash due to the burning of biomass; however, this impact is mitigated by the use of ash as fertilizer. Regarding stakeholders, specifically the local community, their well-being can be considered positively

	impacted by the donations and social actions promoted by the project proponent using the income from carbon credits. In addition, the switch to renewable biomass helps to avoid deforestation, benefiting biodiversity, the conservation of ecosystem services and the mitigation of climate change, thus improving the well-being of local communities.
Location of stakeholders	The project stakeholders are primarily located in São Miguel do Guamá, including the Ceramic sector syndicate, ceramics companies' employees, the São Miguel do Guamá Industries Syndicate (SICOM), local ceramic companies, and the local community. Local environmental agencies, such as SEMMA (Municipal Secretariat of Environment), are also based in São Miguel do Guamá. SEBRAE operates across Pará, while SENAI is located in Belém.
Location of resources	The project activity is developed on private property. No stakeholder owns or have customary access to the territory or resources on the ceramic industries' boundaries.

2.1.2 Stakeholder Consultation and Ongoing Communication

Ongoing consultation	Cenol and Telha Forte's environmental management area is available to receive any kind of suggestions and comments from the community through the website, CSC, telephone, e-mail or even personally. Sustainable Carbon team is also available to discuss the project and is easily accessible via email and telephone: Email: tech.sc@sustainablecarbon.com Telephone: +55 11 98882-2550 In addition, every document regarding the project is public and accessible on the VERRA registry page: https://registry.terra.org/app/projectDetail/VCS/54
Date(s) of stakeholder consultation	The formal stakeholder consultation was carried out during the validation of the project, in 2008. During project validation, a letter was sent to stakeholders informing them about the project. At Cenol and Telha Forte's facilities, the letter was posted on the employees' board, a

	visible location with high employee traffic. The letter remained available for seven days, and comments were expected within seven days after it was posted. Additionally, a stakeholder consultation was conducted on 20-Mar-2015. Although, no formal stakeholder consultation was conducted during this Monitoring Period.
Communication of monitored results	There is open and continuous communication regarding the project's results, impacts, and relevant information, carried out through regularly prepared information materials. These materials present the project, the benefits generated, the outcomes of actions related to the SDGs, the monitored parameters, and the carbon credits issued. Dissemination takes place through various channels — such as email, WhatsApp groups, Dropbox, and the materials remain available for consultation and eventual sharing with interested stakeholders. In this way, all project information is duly recorded and accessible on demand, ensuring a communication channel with stakeholders.
Consultation records	Records of the stakeholder consultation are stored in the ceramic factory office.
Stakeholder input	Stakeholders did not suggest any changes to the project design. If there are any in the future, they will be answered in a culturally appropriate and in a timely manner.

2.1.3 Free, Prior, and Informed Consent

Consent	The project activity is being developed in two ceramic industries, Cenol and Telha Forte, both located on private property. It has not encroached on private, stakeholder, or government property, nor has it resulted in the relocation of people from their land. Stakeholder consent was obtained through consultation during the project validation. Stakeholders received a letter informing them about the project activities, the methodology used, the objectives, and the means of communication with the project proponent to express their opinions and learn more about the project. No
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	comments or objections were raised during the consultation, indicating stakeholder agreement with the project. Since then, no conflicts have arisen between the project proponents and stakeholders.
Outcome of FPIC	The outcome of the stakeholder consultation was the project validation. The project did not encroach on private, stakeholder or government property, nor relocate people off their lands.

2.1.4 Grievance Redress Procedure

During this monitoring period, no grievances were raised. Currently, the company is available to receive any suggestions and comments from the community through telephone, email, or even in person. During this monitoring period, no complaints were registered. In the event of any grievance, it will be resolved within a reasonable time period, taking into account culturally appropriate conflict resolution methods.

Grievances received	Resolution and outcome
N/A	N/A

2.1.5 Public Comments

During this Monitoring Period, no comments were received. Currently, the company is available to receive any suggestions and comments from the community through telephone, email, or even in person.

Summary of comments received	Actions taken
N/A	N/A

2.2 Risks to Stakeholders and the Environment

2.2.1 Management Experience

This project activity involves the Cenol and Telha Forte Ceramics factories and is carried out by Sustainable Carbon – Projetos Ambientais LTDA. As the project's authorized contact, Sustainable Carbon is responsible for preparing this project report and supporting the proponents until the end of the crediting period.

With over 15 years of experience, Sustainable Carbon – Projetos Ambientais LTDA is a pioneer and leader in Latin America in developing carbon credit projects for the Voluntary Carbon Market

(VCM). Sustainable Carbon also excels in corporate sustainability and climate change management, boasting a robust portfolio of over 40 verified fuel-switch and renewable biomass projects.

The project activities are managed by a highly skilled team of technical experts. Our team members bring extensive experience in implementing nature-based and technology-based solution projects, ensuring that all aspects of the project are executed with professionalism and expertise. Their broad knowledge of carbon project management and socio-environmental co-benefits enables us to effectively achieve project goals and deliver long-lasting sustainable solutions and environmental benefits.

2.2.2 Risk assessment

	Risk identified	Mitigation or preventative measure(s) taken
Natural and human-induced risks to stakeholders' wellbeing	No risk identified.	The project does not offer any risk to the stakeholders' wellbeing.
Risks to stakeholder participation	No risk identified.	The project does not offer any risk to the stakeholders.
Working conditions	No risk identified.	The project activity does not offer any risk to the working conditions, as the replacement of native wood with renewable biomass did not result in changes to the existing labor conditions.
Safety of women and girls	No risk identified.	The project does not offer any risk to the safety of women and girls. The project activity does not create risks to the safety of women and girls in the local community, as the replacement of native wood with renewable biomass does not involve practices or interactions that could create exposure or vulnerability.
Safety of minority and marginalized groups, including children	No risk identified.	The project does not offer any risk to the safety of minority and marginalized groups.

		The project activity does not offer risks to the safety of minority or marginalized groups, including children, as the replacement of native wood with renewable biomass does not generate practices that could affect or endanger these groups.
Pollutants (air, noise, discharges to water, generation of waste, and release of hazardous materials and chemical pesticides and fertilizers)	Ashes generation.	The only negative impact identified is that the project activity will generate ashes due to the burning of biomass. However, this impact is mitigated by using the ashes as fertilizer.

2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

	Risks identified ⁸	Mitigation or preventative measure(s) taken
Discrimination	No risk identified.	No complaints of discrimination were made, as evidenced by the Declaration of Human Rights Compliance sent with this Monitoring Report.
Sexual harassment	No risk identified.	No complaints of sexual harassment were made, as evidenced by the Declaration of Human Rights Compliance sent with this Monitoring Report.
Gender equity in labor and work	No risk identified.	Usually, in the ceramic sector, women are not hired for the operational sector due to the intensity and risk of the work. However, there are women

⁸ The identified risks and commensurate mitigation or preventative measure(s) for forced labor, child labor, and human trafficking, must be inclusive of staff and contracted workers employed by third parties.

		occupying other sectors of the ceramic factory.
Forced labor	No risk identified.	The ceramic factory is not involved with forced labor as evidenced by the Declaration of Human Rights Compliance sent with this Monitoring Report.
Child labor	No risk identified.	The ceramic factory is not involved with child labor, as evidenced by the Declaration of Human Rights Compliance sent with this Monitoring Report.
Human trafficking	No risk identified.	The ceramic factory is not involved with human traffic, as evidenced by the Declaration of Human Rights Compliance sent with this Monitoring Report.

2.3.2 Human Rights

Risks identified	Mitigation or preventative measure(s) taken
No risk identified.	There are no Indigenous Peoples (IPs), Local Communities (LC), or customary rights holders living within the boundaries of Cenol and Telha Forte Ceramics Factories, which is located in the municipality of São Miguel do Guamá.

2.3.3 Indigenous Peoples and Cultural Heritage

Risks identified	Mitigation(s) or preventative measure taken
No risk identified.	There are no Indigenous Peoples (IPs), Local Communities (LC), or customary rights holders living within the boundaries of Cenol and Telha Forte Ceramics Factories, which is located in the municipality of São Miguel do Guamá.

2.3.4 Property Rights

Risks identified	Mitigation or preventative measure(s) taken
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No risks identified.	The project did not encroach on private, stakeholder or government property, nor relocate people off their lands. The project is being developed at the ceramics factories located on private property.
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2.3.5 Benefit Sharing

Not applicable. The project did not impact property rights. The ceramics factories included in the project are privately owned.

Summary of the benefit sharing plan	N/A
Benefit sharing during the monitoring period	N/A

2.4 Ecosystem Health

Risk identified		Mitigation or preventative measure(s) taken during the monitoring period
Impacts on biodiversity and ecosystems	No risk identified.	The project attends all legal requirements, and no environmental impacts are predicted. An analyzes conducted at validation showed that the project increases the biodiversity preservation.
Soil degradation and soil erosion	No risk identified.	As described in the Project Description (PD) version 8 and in the Validation Report version 1, the project activity contributes indirectly to the conservation of native forests. This indirect effect is expected to occur through the reduction in the use of firewood, leading to the conservation of forest cover, which in turn is expected to contribute to the maintenance of

		soil conditions ⁹ , based on a descriptive and conceptual assessment of the project activity. In addition, the Cenol and Telha Forte Ceramics Factories is currently authorized to carry out clay extraction under the license n° 46/2020 emitted by the Municipal Secretary of the Environment (SEMMA), ensuring compliance with applicable environmental regulations.
Water consumption and stress	No risk identified.	An analysis conducted at validation showed a preservation of ground water quality as well as preservation of the water cycle renewal.

2.4.1 Rare, Threatened, and Endangered species

Species or habitat	N/A
Areas needed for habitat connectivity	N/A

	Risks identified	Mitigation or preventative measure(s) taken
Habitats for rare, threatened, and endangered species	No risk identified.	The project is not located in or adjacent to habitats for rare, threatened, or endangered species.
Areas for habitat connectivity	No risk identified.	The project is not located in or adjacent to habitats for rare, threatened, or endangered species.

2.4.2 Introduction of species

Species introduced	Classification	Justification for use	Adverse effects and mitigation
N/A	N/A	N/A	N/A

⁹ Available at: < <https://www.sciencedirect.com/science/article/abs/pii/S0341816223007439> > Last visited on January 22nd, 2026.

Existing invasive species	Mitigation measures to prevent the spread or continued existence of invasive species
N/A	N/A

	Risks identified	Mitigation or preventative measure(s) taken
Invasive species	No risk identified	N/A

2.4.3 Ecosystem conversion

Not applicable. This is not an ARR, ALM, WRC or ACoGS project.

	Risks identified	Mitigation or preventative measure(s) taken
Ecosystem conversion	No risk identified	N/A

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

This Monitoring Report refers to the 9th monitoring period of this project activity and includes data from 01-January-2022 to 31-May-2025. The VCS PD of the second crediting period was validated by the Validation and Verification Body (VVB) Earthood Services Private Limited and the present monitoring report will be verified by the Validation and Verification Body (VVB) VERIFIT S.A.S.

The project has been fully operational since the starting date of the first crediting period. This means the ceramic factories are operating using exclusively renewable biomass (sawdust and açai pits), thus mitigating their baseline emissions.

During the validation process, *Cenol* and *Telha Forte* ceramics utilized two different types of kilns in their burning process: *Round*¹⁰ kilns and *Paulista*¹¹ kilns. During the first crediting period, the implementation of the project activity saved energy due to the following modifications:

- Use of biomasses with less surface area than wood.

¹⁰ The “Round” kiln is a kind of intermittent kiln with round shape and lateral furnaces. Its internal diameter is about 9 meters. It is usually employed to burn tiles and bricks.

¹¹ The “Paulistinha” is a kind of intermittent kiln with rectangular shape and lateral furnaces. It is usually employed to burn tiles.

- Insertion of air with the new fuels, increasing the oxygenation.
- Reduction of thermal energy loss since the entrances will be kept closed or connected to the equipment.
- Injection of biomasses controlled by equipment, avoiding surplus of fuel often occurred when using wood.

Most of these improvements were made using the income derived from the carbon credits trade, since the implementation of the project as the construction of new kilns during the first crediting period.

During the revalidation process and the 8th monitoring period, none of the ceramics factories built new kilns. In the 8th monitoring report Cenol was operating with 11 “Paulista” kilns and the Telha Forte Ceramics was operating with 8 “Paulista” kilns (which corresponds to 30% of production) and 2 “Mobile” kilns (which corresponds to 70% of production).

In the current monitoring report Cenol its operating with 11 Paulista kilns and Telha Forte Ceramic factory is operating with 8 Paulista kilns, 2 “Mobile” kilns. In the current monitoring period 2 Paulista kilns of Cenol and Telha forte was restored. These repairs were carried out because the kilns were damaged, demonstrating the ceramic factory's commitment to product quality and production efficiency.

Table 3: Status of the Ceramic Project Activity - 1st Crediting Period

Quantity of kilns (units)						
Ceramic	PD v.05	4th MR	4th MR	5th MR		6th MR
		Kilns Deactivated	Kilns active	Kilns Constructed	Kilns active	Kilns active
Cenol	7 Round kilns	1 Round kiln	6 Round Kiln	-	6 Round kilns	11 Paulista kilns
	3 Paulista kilns	3 Paulista kilns	-	-	-	
Telha Forte	8 Round kilns	8 Round kilns	-	-	-	2 Mobile kilns
	5 Paulista kilns	-	5 Paulista Kilns	3 Paulista kilns	8 Paulista kilns	8 Paulista kilns

Table 4: Status of the Ceramic Project Activity - 2nd Crediting Period

Quantity of kilns (units)				
Ceramic	PD v.08	7th MR	8th MR	9th MR

	Kilns Active	Kilns active	Kilns active	Kilns Active
Cenol	11 Paulista Kilns	11 Paulista kilns	11 Paulista kilns	11 Paulista Kilns
Telha Forte	2 Mobile Kilns	2 Mobile kilns	2 Mobile kilns	2 Mobile Kilns
	8 Paulista Kilns	8 Paulista kilns	8 Paulista kilns	8 Paulista Kilns

3.2 Deviations

3.2.1 Methodology Deviations

There were no methodology deviations identified during this monitoring period or in any of the previous monitoring periods.

3.2.2 Project Description Deviations

The project description deviation of the current monitoring period is described below with all project description deviations that occurred during the current crediting period, in accordance with VCS Standard 5.0, that states that any deviation must also be reported in all subsequent verification reports.

Historical deviations

- Decommissioning of Kilns

According to the PD v.8 and the 6th monitoring report, Cenol Ceramic factory presents 13 Intermittent (Paulista) kilns. However, during the 7th monitoring period the total of Paulista kilns in the factory was reduced to 11.

The deviation was verified in 2022 by the VVB. Thus, it is possible to guarantee that this adjustment does not influence or interfere with the baseline, additionality, and conservatism of this project.

- Updating reference for biomass surplus

Also, during the 8th monitoring period, Sustainable Carbon's Team verified that the reference used in the VCS PD v.8 to assess the biomass surplus of forest residues is no longer available. Then, even though the biomass surplus was already validated during the revalidation, in order to maintain credible data in leakage emissions calculus Sustainable Carbon's team has updated the value of forest residues and sawdust generation' reference. Before the exchanges, it was considered that only 22% of the wood produced generated forest residues in Pará's state. Yet, after the literature update, the total forest residues generated by wood produced increased from

22% to 55%, therefore the total production of forest residues went from 1,181,149 m³ to 2,952,873 m³.

In the 8th monitoring period, the quantity of biomass utilized in the region, including the project activity's consumption, was larger than 25% of the available biomass in the project region. Thus, according to "General guidance on leakage in biomass project activities" this update does not generate leakage emissions since the quantity of biomass availability was around 31% in the project region.

This adjustment in the reference used does not have impact in the applicability of the methodology, additionality, or the appropriateness of the baseline scenario.

Deviations for the current monitoring period (9th)

- Updating the geographic coordinates of the project

During this 9th monitoring period, the coordinates of the Cenol and Telha Forte Ceramics have been updated in the Monitoring Report to reflect the accurate location of the project activity. The coordinates previously included in the registered PD (Version 08, dated 20 June 2018) were 1° 32' 12.06"S; 47° 30' 48.59"W for Cenol Ceramic and 1° 32' 12.41"S; 47° 30' 48.65"W for Telha Forte Ceramic, and did not reflect the precise location of the ceramic factories. These have now been corrected to the accurate coordinates 1° 36' 19.8"S; 47° 29' 19.2"W for Cenol Ceramic and 1° 36' 00.1"S; 47° 29' 04.0"W for Telha Forte Ceramic.

This update, included in Section 1.8, reflects a correction rather than a change in project boundaries or site and was made to improve accuracy of the project location. The revised coordinates have also been verified during the audit in this 9th monitoring period. This deviation does not impact the applicability of the methodology, additionality, or the appropriateness of the baseline scenario, and the project remains in conformance with the applied methodology.

Updating the fNRB parameter

During this monitoring period, the fraction of non-renewable biomass (fNRB) was reassessed and recalculated using data specific to the State of Pará, replacing the Amazon biome-level approach applied in the registered VCS-PD. Upon reassessment, the Amazon biome-level dataset was no longer considered the most appropriate representation of the project conditions, as sufficiently detailed and verifiable Pará State-specific data were available for the parameters required under CDM TOOL30. Since both the project activity and the relevant biomass supply area are located entirely within Pará State, these data provide a more localized, accurate, and geographically representative assessment of the project conditions. This approach remains consistent with CDM Tool 30 (Version 1), which allows the determination of fNRB using country- or region-specific data where available.

The deviation affects exclusively the estimation of the fNRB parameter used in the calculation of baseline emissions. The project activity remains unchanged and continues to consist of the

switch from non-renewable biomass to renewable biomass as described in the registered VCS-PD. Likewise, the baseline scenario and the assumptions supporting the demonstration of additionality remain unchanged. As the revision is limited to the reassessment of fNRB, it does not affect the applicability of AMS-I.E (Version 7) or CDM Tool 30 (Version 1).

The registered VCS-PD applied an fNRB value of 79.54%, whereas the updated assessment resulted in values of 48.38% for 2022, 58.79% for 2023, 63.42% for 2024, and 65.89% for 2025. Since baseline emissions under AMS-I.E are directly proportional to the fNRB value, the revised values directly affect the estimation of baseline emissions and emission reductions for the monitoring period.

To assess the impact of the fNRB values on emission reductions, a comparative calculation was carried out using two scenarios: (i) the fNRB value of 79.54% applied in the registered VCS-PD; and (ii) the revised annual fNRB values calculated using the Pará State-specific data. Under scenario (i), the emission reductions for the monitoring period would amount to 115,240 tCO₂e. Under scenario (ii), the emission reductions amount to 83,368 tCO₂e. Therefore, the use of the revised annual fNRB values results in fewer emission reductions than would have been obtained using the fNRB value from the registered VCS-PD.

Table 5: Comparison of ERs under fNRB scenarios

Scenario	fNRB applied				ERs for the monitoring period (tCO ₂ e)
	2022	2023	2024	2025	
i) Registered VCS-PD approach	79.54%	79.54%	79.54%	79.54%	115,240
ii) Revised Pará-specific approach	48.38%	58.79%	63.42%	65.89%	83,368
Difference					-31,872

The comparative assessment demonstrates that the revised approach does not lead to an overestimation of emission reductions. The revised fNRB estimates are consistently lower than the value applied in the VCS-PD, resulting in more conservative emission reduction estimates. Therefore, the revised approach is considered conservative while providing a more geographically representative estimate of the fNRB parameter for the project context.

Accordingly, the deviation is limited to the reassessment of the fNRB parameter and does not affect the applicability of AMS-I.E (Version 7) and CDM Tool 30 (Version 1), the project additionality demonstrated in the registered VCS-PD, or the conservativeness of the results.

These conclusions are supported by the Pará State-specific datasets used in the fNRB assessment, the comparative assessment of emission reductions presented above, and the monitoring calculation spreadsheet containing all input data, assumptions, formulas,

intermediate calculations, and results. The step-by-step methodology for the determination of fNRB, including equations and references, is described in Section 5.1 (Baseline Emissions).

3.3 Grouped Projects

Not applicable. This is not a grouped project.

3.4 Baseline Reassessment

Did the project undergo baseline reassessment during the monitoring period?

☐ Yes ☒ No

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	EF projected fossil fuel
Data unit	tCO ₂ /TJ
Description	Emission factor for the substitution of non-renewable woody biomass by similar consumers.
Source of data	AMS-I.E.: Switch from non-renewable biomass for thermal applications by the user - Version 7.0. Available at: < https://cdm.unfccc.int/methodologies/DB/9LFOR81TCT5FLI1AJYP46CQY802J79 > Last visit on: June 24 th , 2025.
Value applied	81.6
Justification of choice of data or description of measurement methods and procedures applied	This value represents the emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis. It is assumed that the mix of present and future fuels used would consist of a solid fossil fuel (lowest in the ladder of fuel choices), a liquid fossil fuel (represents a progression over solid fuel in the ladder of fuel use choices) and a gaseous fuel (represents a progression over liquid fuel in the ladder of fuel use choices). Thus a 50 per cent weight is assigned to coal as the alternative solid fossil fuel (96 t CO ₂ /TJ) and a 25 per cent weight is assigned to both liquid and gaseous fuels (71.5 t CO ₂ /TJ for kerosene and 63.0 t CO ₂ /TJ for liquefied petroleum gas (LPG)).
Purpose of Data	The fossil fuel likely to be used by similar consumers is taken from the applied methodology.

	This parameter was used to calculate baseline emissions from the use of the fossil fuel that would be used in the baseline scenario, in the absence of non-renewable wood.
Comments	Applicable for stationary combustion in the manufacturing industries and construction.
Data / Parameter	ρ_{wood}
Data unit	tonne/m ³
Description	Specific gravity (of non-renewable wood)
Source of data	LORENZI, H. Árvores Brasileiras: Manual de Identificação e Cultivo de Plantas Arbóreas Nativas do Brasil. vol.1. 4.ed. Nova Odessa. SP: Instituto Plantarum. 2002. Available at: <https://pt.scribd.com/document/535253703/ARVORES-BRASILEIRAS>. Last visit on: June 24th, 2025. QUIRINO, W. F. et al. Poder Calorífico da Madeira e de Resíduos Lignocelulósicos. Biomassa & Energia, v.1, n.2, p. 173-182, 2004. Available at: <https://pt.scribd.com/document/535253703/ARVORES-BRASILEIRAS>. Last visit on: June 24th, 2025.
Value applied	0.67
Justification of choice of data or description of measurement methods and procedures applied	The species used to calculate the value are typical trees of Amazon Biome that are usually employed as fuel in the ceramic factories of the region. The amount of wood used in the baseline was measured in volume unit.
Purpose of Data	This parameter was used to calculate baseline emissions from the use of non-renewable fuel that would be used in the baseline scenario. The amount of wood used in the baseline was measured in volume units, so this data is used to convert measured values to tonnes.
Comments	The species used to calculate the average value are typical trees of Amazon Biome that are usually utilized as fuel in the ceramic industries of the region. Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.
Data / Parameter	BF _y

Data unit	Tonnes of native wood per tonnes of ceramic units fired		
Description	Baseline consumption of non-renewable biomass per tonnes of ceramic units produced in year y.		
Source of data	Historical data from the project proponent.		
Value applied	Cenol Ceramic	Telha Forte Ceramic	
	Paulista Kiln	Paulista Kiln	Mobile Kilns
	0.64	0.62	0.46
Justification of choice of data or description of measurement methods and procedures applied	This second crediting period presents three BF_y values. The value presented to Paulista Kiln in Cenol and Telha Forte Ceramics are the same calculated in the first crediting period, changing only the unit of measurement. One different value of BF_y is applied due to the construction to the two Mobile Kilns. The value used to Mobile Kilns was acquired through the average consumption and production of ceramic devices during the years when the ceramic used to consume non-renewable biomass. In addition, was provided a document of third part indicated when the mobile kiln is more efficiency than Paulista kiln already existent in Ceramic. The Mobile Kiln is 25% more efficient than Paulista kiln and this value was subtracted of total BF_y (0.62), using only real percentage of new kiln (0.46) to this Mobile Kiln BF_y.		
Purpose of Data	The purpose of the data is to provide the consumption of non-renewable biomass per tonnes of ceramic units produced in a year in the baseline scenario.		
Comments	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.		

Data / Parameter	EF _{CO₂,f}	
Data unit	g CO ₂ /t km	
Description	Default CO ₂ emission factor for freight transportation activity f	
Source of data	TOOL12 Methodological tool: Project and leakage emissions from transportation of freight Version 01.1.0 Available at: < https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-12-v1.pdf/history_view > Last visit on: June 24 th , 2025.	
Value applied	Vehicle class	Vehicle class Emission factor (g CO ₂ /t km)
	Heavy vehicles	129
	Light vehicles	245

Justification of choice of data or description of measurement methods and procedures applied	The emission factor has been derived based on custom design transient speed-time-gradient drive cycle (adapted from the international FIGE cycle), vehicle dimensional data, mathematical analysis of loading scenarios, and dynamic modelling based on engine power profiles, which, in turn, are a function of gross vehicle mass (GVM), load factor, speed/acceleration profiles and road gradient.
Purpose of Data	This parameter is utilized to calculate the project emission due to the freight transportation of biomass from the suppliers to the ceramic industry.
Comments	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

4.2 Data and Parameters Monitored

Data / Parameter	PR _y																							
Data unit	Tonnes of ceramic devices																							
Description	Production of ceramic devices.																							
Source of data	Controlled by the project proponent.																							
Description of measurement methods and procedures to be applied	The number of ceramic pieces produced is monitored by counting the total production of one year, based on data from last crediting period. This parameter will be monitored by the project proponent (meaning the ceramic owner). The amount will be acquired by counting the total production of the period considered for the ceramic factory and data will be aggregated on a monthly and yearly basis.																							
Frequency of monitoring/recording	Annually.																							
Value monitored	<table><tr><th colspan="4">Production (tonnes of ceramic units)</th></tr><tr><th colspan="2" rowspan="2">Period</th><th>Cenol</th><th>Telha Forte</th></tr><tr><th>Production</th><th>Production</th></tr><tr><td rowspan="3">2022</td><td>January</td><td>2,118.04</td><td>3,431.06</td></tr><tr><td>February</td><td>2,087.90</td><td>3,249.52</td></tr><tr><td>March</td><td>2,829.04</td><td>2,965.76</td></tr></table>				Production (tonnes of ceramic units)				Period		Cenol	Telha Forte	Production	Production	2022	January	2,118.04	3,431.06	February	2,087.90	3,249.52	March	2,829.04	2,965.76
Production (tonnes of ceramic units)																								
Period		Cenol	Telha Forte																					
		Production	Production																					
2022	January	2,118.04	3,431.06																					
	February	2,087.90	3,249.52																					
	March	2,829.04	2,965.76																					

		April	947.43	3,079.02
		May	926.81	3,498.35
		June	1,956.83	3,325.06
		July	2,146.77	3,410.92
		August	2,017.82	3,307.25
		September	2,341.80	3,243.48
		October	2,528.72	3,140.28
		November	2,252.41	3,090.58
		December	2,614.23	3,387.52
	Total 2022		24,767.80	39,129.34
	2023	January	2,524.85	3,323.62
		February	2,265.63	2,770.25
		March	2,764.63	3,710.10
		April	1,508.28	3,072.00
		May	1,538.89	3,414.62
		June	1,429.51	3,421.47
		July	1,509.56	3,018.51
		August	1,661.29	1,384.32
		September	1,300.11	3,335.03
		October	2,254.31	3,232.52
		November	2,450.37	3,074.78
		December	2,406.35	3,322.33
	Total 2023		23,613.78	37,079.54
	2024	January	2,498.09	3,465.23
		February	2,364.34	3,172.60
		March	2,178.53	2,793.75
		April	2,279.10	2,884.85
		May	2,082.48	2,314.11
		June	2,135.28	2,372.18
		July	2,304.90	2,697.65
		August	2,147.10	3,474.33
		September	2,163.91	3,335.09
		October	2,439.55	3,403.60
		November	2,095.08	3,126.94
		December	2,362.10	3,330.24
	Total 2024		27,050.43	36,370.55
	2025	January	2,615.38	3,311.91
		February	2,348.20	2,880.44
		March	2,430.04	2,930.20
		April	2,309.73	2,782.13
		May	2,476.07	2,995.02

		Total 2025	12,179.42	14,899.71
		Total in the monitoring period	87,611.44	127,479.14
Monitoring equipment	No monitoring equipment is used to determine this parameter. Production is counted by trained personnel on Cenol and Telha Forte ceramics.			
QA/QC procedures to be applied	Data concerning PR_y measurement points are from an internal control document used by Cenol and Telha Forte Ceramics. These documents are organized per month and daily filled according to data based on ceramic units burned in the kilns. Data was rechecked according to the biomass employed and the kiln consumption of renewable biomass.			
Purpose of the data	Calculate baseline emissions			
Calculation method	The ceramic industry has an internal control of the quantity of ceramic pieces produced. It was rechecked according to the biomass employed in the ceramic kilns.			
Comments	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.			

Data / Parameter	Q _{renbiomass}
Data unit	Tonnes per month
Description	Amount of renewable biomass utilized.
Source of data	The ceramic owner measures the dimensions of the trucks that delivery the biomass and with this information a receipt is issue by ceramic employees containing the total volume of biomass and the price paid, as an internal control.
Description of measurement methods and procedures to be applied	The amount of biomass was monitored in accordance with the volume measured from the truck dimensions. These measured volumes are recorded in the monitoring spreadsheets shared by Sustainable Carbon with the ceramic facility, together with information on the date of biomass delivery, type of biomass and supplier identification. The VCS PD establishes that values in the receipts described in m³ (when applicable), shall be converted into tonnes through the specific gravity of each biomass. The specific gravity values of each renewable biomasses used in this project are:

	Biomass		Sawdust	Açaí Pits
	Specific gravity (tonne/m³)		0.35	0.72

The sources of these data are:

Sawdust:
SIMIONI. F. J. Análise diagnóstica e Prospectiva da cadeia produtiva de energia de biomassa de origem florestal no planalto sul de Santa Catarina. Curitiba. 2007. Available at: <<https://www.infoteca.cnptia.embrapa.br/infoteca/handle/doc/313015>> Last visit on: June 24th, 2025.

Açaí pits:
PADILHA et al. Avaliação do Potencial dos Caroços de Açaí para a geração de energia. Biomassa & Energia. v. 2. n. 3. p. 231-239. 2005. Available at: <<https://web.archive.org/web/20180516220207/http://www.renabi.org.br/06-B&E-v1-n2-2004-173-182.pdf>>. Last visit on: June 24th, 2025.

Frequency of monitoring/recording	Monthly																																																																																			
Value monitored	Total amount during the monitoring period (tonnes): <table><tr><th colspan="6">Q_{renbiomass} - Amount of renewable biomass</th></tr><tr><th colspan="2" rowspan="2">Period</th><th colspan="2">Cenol</th><th colspan="2">Telha Forte</th></tr><tr><th>Açaí pits (ton)</th><th>Sawdust (ton)</th><th>Açaí pits (ton)</th><th>Sawdust (ton)</th></tr><tr><td rowspan="12">2022</td><td>January</td><td>121.80</td><td>507.43</td><td>181.23</td><td>755.01</td></tr><tr><td>February</td><td>71.79</td><td>371.50</td><td>197.98</td><td>1,024.45</td></tr><tr><td>March</td><td>52.77</td><td>631.90</td><td>75.92</td><td>909.04</td></tr><tr><td>April</td><td>10.34</td><td>125.48</td><td>106.86</td><td>1,296.63</td></tr><tr><td>May</td><td>22.99</td><td>400.57</td><td>63.05</td><td>1,098.56</td></tr><tr><td>June</td><td>41.11</td><td>589.32</td><td>60.83</td><td>872.02</td></tr><tr><td>July</td><td>61.39</td><td>556.20</td><td>84.81</td><td>770.26</td></tr><tr><td>August</td><td>112.12</td><td>533.92</td><td>159.73</td><td>760.62</td></tr><tr><td>September</td><td>92.90</td><td>730.50</td><td>147.54</td><td>1,160.21</td></tr><tr><td>October</td><td>79.70</td><td>742.12</td><td>218.12</td><td>2,031.16</td></tr><tr><td>November</td><td>72.61</td><td>640.32</td><td>230.11</td><td>2,029.24</td></tr><tr><td>December</td><td>56.18</td><td>752.72</td><td>204.42</td><td>2,739.05</td></tr><tr><td colspan="2">Total 2022</td><td>795.55</td><td>6,581.98</td><td>1,730.60</td><td>15,446.24</td></tr></table>	Q _{renbiomass} - Amount of renewable biomass						Period		Cenol		Telha Forte		Açaí pits (ton)	Sawdust (ton)	Açaí pits (ton)	Sawdust (ton)	2022	January	121.80	507.43	181.23	755.01	February	71.79	371.50	197.98	1,024.45	March	52.77	631.90	75.92	909.04	April	10.34	125.48	106.86	1,296.63	May	22.99	400.57	63.05	1,098.56	June	41.11	589.32	60.83	872.02	July	61.39	556.20	84.81	770.26	August	112.12	533.92	159.73	760.62	September	92.90	730.50	147.54	1,160.21	October	79.70	742.12	218.12	2,031.16	November	72.61	640.32	230.11	2,029.24	December	56.18	752.72	204.42	2,739.05	Total 2022		795.55	6,581.98	1,730.60	15,446.24
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	2023	January	57.01	679.20	191.70	2,285.13
		February	38.75	618.11	171.74	2,739.80
		March	37.56	570.53	177.89	2,701.98
		April	27.35	384.25	131.71	1,850.84
		May	38.81	437.58	165.07	1,861.01
		June	65.53	519.34	229.12	1,815.73
		July	59.17	340.73	211.23	1,216.34
		August	49.48	267.08	271.50	1,465.60
		September	32.97	180.92	318.41	1,747.07
		October	76.78	381.37	331.18	1,644.94
		November	117.67	514.32	307.18	1,342.67
		December	112.44	485.31	292.82	1,263.85
	Total 2023		713.52	5,379.08	2,799.56	21,934.96
	2024	January	54.33	287.86	316.66	1,677.79
		February	80.59	680.45	188.10	1,588.22
		March	49.29	667.77	101.81	1,379.27
		April	81.80	769.17	117.86	1,108.31
		May	110.85	665.04	141.48	848.85
		June	191.49	782.68	157.29	642.87
		July	164.75	687.78	123.72	516.49
		August	166.68	665.98	258.84	1,034.22
		September	158.72	487.43	328.35	1,008.69
		October	128.06	502.67	343.08	1,346.70
		November	146.37	416.03	390.16	1,108.94
		December	132.15	512.20	336.45	1,304.04
	Total 2024		1,465.09	7,125.04	2,803.82	13,564.03
	2025	January	129.60	508.29	411.20	1,612.68
		February	97.68	419.81	314.50	1,351.71
		March	100.13	555.35	157.26	872.23
		April	123.27	648.14	180.68	950.00
		May	117.06	605.93	224.13	1,160.17
	Total 2025		567.73	2,737.51	1,287.77	5,946.80
	Total in the monitoring period		25,365.49		65,513.78	
Monitoring equipment		No monitoring equipment is used to determine this parameter.				
QA/QC procedures to be applied		Amount of biomass was checked according to receipts of purchase. The energy balance was verified according to the amount of biomass applied. The thermal energy generated with the use of sawdust per tonnes of ceramic devices produced during the current monitoring period was compared to the VCS PD.				
Purpose of the data		● Calculation of leakage emissions				

Calculation method	The energy generated by the amount of renewable biomass during the current monitoring period was calculated based on the Net Calorific Value of each biomass, as can be seen on the VCS MR Calculation spreadsheet.
Comments	Data was measured for each purchase/acquisition of biomass and aggregated monthly. Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Data / Parameter	Origin of renewable biomass
Data unit	Not applicable
Description	Renewable origin of the biomass.
Source of data	Controlled by the project proponent.
Description of measurement methods and procedures to be applied	This information was given by the biomass's providers. The guarantee of acquiring renewable biomass was achieved by invoices from the providers. The biomasses (sawdust and açai pits) are considered renewable as fulfilling the options described in the methodology applied.
Frequency of monitoring/recording	Each monitoring period.
Value monitored	Not applicable.
Monitoring equipment	No monitoring equipment was used to determine this parameter.
QA/QC procedures to be applied	The biomasses were considered renewable as they were in accordance with the definition given by the Annex 18 of the 23 rd meeting of the Executive Board from the Clean Development Mechanism ¹² .
Purpose of the data	Not directly applied for the calculation. This parameter is used to guarantee that the amount of biomass acquired by the project proponent has a renewable origin. It is also necessary to comply with procedures required by the methodology AMS-I.E, Version 07.
Calculation method	Not applicable.
Comments	All the renewable biomasses utilized in the monitoring period were already described in the VCS PD and are in accordance with definitions of renewable biomass set in the applied methodology.

¹² CDM – Executive Board. Annex 18 definition of renewable biomass. EB 23. Available at: <https://cdm.unfccc.int/EB/023/eb23_repan18.pdf>. Last visit on: June 24th, 2025.

	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.
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Data / Parameter	Leakage of non-renewable biomass
Data unit	tCO ₂ e
Description	Leakage resulted from the non-renewable biomass.
Source of data	TOOL16: Project and leakage emissions from biomass version 5.0
Description of measurement methods and procedures to be applied	The sources of leakages predicted in the applied methodology will be monitored. Scientific articles, official statistical data, regional and national surveys will be assessed in order to ensure that there was no leakage from non-renewable biomass (or to estimate the leakage). Please see Section 5.3: "Leakage".
Frequency of monitoring/recording	Annually
Value monitored	0
Monitoring equipment	No monitoring equipment is used to determine this parameter
QA/QC procedures to be applied	Data available regarding the ceramic industries fuel consumption will be used to monitor the leakage.
Purpose of the data	Calculation of leakage emissions.
Calculation method	Not applicable.
Comments	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Data / Parameter	$f_{NRB,y}$
Data unit	Percentage
Description	Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass.
Source of data	Based on national and international articles, databases and data searched by the project developer.

	TOOL30 – Methodological tool: Calculation of the fraction of non-renewable biomass - version 01. 0 ¹³ .										
Description of measurement methods and procedures to be applied	The monitoring of this parameter is based on national and international articles, databases and data monitored by the project developer. The sources provided information about the availability of woody biomass in Brazil. As per TOOL 30 v.1, the shares of renewable and non-renewable woody biomass in the quantity of woody biomass consumption were determined on a country-specific basis (paragraph 10) and using official statistics or reports or peer-reviewed literature (option a, paragraph 12).										
Frequency of monitoring/recording	Annually.										
Value monitored	<table> <tr> <th>Year</th><th>$f_{NRB,y}$</th></tr> <tr> <td>2022</td><td>48.38%</td></tr> <tr> <td>2023</td><td>58.79%</td></tr> <tr> <td>2024</td><td>63.42%</td></tr> <tr> <td>2025</td><td>65.89%</td></tr> </table>	Year	$f_{NRB,y}$	2022	48.38%	2023	58.79%	2024	63.42%	2025	65.89%
Year	$f_{NRB,y}$										
2022	48.38%										
2023	58.79%										
2024	63.42%										
2025	65.89%										
Monitoring equipment	No monitoring equipment is used to determine this parameter.										
QA/QC procedures to be applied	The monitoring of this parameter was based in national and international articles and database every monitoring period. The sources provided information about the sustainable use of woody biomass within Pará State, where the project activity is located.										
Purpose of the data	Calculation of Baseline Emissions										
Calculation method	Calculations according to “TOOL30: Calculation of the fraction of non-renewable biomass - Version 01.0”. The fraction of woody biomass used in the absence of the project activity in year y is essentially captured in the equation below: $f_{NRB} = \frac{NRB}{NRB + RB}$ Where: <i>f_{NRB}</i>: Fraction of non-renewable biomass (fraction or %) <i>NRB</i>: Quantity of non-renewable biomass determined as per paragraph 10 of TOOL 30 v.1 (tonnes/year) <i>RB</i>: Quantity of renewable biomass determined as per section 4.2 of TOOL 30 v.1 (tonnes/year)										

¹³ Calculation of the fraction of non-renewable biomass. Available at: <<https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-30-v1.pdf>> Last visit on October 21st, 2025.

	For detailed information please check the section "5.1 Baseline Emissions" or "fNRB,y" tab available in the " VCS MR Calculations Cenol_Telha Forte" spreadsheet.
Comments	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Data / Parameter	Renewable biomass surplus		
Data unit	tonnes or m ³		
Description	Amount of renewable biomass available.		
Source of data	Monitored		
Description of measurement methods and procedures to be applied	It was used to calculate the leakage of renewable biomass. The measurement of the leakage was based on national and international articles and databases every monitoring period. These sources provided information about the biomass availability in the project activity's region. The bibliographic references are described on the section 5.3 "Leakage".		
Frequency of monitoring/recording	Annually		
Value monitored	Biomass surplus	Surplus	Year
	Açaí pits	607,527.12 tonnes	2022
	Forest residues (sawdust, wood residue)	412,711.18 m ³	2022
	Biomass surplus	Surplus	Year
	Açaí pits	606,162.06tonnes	2023
	Forest residues (sawdust, wood residue)	397,608.84m ³	2023
	Biomass surplus	Surplus	Year
	Açaí pits	605,116.67 tonnes	2024
	Forest residues (sawdust, wood residue)	416,537.30 m ³	2024
	Biomass surplus	Surplus	Year

	Açaí pits	608,454.70 tonnes	2025
	Forest residues (sawdust, wood residue)	450,836.64 m ³	2025
	Detailed information in Section 5.3.: “Leakage”.		
Monitoring equipment	No monitoring equipment is used to determine this parameter.		
QA/QC procedures to be applied	Data available regarding the ceramic industry fuel consumption will be employed to monitor the leakage.		
Purpose of the data	Calculation of leakage emissions.		
Calculation method	The amount of biomass used by the project activity in each year of the crediting period is compared to total biomass available, as estimated on the VCS PD.		
Comments	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.		

Data / Parameter	D_{f,m}		
Data unit	Kilometer		
Description	Return trip distance between the origin and destination of freight transportation activity f in monitoring period m.		
Source of data	Monitored		
Description of measurement methods and procedures to be applied	Determined once for each freight transportation activity f for a reference trip using the vehicle odometer or any other appropriate sources (e.g. on-line sources).		
Frequency of monitoring/recording	To be updated whenever the distance changes.		
Value monitored	Provider	Origin	Destiny
	C.TELHA FORTE	Cerâmica Telha Forte - São Miguel do Guamá, PA, 68660-000	Cenol Ceramic Industry: Rode BR 010, KM 1810, S/N
	ALLEF	São Miguel do Guamá, PA	Cerâmica Telha Forte
			D _{f,m} - Return trip distance (in kilometers)
			2
			5

	ADAILSON	Tomé-Açu, PA	- São Miguel do Guamá, PA, 68660-000	292
	BAIANO	São Miguel do Guamá, PA		5
	BIRA	Ulianópolis, PA		492
	BRINQUEDO	Tomé-Açu, PA		292
	CARLINHO	São Miguel do Guamá, PA		5
	CLEBER	São Miguel do Guamá, PA		5
	DANILO	São Miguel do Guamá, PA		5
	EDER MONTEIRO	Benevides, PA		226
	EDINALDO	São Miguel do Guamá, PA		5
	FELIPE	São Miguel do Guamá, PA		5
	FELIPE DA CONQUISTA	Conquista, Tomé-Açu PA		318
	FOGUINHO	Paragominas, PA		326
	GAZOLA	Ananindeua - PA		254
	GLAILSON	São Miguel do Guamá, PA		5
	HIGOR	Vila Caisal, Santa Bárbara do Pará, PA		256
	HR MADEIRAS	Moju, PA		462
	IDEAL MAD.	Icoaraci, PA		298
	IPIXUNA	Ipixuna do Pará, PA		222
	JC MADEIRAS	Nova Esperança do Piria, PA		300
	JOSE ALEX	Nova Esperança do Piria, PA		300
	JOSE CARLOS	Paragominas, PA		326
	JOSE MARIA	São Miguel do Guamá, PA		5
	KARATE	Tome-Açu, PA		292
	LENILSON	São Miguel do Guamá, PA		5
	M.GREENEX	Santa Bárbara do Pará, PA		256
	M.INDUFEX	Santa Bárbara do Pará, PA		256
	M.ITAPEMIRIN	Icoaraci, PA		298
	M.MÃE DO RIO	Benfica, Benevides, PA		242
	M.MARITUBA	Marituba, PA		246

	M.ST ANTONIO	São Miguel do Guamá, PA	5
	MAD.BAIANO	São Miguel do Guamá, PA	5
	MAD.BELÉM	Belém, PA	290
	MAD.BRASIL	Belém, PA	290
	MAD.CCM	Tomé-Açu, PA	292
	MAD.DITORA	Icoaraci, PA	298
	MAD.DUNORTE	Paragominas, PA	326
	MAD EVERRESTE	Santa Bárbara do Pará, PA	256
	MAD ITAMAL	Icoaraci, PA	298
	MAD.LAMAPA	Icoaraci, PA	298
	MAD LUANDA	Benevides, PA	226
	MAD.M2000	Icoaraci, PA	298
	MAD MADEARTE	Vila Distrito, Ananindeua, PA	258
	MAD.MOJU	Maju, PA	462
	MAD MURININ	Murinin, Belém, PA	250
	MAD.PIRIA	Nova Esperança do Piria, PA	300
	MAD.TOFOLI	Santa Bárbara do Pará, PA	256
	MAD.WXL	Benevides, PA	226
	MADEREIRA	Benevides, PA	226
	MARACAPUERA	Outeiro, Belém, PA	312
	MARINALDO	Belém, PA	290
	MUNDAO	São Miguel do Guamá, PA	5
	N.ESPERANÇA	Nova Esperança do Piria, PA	300
	NILTON	São Miguel do Guamá, PA	5
	PARAGOMINA	Paragominas, PA	326
	PAULO	São Miguel do Guamá, PA	5
	PEDRO	Icoaraci, PA	298
	RAIMUNDO	São Miguel do Guamá, PA	5
	RENATO JUNIOR	São Miguel do Guamá, PA	5
	RUGGERIO	Vila Caisal, Santa Bárbara do Pará, PA	256

	S. 7.0 MADEIRAS	Vila Murinin,Benevides, PA	250
	S.ALAGADOS	Santa Bárbara do Pará, PA	256
	S.ALVARENGA	Icoaraci, PA	298
	S.AMAZONGREN	Marituba, PA	246
	S.BELA VISTA	Marituba, PA	246
	S.BEIRA RIO	Vila Caisal, Santa Bárbara do Pará, PA	256
	S. CASTANHAL	Castanhal, PA	142
	SERR.CLAIM	Tome-Açu, PA	292
	S.CONCORDIA	Concordia do Pará, PA	184
	S. DIMENSÃO	São Miguel do Guamá, PA	5
	S.FLORES MAD	Paragominas, PA	326
	S.INTERLAGO	São Miguel do Guamá, PA	5
	S.JAGUARE	Nova Esperança do Piria, PA	300
	S. LUMA PAU	Paragominas, PA	326
	S.MADEARTE	Vila Distrito,Ananideua,PA	258
	S. MADALENA	Marituba, PA	246
	S.MAD PORTE	São Miguel do Guamá, PA	5
	S.NEGO PIRIA MAD.	Nova Esperança do Piria, PA	300
	S.NORMASSA	Morenin,Benevides, PA	250
	S.NOVA ERA	Maju, PA	462
	S.NOVA JERUS	Marituba, PA	246
	S.SANTA ROSA	Benfica, Benevides, PA	242
	S.SÃO LUIZ	São Miguel do Guamá, PA	5
	SÃO SEBASTIÃO	Ulianópolis, PA	492
	S.S FRANCISCO	São Miguel do Guamá, PA	5
	S.S SEBASTIÃO	Ulianópolis, PA	492
	S.STª IZABEL	Santa Bárbara do Pará, PA	256
	S.ST MARIA	Maju, PA	462
	S.TUCUMAN	São Miguel do Guamá, PA	5

	S.WXI QUEEN	Benfica, Benevides, PA	242
	SER.MURENIN	Santa Bárbara do Pará, PA	256
	SERR.007	Murinin, Belém, PA	250
	SERR. DO IRMÃO	Nova Esperança do Piria, PA	300
	SERR.ABRAMEX	Moju, PA	462
	SERR.ABP MAD	Paragominas, PA	326
	SERR.ACARA	Acara, PA	246
	SERR. BENEVIDES	Murinin, Belém, PA	250
	SERR.BIL	São Miguel do Guamá, PA	5
	SERR. BIO MADEIRAS	Canaã dos Carajás, PA	1778
	SERR. B O MADEIRAS	Canaã dos Carajás, PA	1778
	SERR.BUJARU	Bujaru - PA	322
	SERR. CASTANHEIRA	Bujaru - PA	322
	SERR.CCM	Tomé-Açu, PA	292
	SERR.CCR	Benevides, PA	226
	SERR.CLAIN	Tomé-Açu, PA	292
	SERR.COMERCIO	Tomé-Açu, PA	292
	SERR.CONQUISTA	Conquista, Tomé-Açu PA	318
	SERR. CRG MADEIRA	Icoaraci, PA	298
	SERR.CRISTAL	Santa Bárbara do Pará, PA	256
	SERR. DAMALTA	Icoaraci, PA	298
	SERR. DIMENSÃO	São Miguel do Guamá, PA	5
	SERR.DINIZ	Santa Bárbara do Pará, PA	256
	SERR.DISTRITO	Ananindeua - PA	254
	SERR. DITORA	Icoaraci, PA	298
	SERR.DO CÉLIO	Nova Esperança do Piria, PA	300
	SERR. DO PAM	Tome-Açu, PA	292
	SERR. DO PEU	Nova Esperança do Piria, PA	300
	SERR. DP MAD	Paragominas, PA	326
	SERR.DPM MAD	Paragominas, PA	326
	SERR. D.R MAD	Tome-Açu, PA	292

	SERR.ESTRELA	Maju, PA	462
	SERR. FIMEX	Vila Distrito, Ananindeua, PA	258
	SERR.FLORIMA	Paragominas, PA	326
	SERR. FRISSE MADEIRA	Icoaraci, PA	298
	SERR. GOF	Icoaraci, PA	298
	SERR.GOLDES	Benevides, PA	226
	SERR.GOLFF	Icoaraci, PA	298
	SERR.HADEX	Benevides, PA	226
	SERR. HR MADEIRA	Maju, PA	462
	SERR.ICORACY	Icoaraci, PA	298
	SERR. INAJAS	São Miguel do Guamã, PA	5
	SERR.INFEX	Vila Caisal, Santa Bárbara do Pará, PA	256
	SERR. IRMAO	Nova Esperança do Piria, PA	300
	SERR. ITAPEMIRIN	Outeiro, Belém, PA	312
	SERR.JURUA	Ananindeua - PA	254
	SERR. JP MADEIRA	Benevides, PA	226
	SERR. JS MADEIRA	Ulianópolis, PA	492
	SERR.JY MAD	Maju, PA	462
	SERR.LIDER MADEIRA	Icoaraci, PA	298
	SERR.LIMA MADEIRAS	Tomé-Açu, PA	292
	SERR.LUANDA	Benevides, PA	226
	SERR.LUMA	Paragominas, PA	326
	SERR. MDL	Bujaru - PA	322
	SERR.M L F	Murinin, Belém, PA	250
	SERR. MADEARTE MAD	Ananindeua - PA	254
	SERR.MADEIRA	Mãe do Rio, PA	103
	SERR. MADENAVE	Benevides, PA	226
	SERR.MADRIL	Benevides, PA	226
	SERR. MB MADEIRA	Ulianópolis, PA	492
	SERR.MEDEIROS	Marituba, PA	246
	SERR.MARITUBA	Marituba, PA	246
	SERR.MARVEL	Maju, PA	462

	SERR.NB MAD.	Ulianópolis, PA	492
	SERR.NORMATIVA	Icoaraci, PA	298
	SERR.NORTE BRASIL	Maracacuera, PA	300
	SERR.NOVA ERA	Moju, PA	462
	SERR.NOVA TERRA	Tomé-Açu, PA	292
	SERR.NORCOPE	Novo Horizonte, Ipixuna do Pará, PA	182
	SERR. NORMAZAN	Benevides, PA	226
	SERR. NORTESUL	São Miguel do Guamá, PA	5
	SERR.OUTEIRO	Outeiro, Belém, PA	312
	SERR.PIMACON	Nova Esperança do Piria, PA	300
	SERR. PIRIA	Cachoeiro do Piria, PA	352
	SERR.PORTAL	Tomé-Açu, PA	292
	SERR. PRISCILA	Garrafão do Norte, PA	194
	SERR.PROMAP	Icoaraci, PA	298
	SERR.RIO DOCE	Murinin, Belém, PA	250
	SERR. RIO NEGRO	Icoaraci, PA	298
	SERR. RIO VERMELHO	Benevides, PA	226
	SERR.RT NORTE	São Miguel do Guamá, PA	5
	SERR.RP MAD	Paragominas, PA	326
	SERR. RP NORTE MADEIRA	São Miguel do Guamá, PA	5
	SERR.SALVADOR	Icoaraci, PA	298
	SERR.SB CAISAL	Vila Caisal, Santa Bárbara do Pará, PA	256
	SERR. S MIGUEL	São Miguel do Guamá, PA	5
	SERR. SÃO LUIZ	São Miguel do Guamá, PA	5
	SERR. SÃO SEBASTIÃO	Tailândia, PA	826
	SERR.SÃO TOMAIS	Belém, PA	290
	SERR. SARDEL	Ulianópolis, PA	492
	SERR. SMG MADEIRA	Tomé-Açu, PA	292
	SERR.SOARES	Marituba, PA	246
	SERR. SP MADEIRA	Santa Bárbara do Pará, PA	256

	SERR. STª CRUZ	Benevides, PA	226
	SERR.STª CRUZ	Benevides, PA	226
	SERR. STºANTONIO	São Miguel do Guamá, PA	5
	SERR. SANTA CRUZ	Benevides, PA	226
	SERR. ST MARIA	Tailândia, PA	826
	SERR.SANTA TEREZA	Maju, PA	462
	SERR.TABOCAS	Santa Bárbara do Pará, PA	256
	SERR. TAILANDIA	Tailândia, PA	826
	SERR.TOFFOLI	Vila Caisal, Santa Bárbara do Pará, PA	256
	SERR.VIMEX	Icoaraci, PA	298
	SERR.WERSAN	Maracacuera,Icoaraci, PA	300
	SERR.YR MAD	Maju, PA	462
	SERRARIA	Maju, PA	462
	SERRARIA AL MADEIRA	Vila Caisal, Santa Bárbara do Pará, PA	256
	SERRARIA ANAJAS	São Miguel do Guamá, PA	5
	SERRARIA BELEM	Belém, PA	290
	SERRARIA BRASIL	Icoaraci, PA	298
	SERRARIA CENTRAL	Benevides, PA	226
	SERRARIA CRT NORTE	São Miguel do Guamá, PA	5
	SERRARIA DIMENSÃO	São Miguel do Guamá, PA	5
	SERRARIA DINIS	Santa Bárbara do Pará, PA	256
	SERRARIA DITORA	Icoaraci, PA	298
	SERRARIA DN	Ulianópolis, PA	492
	SERRARIA DUNORTE	Paragominas, PA	326
	SERRARIA GC	Icoaraci, PA	298
	SERRARIA GM MADEIRA	Icoaraci, PA	298
	SERRARIA GRELEX	Santa Bárbara do Pará, PA	256
	SERRARIA IDEAL	Icoaraci, PA	298
	SERRARIA INTERLAGOS	São Miguel do Guamá, PA	5
	SERRARIA INTERLAGOS	São Miguel do Guamá, PA	5
	SERRARIA IRITUIA	Irituia, PA	51

	SERRARIA ITAMAL	Icoaraci, PA	298
	SERRARIA JN MADEIRA	São Miguel do Guamá, PA	5
	SERRARIA JN NORTE	São Miguel do Guamá, PA	5
	SERRARIA MADAL	Murinin, Belém, PA	250
	SERRARIA MADEPORTE	São Miguel do Guamá, PA	5
	SERRARIA MADEREIRA	São Miguel do Guamá, PA	5
	SERRARIA MÃE DO RIO	Benevides, PA	226
	SERRARIA MOJU	Moju, PA	462
	SERRARIA NAJAS MADEIRAS	São Miguel do Guamá, PA	5
	SERRARIA NEGO PIRIA	Nova Esperança do Piria, PA	300
	SERRARIA NOVA ESPERANÇA	Cachoeiro do Piria, PA	352
	SERRARIA PARAGOMINAS	Paragominas, PA	326
	SERRARIA PIRIA	Cachoeiro do Piria, PA	352
	SERRARIA RIO VERDE	Benevides, PA	226
	SERRARIA RN MADEIRA	Tomé-Açu, PA	292
	SERRARIA SÃO LUIZ MADEIRA	São Miguel do Guamá, PA	5
	SERRARIA SB MADEIRA	Santa Bárbara do Pará, PA	256
	SERRARIA SPF	Bujaru - PA	322
	SERRARIA ULIANOPOLIS	Ulianópolis, PA	492
	SERRARIA VEDAC	São Miguel do Guamá, PA	5
	SR JOÃO	Benevides, PA	226
	SUMAROCK	São Miguel do Guamá, PA	5
	TICO	Belém, PA	290
	STª BARBARA	Santa Bárbara do Pará, PA	256
	ULIANOPOLIS	Paragominas, PA	326
	WOOD GREEN	Outeiro, Belém, PA	312
	ZÉ DENIR	São Miguel do Guamá, PA	5
	ZÉ LAURO	São Miguel do Guamá, PA	5
	ZÉ MARIA	São Miguel do Guamá, PA	5

	ZEZINHO	São Miguel do Guamá, PA		5
	The suppliers highlighted in red contribute to Project Emissions due to the distances traveled. More detailed information is available in the VCS-MR Calculation spreadsheet for Cenol and Telha Forte.			
Monitoring equipment	No monitoring equipment is used to determine this parameter.			
QA/QC procedures to be applied	Data available regarding the ceramic industry freight of biomass transportation.			
Purpose of the data	Calculate of Project Emissions			
Calculation method	Information in section 5.2 – Project Emissions.			
Comments	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.			

Data / Parameter	FR _{f,m}				
Data unit	tonnes				
Description	Total mass of freight transported in freight transportation activity f in monitoring period m.				
Source of data	Records by project participants or records by truck operators.				
Description of measurement methods and procedures to be applied	This parameter is record by the ceramic in a sheet with the distance between the ceramic and the furnisher. Information in section 5.2 – Project Emissions.				
Frequency of monitoring/recording	Annually				
Value monitored		Period	FR _{f,m} in tonnes		
			Cenol and Telha Forte		Total (tonnes)
			Açaí pits (tonnes)	Sawdust (tonnes)	
	2022	2,534.11	21,986.22	24,520.33	
	2023	3,737.03	27,163.43	30,900.46	
	2024	4,268.90	20,689.05	24,957.95	
	2025	1,855.43	8,684.30	10,539.73	
	Total in the Monitoring Period		90,918.47		
Monitoring equipment	No monitoring equipment is used to determine this parameter.				

QA/QC procedures to be applied	Data available regarding the ceramic industry freight of biomass transportation.
Purpose of the data	Calculation of Project Emissions
Calculation method	Information in section 5.2 – Project Emissions
Comments	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Data / Parameter	NCVbiomass
Data unit	TJ/tonne of wood
Description	Net Calorific Value of non-renewable woody biomass that is substituted.
Source of data	AMS-I.E.: Switch from non-renewable biomass for thermal applications by the user - Version 7.0 ¹⁴ . The value informed in the applied methodology is based on IPCC default for wood fuel.
Frequency of monitoring/recording	Annually
Value monitored	0.015
Monitoring equipment	No monitoring equipment is used to determine this parameter.
Justification of choice of data or description of measurement methods and procedures applied	The source of data is the IPCC default for wood fuel, as recommended in the applied methodology.
QA/QC procedures to be applied	N/A
Purpose of the data	Calculate Baseline Emissions
Calculation method	N/A

¹⁴ Available at: <<https://cdm.unfccc.int/methodologies/DB/9LFOR81TCT5FLI1AJYP46CQY802J79>>. Last visited on: June 24th, 2025.

Comments

Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

4.3 Monitoring Plan

The monitoring is done with the aim of determining the most approximate quantity of non-renewable wood that, in the absence of the project, would be used in the ceramics' kilns and consequently the amount of GHG that would be emitted in tonnes of CO₂e. Section 4.2 describes data and parameters monitored, as well as the procedures involved on the monitoring plan.

Ceramics personnel are responsible for monitoring the operating conditions at the factories, including the amount of renewable biomass consumed and the monthly production of ceramic devices (parameters $Q_{renbiomass}$ and PR_y). They are also responsible for storing invoices, sales receipts, and other documents related to the purchase or acquisition of biomass.

Monitoring data for the $Q_{renbiomass}$ and PR_y parameters is recorded by ceramic personnel in electronic spreadsheets. These spreadsheets are prepared and shared by Sustainable Carbon team with the ceramic facilities via a cloud-based service (Dropbox), ensuring real-time access to monitoring information for both parties.

Sustainable Carbon is responsible to assess if the biomasses are from renewable origin, to evaluate if there is a surplus of renewable biomass and to calculate emission reductions, including an assessment of leakage emissions and the determination of parameter $f_{NRB,y}$. This assessment is based on the monitoring information recorded in the structured spreadsheets shared by Sustainable Carbon with the ceramic facility, which include data on each biomass delivery (such as delivery date, type of biomass, volume received and supplier identification). Sustainable Carbon also assists the Ceramics personnel to double check the monitored data on biomass consumption and ceramic units' production.

Analysis on production data is performed by a series of comparisons between different measurement points of production (molding machine, kiln loading and kiln unloading) to detect inconsistencies or suspicious data. Analysis on biomass data is performed by a series of comparisons between the amount of biomass and the cost over months to identify inconsistencies or unexpected variations in these parameters.

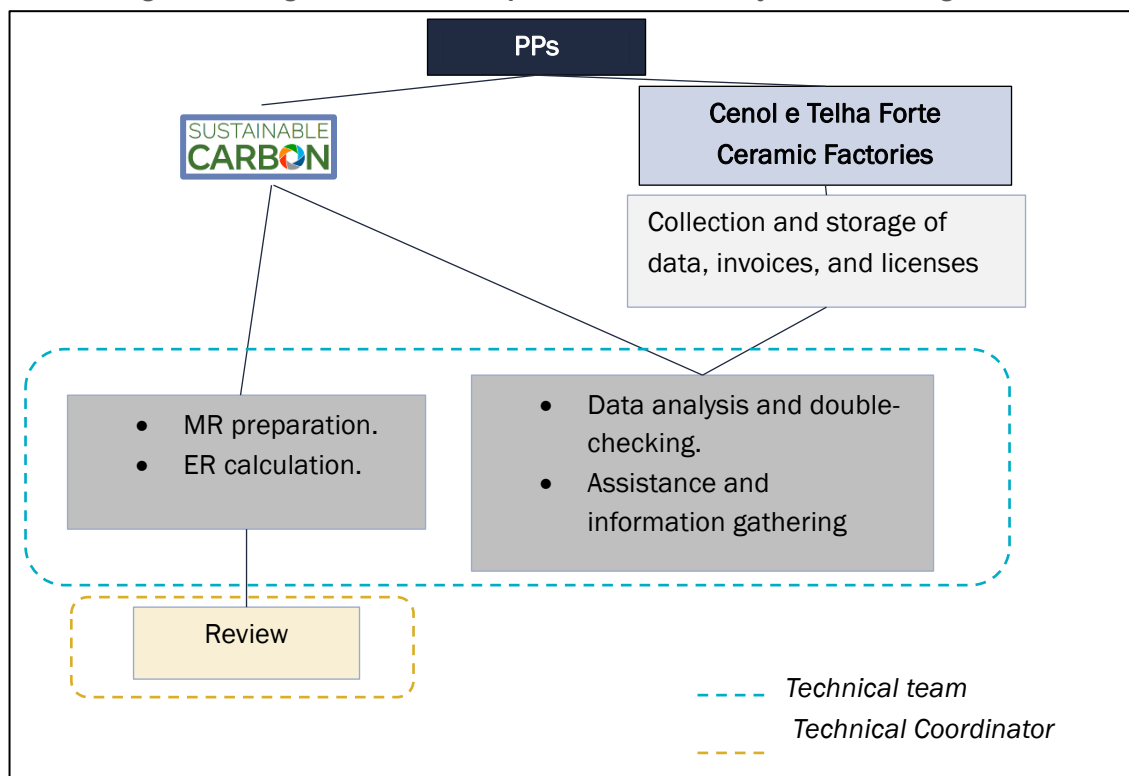
Sustainable Carbon is responsible for providing the required guidance to the ceramics factories, registering Biomass and Production data, in order to minimize errors, including assisting the factories in case the person in charge of the project monitoring is replaced.

The responsible for the monitoring plan are Mr. Francisco Valdir director and Mrs. Camila Moura secretary and Mrs. Rosângela Siqueira healthy technician from Cenol and Telha Forte ceramics. Sustainable Carbon technical team (including those members described on Section 1.3) was also involved in the project monitoring.

The stakeholders involved in gathering the data were selected by Cenol and Telha Forte Ceramic factories, which contacted those individuals with the knowledge necessary to provide the required information and evidence.

The diagram below shows what is the role of Cenol and Telha Forte Ceramic and Sustainable carbon in the project monitoring.

Figure 2: Diagram with the responsible for the Project Monitoring



5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The project activity in this monitoring period (41 months) generated 378.36 TJ per year. Converting this number to MWh, it was generated 105,099.09 MWh per year, which corresponds to the use of 12.00 MW_{thermal} on average of the kiln's capacity during the monitored period, which is less than the limits of 45 MW_{thermal} for Type I Small scale project activities.

Baseline emissions were calculated according to equations below.

$$BE_y = B_y \times f_{NR,y} \times NCV_{biomass} \times EF_{projected_fossilful} \quad (\text{Equation 01})$$

Where:

BE_y: Baseline emissions during the year y in tCO₂e

B_y: Quantity of biomass that is substituted or displaced in tonnes

f_{NRB,y}: Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass using survey methods.¹⁵

NCV_{biomass}: Net calorific value of non-renewable biomass that is substituted in TJ/tonne

EF_{projected_fossil fuel}: Emission factor for the projected fossil fuel consumption in the baseline in tCO₂/TJ¹⁶.

The **f_{NRB,y}** is determined following the principles of the CDM TOOL30 version 01¹⁷, considering the State of Pará as the assessment area, as follows:

$$f_{NRB,y} = \frac{NRB}{NRB + RB} \quad (\text{Equation 02})$$

Where:

f_{NRB,y}: Fraction of biomass (wood) used in the absence of the project activity in year y that can be established as non-renewable biomass using survey methods in %

NRB: Quantity of non-renewable biomass in t/yr

RB: Quantity of renewable biomass in t/yr

Table 6: Annual values used for estimation of parameter *f_{NRB}*

Year	NRB (t/yr)	RB (t/yr)	<i>f_{NRB,y}</i> (%)
2022	2,293,784	2,446,971	48.38
2023	2,804,842	1,966,267	58.79
2024	2,828,679	1,631,433	63.42
2025	2,938,900	1,521,212	65.89

NRB is determined as per paragraph 10 of the CDM TOOL30 version 01, as follows:

$$NRB = H - RB \quad (\text{Equation 03})$$

¹⁵ According to Methodological Tool TOOL30 - Calculation of the fraction of non-renewable biomass - version 01 Document available at: <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-30-v1.pdf>. Last visit on: August 28th, 2026.

¹⁶ The fossil fuel likely to be used by similar consumers is taken the IPCC default value of residual fossil fuel.

¹⁷ CDM TOOL30 Version01, available at: <<https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-30-v1.pdf>>. Last visited on August 28th, 2026.

Where:

NRB: Quantity of non-renewable biomass in t/yr

H: Total annual consumption of wood in the absence of the project activity on a region basis

RB: Quantity of renewable biomass in t/yr

H is estimated according to paragraph 12 - Option (a) Official statistics or reports or peer-reviewed literature, of the CDM TOOL30 version 01, using official data from IBGE (Brazilian Institute of Geography and Statistics) for Pará State¹⁸, where the ceramic manufacturing unit is located. The selected dataset includes forest extraction statistics for charcoal, fuelwood, and timber, which were used to estimate total annual wood consumption in the selected region. This approach is consistent with TOOL30, which requires H to account for all wood consumption within the selected region, including woodfuel, timber, industrial consumption, and other non-energy applications.

No double-counting occurs in the estimation of H, as charcoal, fuelwood, and timber are reported by IBGE as distinct biomass categories and are accounted for separately, with each category included only once in the estimation of total regional woody biomass consumption.

The reported quantities are then converted to a common mass basis for aggregation. Charcoal is converted to woody biomass equivalent using the TOOL30 default conversion factor of 6.00 kg of firewood/kg of charcoal. Fuelwood and timber volumes are converted to tonnes using the selected wood density (specific gravity factor) of 0.632 t/m³¹⁹.

The same wood density value was applied to both fuelwood and timber because both are woody biomass volumes (m³) and require conversion to mass (t) for the estimation of parameter H. The density factor represents the oven-dry density of wood, which is determined by species composition rather than the end use of the material as fuelwood or timber. The selected value was derived from the Global Wood Density Database²⁰, using a dataset comprising 4,191 tropical South American tree species. The resulting average density is considered representative of the regional woody biomass and suitable for both timber and fuelwood used in the project region.

¹⁸ IBGE (Brazilian Institute of Geography and Statistics). Available at: <<https://cidades.ibge.gov.br/brasil/pa/pesquisa/16/12705>>. Last visited on August 28th, 2026.

¹⁹ Zanne, A.E., Lopez-Gonzalez, G., Coomes, D.A., Ilic, J., Jansen, S., Lewis, S.L., Miller, R.B., Swenson, N.G., Wiemann, M.C., and Chave, J. 2009. Global Wood Density Database. Dryad. Available at: <<https://datadryad.org/dataset/doi:10.5061/dryad.234>>. Last visited on August 28th, 2026.

²⁰ Zanne, A.E., Lopez-Gonzalez, G., Coomes, D.A., Ilic, J., Jansen, S., Lewis, S.L., Miller, R.B., Swenson, N.G., Wiemann, M.C., and Chave, J. 2009. Global Wood Density Database. Dryad. Available at: <<https://datadryad.org/dataset/doi:10.5061/dryad.234>>. Last visited on August 28th, 2026.

Table 7: Annual values used for estimation of parameter H

Year	IBGE Data			Converted Value			H (t)
	Charcoal (t)	Fuelwood (m³)	Timber (m³)	Charcoal (t)	Fuelwood (t)	Timber (t)	
2022	139,485	1,427,196	4,749,774	836,910	901,988	3,001,857	4,740,755
2023	129,647	1,332,537	4,985,861	777,882	842,163	3,151,064	4,771,110
2024	134,444	1,314,718	4,466,053	806,664	830,902	2,822,545	4,460,111
2025*	134,444	1,314,718	4,466,053	806,664	830,902	2,822,545	4,460,111

*Since official 2025 data were not available, the most recent official dataset available, corresponding to 2024, was used as a proxy for 2025.

RB is determined as follows:

$$RB = \sum (MAI_{forest,i} \times (F_{forest,i} - P_{forest})) + \sum (MAI_{other,i} \times (F_{other,i} - P_{other,i})) \quad (\text{Equation 04})$$

Where:

RB: Quantity of renewable biomass in t/yr

MAI_{forest,i}: Mean Annual Increment of woody biomass growth per hectare in subcategory i of forest areas in t/ha/yr

MAI_{other,i}: Mean Annual Increment of woody biomass growth per hectare in subcategory i of other wooded land areas in t/ha/yr

F_{forest,i}: Extent of forest in sub-category i in ha

F_{other,i}: Extent of other wooded land in sub-category i in ha

P_{forest,i}: Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) within forest areas in ha

P_{other,i}: Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) within other wooded land areas in ha

i: Sub-category i of forest areas and other wooded land areas

The **MAI_{forest,i}** parameter was estimated based on the mean annual increment (MAI) of above-ground biomass carbon for the Amazon biome, as reported in Brazil's Third National

Communication to the UNFCCC²¹. The reported MAI carbon is 0.34 tC/ha/yr. Since the methodology requires the parameter to be expressed in biomass units (t/ha/yr), the carbon increment was converted using the carbon fraction of 47%, also reported in the same source. Accordingly, the biomass increment was calculated by dividing the carbon increment by the carbon fraction, resulting in a $MAI_{forest,i}$ value of 0.72 t/ha/yr.

The use of above-ground biomass increment is considered appropriate as a conservative proxy for woody biomass growth, since below-ground biomass is not added to the MAI value used in the RB calculation.

The $F_{forest,i}$ parameter is determined annually based on MapBiomass land-cover data²², considering the forest and woody vegetation classes relevant to the availability of woody biomass within the selected boundary. The land-cover classes included in $F_{forest,i}$ are Forest Formation, Arboreal Restinga, Flooded Forest, Mangrove, and Savanna Formation. These classes represent all woody vegetation considered relevant for woody biomass availability within the selected boundary.

Since all woody vegetation classes relevant to woody biomass availability are already included in $F_{forest,i}$, $F_{other,i}$ is set to zero, as, according to CDM TOOL30 v01, this parameter represents the area of other wooded land. Therefore, no additional areas qualify as "other wooded land" and can be accounted for separately. Including such areas under $F_{other,i}$ would result in double counting of woody biomass resources already represented in $F_{forest,i}$. Consequently $MAI_{other,i}$ and $P_{other,i}$ are not applicable, as these parameters are only defined for areas classified as "other wooded land", and no such areas are identified in this calculation.

For the $P_{forest,i}$ parameter, publicly available datasets were used to identify non-accessible forest areas within the selected region. Areas corresponding to Conservation Units²³, Federal and State Not Designated Public Forests²⁴, Indigenous Lands²⁵, Quilombola Lands²⁶, and Permanent

²¹ Brazil's Third National Communication to the United Nations Framework Convention on Climate Change, Volume III, Table A1.18, p. 293. Available at: <<https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/cgcl/clima/arquivos/destaques/terceira-comunicacao-nacional-do-brasil-a-unfccc-volume-iii.pdf>>. Last visited on August 28th, 2026.

²² MapBiomass Platform – Land Cover and Land Use Collection. Available at: <<https://plataforma.brasil.mapbiomas.org/>>. Last visited on August 28th, 2026.

²³ ISA Protected Areas Database (SisArp). Available at: <<https://uc.socioambiental.org/mapa>>. Last visited on August 28th, 2026.

²⁴ National Public Forest Registry (CNFP). Available at: <<https://www.gov.br/florestal/pt-br/assuntos/cadastro-nacional-de-florestas-publicas>>. Last visited on August 28th, 2026.

²⁵ Indigenous Peoples in Brazil database. Available at: <<https://terrasindigenas.org.br/pt-br/brasil>>. Last visited on August 28th, 2026.

²⁶ Amazônia Quilombola database. Available at: <<https://amazoniaquilombola.org.br/#painel>>. Last visited on August 28th, 2026.

Preservation Areas (APPs)²⁷ are considered non-accessible forest areas. These land categories represent distinct territorial classifications established under separate administrative systems and maintained in independent official registries by different authorities, each using its own datasets and classification criteria. Based on this structure, no evidence of overlap or double counting between categories was identified.

All categories were considered non-accessible because they are subject to legal protection, territorial rights, or governmental control, making them consistent with the definition of non-accessible forest areas provided in CDM TOOL30 v01. Accordingly, the resulting $P_{forest,i}$ values reflect the territorial characteristics of Pará State, where a significant proportion of the forest area is subject to legal or administrative restrictions that limit regular woody biomass extraction.

Annual values were used whenever reliable annual data were available. However, annual datasets were not available for all land categories. For Conservation Units, Indigenous Lands, and Quilombola Lands, a single value was available and was therefore applied to all monitoring years.

For Not Designated Public Forests, data were available for 2022, 2024, and 2025. Therefore, the 2022 value was applied to both 2022 and 2023, as no updated data were available for 2023. The 2024 and 2025 values were applied to their respective years. Annual data for Permanent Preservation Areas (APPs) were available for all years.

Table 8: Annual values used for estimation of parameter RB

Year	$MAI_{forest,i}$ (t/ha/yr)	$F_{forest,i}$ (ha)	$P_{forest,i}$ (ha)
2022	0.72	91,512,334	88,129,757
2023	0.72	91,171,086	88,453,011
2024	0.72	90,845,583	88,590,367
2025	0.72	90,845,583*	88,742,732

*Since official 2025 data were not available, the most recent official dataset available, corresponding to 2024, was used as a proxy for 2025.

Table 9: Annual values used for estimation of parameter $P_{forest,i}$

Year	Conservation Units (ha)	Not Designated Public Forests (ha)	Indigenous Lands (ha)	Quilombola Lands (ha)	Permanent Preservation Areas (APPs)
2022	42,128,527	7,764,873	35,314,005	1,286,124	1,636,227

²⁷ Rural Environmental Registry (CAR). Available at: <<https://painel.car.gov.br/car/sense/app/724964d6-be54-40cd-a892-ef9bc03fa411/sheet/d0334df5-8263-4fde-943a-7ef9aaad4fa3/state/analysis>>. Last visited on August 28th, 2026.

2023	42,128,527	7,764,873	35,314,005	1,286,124	1,959,481
2024	42,128,527	7,482,721	35,314,005	1,286,124	2,378,989
2025	42,128,527	7,161,927	35,314,005	1,286,124	2,852,148

B_y is determined using option (b) of the applied methodology, as follows:

Calculated from the thermal energy generated in the project activity as:

$$B_y = \frac{HG_{p,y}}{\eta_{old} \times NCV_{biomass}} \quad (\text{Equation 05})$$

Where:

$HG_{p,y}$: Quantity of thermal energy generated by the renewable energy in the project in year y in TJ.

η_{old} : Efficiency of the system being replaced

$$HG_{p,y} = SGE \times PR_y \quad (\text{Equation 06})$$

Where:

SGE : Specific energy which has to be generated in the process to produce a certain amount of ceramic units in TJ/thousands of ceramic units.

PR_y : Amount of product produced in year y in units of ceramic pieces fired

$$\eta_{old} = \frac{SGE}{SFE} \quad (\text{Equation 07})$$

Where:

SFE : Specific fuel energy needed for the process to produce a certain amount of ceramic units in TJ/ thousands of ceramic units.

$$SFE = BF_y \times NCV_{biomass} \quad (\text{Equation 08})$$

Where:

BF_y : Consumption of non-renewable biomass per thousand of ceramic units fired in year y

Using the Equations 6, 7 and 8 in the Equation 5 it results to:

$$B_y = PR_y \times BF_y \quad (\text{Equation 09})$$

As shown in the calculations above, the η_{old} is not required to calculate the Baseline emissions, thus it was excluded.

The exact production (PR_y) was monitored by the project proponent based on data from ceramic units which comes out from the molding machine. Data is aggregated on a monthly and yearly basis. Measurements are done by an internal control sheet monitored by the ceramic owner.

This second crediting period presents three BF_y values. The value presented to Paulista Kiln in Cenol and Telha Forte Ceramics are the same calculated in the first crediting period, changing only the unit of measurement, which was determined through historical consumption of non-renewable biomass by the ceramic. It was calculated by dividing the monthly consumption at the baseline from the monthly production at the baseline.

One different value of BF_y is applied due to the construction to the two Mobile Kilns during the previous crediting period. The value used to Mobile Kilns was acquired through the average consumption and production of ceramic devices during the years when the ceramic used to consume non-renewable biomass. In addition, was provided a document of third part indicated when the mobile kiln is more efficiency than Paulista kiln already existent in Ceramic. The Mobile Kiln is 25% more efficient than Paulista kiln and this value was subtracted of total BF_y (0.62), using only real percentage of new kiln (0.46) to this Mobile Kiln BF_y .

Baseline emissions during the monitored period are summarized in table 10:

Table 10: Baseline emissions for Cenol and Telha Forte Ceramics

Baseline Emissions (tCO ₂ e)			
Period		Cenol	Telha Forte
2022	January	802	1,032
	February	791	977
	March	1,072	892
	April	359	926
	May	351	1,052
	June	741	1,000
	July	813	1,026
	August	764	994
	September	887	975
	October	958	944
	November	853	929
	December	990	1,019
	Total 2022	9,381	11,766
2023	January	1,162	1,214
	February	1,043	1,012
	March	1,273	1,356
	April	694	1,122
	May	708	1,248

	June	658	1,250
	July	695	1,103
	August	765	506
	September	598	1,219
	October	1,038	1,181
	November	1,128	1,123
	December	1,108	1,214
Total 2023		10,870	13,548
2024	January	1,241	1,366
	February	1,174	1,251
	March	1,082	1,101
	April	1,132	1,137
	May	1,034	912
	June	1,060	935
	July	1,145	1,063
	August	1,066	1,370
	September	1,075	1,315
	October	1,212	1,342
	November	1,040	1,233
	December	1,173	1,313
Total 2024		13,434	14,338
2025	January	1,350	1,356
	February	1,212	1,180
	March	1,254	1,200
	April	1,192	1,139
	May	1,278	1,227
Total 2025		6,286	6,102
Total of monitoring period		85,725	

5.2 Project Emissions

The project emissions are those related to the CO₂ emissions from fossil fuels consumption and transportation of biomass. The project emissions are calculated according to the methodological tool – TOOL 16 – Project and leakage emissions from biomass Version 04.0.

According to the applied methodology, project emissions involve emissions resulting from the cultivation of biomass, transportation of biomass, and processing of biomass. Project emissions of cultivation of biomass and processing of biomass are not applicable to the project, as no biomass is cultivated or processed in the project activities.

Therefore, project emissions should result from biomass transportation, and it was calculated using Methodological TOOL 12 "Project and leakage emissions from transportation of freight" – 0.1.1.0, where was used option B "using conservative default values."

The emissions caused by transportation were monitored during the verification to ensure the transportation distance is less than 200 Km; however, if it is over than 200km, project emissions will be calculated using the equation below.

$$PE_{TR,m} = \sum_f D_{f,m} \cdot FR_{f,m} \cdot EF_{CO_2,f} \cdot 10^{-6} \quad (\text{Equation 10})$$

Where:

PE_{TR,m} = Project emissions from road transportation of freight monitoring period *m* (tCO₂e)

D_{f,m} = Return trip road distance between the origin and destination of freight transportation activity *f* in monitoring period *m* (km)

FR_{f,m} = Total mass of freight transported in freight transportation activity *f* in monitoring period *m* (t)

EF_{CO₂,f} = Default CO₂ emission factor for freight transportation activity *f* (gCO₂/tkm)

f = Freight transportation activities conducted in the project activity in monitoring period *m*

Table 11: Project Emissions for Cenol and Telha Forte Ceramics

Period	Project Emissions (tCO ₂ e)	
	Cenol	Telha Forte
2022	0.00	809.00
2023	0.00	899.00
2024	0.00	454.00
2025	0.00	195.00
Total in this monitoring period	2,357.00	

5.3 Leakage Emissions

Leakage is estimated as 0 (zero) tCO₂e during the entire monitoring period.

The Methodology AMS-I.E v.7, paragraph 21, states that “General guidance on leakage in biomass project activities shall be followed to quantify leakages pertaining to the use of biomass residues”.

The “General guidance on leakage in biomass project activities²⁸” (attachment C of appendix B) of Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-Scale CDM Project Activity Categories, identifies different emission sources based on the type of biomass considered (described in the table below).

Table 12: Sources of leakage according to the type of biomass

Biomass Type	Activity/ Source	Shift of pre project activities	Emissions from biomass generation/ cultivation	Competing use of biomass
Biomass from forests	Existing forests	-	-	X
	New forests	X	X	-
Biomass from croplands or grasslands (woody or non-woody)	In the absence of the project the land would be used as a cropland/wetland	X	X	-
	In the absence of the project the land will be abandoned	-	X	-
Biomass residues or waste	Biomass residues or wastes are collected and use.	-	-	X

Observing table 12 and considering that the Biomass Type of the present project activity falls under “Biomass residues or waste”, the possible source of leakage is the competing use of biomass residues, such as açai pits and forest residue like sawdust and wood residue. All these biomasses have regional availability at least 25% higher than the total quantity utilized, including the project activity consumption. This is demonstrated in the analysis below and confirms the lack of leakage for each biomass in accordance with requirements of the “General guidance on leakage in biomass project activities”.

Forest Residues (Sawdust, Wood residue)

²⁸ Available at:

<https://cdm.unfccc.int/methodologies/SSCmethodologies/approved/history/c_leak_biomass/guid_biomass_v03.pdf>
Last visited on October 21st 2025

The timber industry in Brazil generates a significant amount of waste, and the destination of these remnants is quite diverse. By-products can be utilized in various sectors such as energy, furniture, and civil construction. In the ceramic industry, forest residues are commonly used as fuel for firing ceramic products, producing thermal energy.

Pará is the fourth-largest state in Brazil in terms of firewood exploitation, and its wood industry produces substantial volumes of residue. It is estimated that approximately 55% of the wood processed results in forest residue. With a total wood production of 3,459,265 m³ in 2022, this corresponds to roughly 1,902,596 m³ of forest residues annually.

The annual project activity consumption of forest residues during this monitoring period is presented in table below. The forest residues consumed by the project activity represent less than 5% of the total wood residues in Pará.

The calculation method is described as:

$$\text{Project activity consumption (\%)} = \frac{\text{Project Activity Consumption}}{\text{Production of forest residues}} \times 100 \quad (\text{Equation 11})$$

Where:

Project Activity Consumption = Annual Project activity consumption of forest residue in m³ (m³/year).

Production of forest residues = Annual Production of forest residues in the project's region in m³ = 1,902,596 m³.

Table 13: Project activity average consumption of forest residues

Period	Project activity consumption (m ³)	Project Activity Consumption of the total forest residues in Pará (%)
2022	62,937.76	3.31%
2023	78,040.10	4.10%
2024	59,111.64	3.11%
2025*	24,812.30	1.30%

*Until May.

In addition, it is estimated an annual usage of 75% (1,426,946.81 m³) of these residues in the project region, according to Imazon²⁹. Table 13 demonstrate that there is a biomass surplus of forest residue larger than 25% in the region.

²⁹ According to Imazon (Amazon Institute of People and the Environment). 2009. Available at: <<https://imazon.org.br/atividade-madeireira-na-amazonia-brasileira-producao-receita-e-mercados/amp/>>>; Last visited on: June 24th, 2025.

Biomass surplus of forest residue was calculated according to equation:

$$\text{Biomass surplus (m}^3\text{)} = \text{Production of forest residue} - (\text{Usage of this residue in the region} + \text{Project activity consumption}) \quad (\text{Equation 12})$$

Then:

$$\text{Biomass Surplus (\%)} = \frac{\text{Production of Forest Residues}}{\text{Project Activity Consumption} + \text{Usage of forest residues in region}} - 1 \quad (\text{Equation 13})$$

Where:

Production of forest residues = Annual Production of forest residues in the project's region in m³ = 1,902,596 m³.

Usage of this residue in the region = Annual usage of forest residues in the project's region in m³ = 1,426,946.81 m³.

Project Activity Consumption = Annual Project activity consumption of forest residue in m³ (m³/year).

Table 14: Biomass surplus of forest residues

Period	Biomass surplus (m ³)	Biomass surplus (%)
2022	412,711.18	27.70%
2023	397,608.84	26.42%
2024	416,537.30	28.03%
2025*	450,836.64	31.05%

*Until May

Forest residue surplus was larger than 25% during this monitoring period. This way, this renewable biomass did not have potential to generate leakage emissions, which can be considered as 0.

Açaí pits

In terms of açaí pits, the State of Pará is the largest producer of açaí (*Euterpe oleraceae*) in Brazil. Açaí Pits are widely available, as açaí is a staple food in the daily diet of the local population and is extensively cultivated throughout the state. However, these residues still lack an adequate economic destination.

According to the State Secretariat of Fisheries and Agricultural Development of Pará (SEDAP), the annual production of açaí in the state is approximately 1,389,000 tonnes³⁰. Açaí Pits represent about 83% of the fruit's weight, resulting in an estimated annual residue of 1,152,870 tonnes.

The annual project activity consumption of açaí pits during this monitoring period is presented in table below. The values represent less than 1% of the total açaí pits in Pará.

The calculation method is described as:

$$\text{Project activity consumption (\%)} = \frac{\text{Project Activity Consumption}}{\text{Production of açaí pits}} \times 100 \text{ (Equation 14)}$$

Where:

Project Activity Consumption = Annual Project activity consumption of açaí pits in tonnes (tonnes/year).

Production of açaí pits = Annual Production of açaí pits in the project's region in tonnes = 1,152,870 tonnes.

Table 15: Project activity average consumption of açaí pits

Period	Project activity consumption (tonnes)	Project Activity Consumption of the total açaí pits in Pará (%)
2022	3,493.98	0.30%
2023	4,859.04	0.42%
2024	5,904.43	0.51%
2025	2,566.40	0.22%

*Until May

Moreover, it is estimated an annual usage of approximately 47% (541,848.9 tonnes) of the residues in the region³¹. Therefore, it is observed that there is an excess of açaí pits in the region even considering the quantity of biomass that is utilized by the project activity, as shown in table 15 below. Hence, this renewable biomass did not have potential to generate leakage emissions.

Biomass surplus for açaí pits was calculated according to the following equations:

³⁰ SEDAP-PA. Agricultura. Available at: <<https://www.sedap.pa.gov.br/boletim-cvis>>. Last visit on: June 24th, 2025.

³¹ Source: Discarding and final destination of açaí in the Oriental Amazon – Brazil, 2022. <https://doi.org/10.1590/1809-4422asoc2020138r2vu2022L20A>. Last visit on: June 24th, 2025.

$$\text{Biomass surplus} = \text{Production of açai pits} - (\text{Usage of this residue in region} + \text{Project activity consumption}) \text{ (Equation 14)}$$

Then:

$$\text{Biomass Surplus (\%)} = \frac{\text{Production of açai pits}}{\text{Project Activity Consumption} + \text{Usage of açai pits in region}} - 1 \text{ (Equation 15)}$$

Where:

Production of açai pits = Annual Production of açai pits in the project's region in tonnes = 1,152,870 tonnes.

Usage of this residue in the region = Annual usage of açai pits in the project's region in tonnes = 541,848.9 tonnes.

Project Activity Consumption = Annual Project activity consumption of açai pits in tonnes (tonnes/year).

Table 16: Biomass surplus of açai pits

Period	Biomass surplus (tonnes)	Biomass surplus (%)
2022	607,527.12	111.40%
2023	606,162.06	110.87%
2024	605,116.67	110.47%
2025*	608,454.70	111.76%

*Until May

Açai pits surplus was larger than 25% during this monitoring period. This way, this renewable biomass did not have potential to generate leakage emissions, which can be considered as 0.

In addition, the Methodology AMS-I.E v.7 states that the following potential source of leakage shall be considered:

Paragraph 20 (a): The use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources. If this leakage assessment quantifies an increase in the use of non-renewable woody biomass used by the non-project households/users that is attributable to the project activity then is adjusted to account for the quantified leakage."

The project activity has not displaced the use of renewable biomass of a non-project user, since both renewable and non-renewable biomasses are widely available in the region during the current monitoring period. The fuel switch performed by the project is not expected to have affected biomass prices, since the project consumption represents a small fraction of total biomass available in the market. Therefore, the project is not expected to have influenced the

fuel choice of non-project users, and no leakage emissions are considered for this monitoring period.

5.4 GHG Emission Reductions and Carbon Dioxide Removals

This category comprises small thermal appliances that displace the use of non-renewable biomass by introducing new renewable energy end-user technologies. The project's emissions from the combustion of native wood are accounted in the same way as fossil fuel combustion, once it is not renewable and emits CO₂.

The Emission Reductions are estimated based on the equation below:

$$ER_y = BE_y - PE_y - LE_y \text{ (Equation 16)}$$

Where:

ER_y: Emission Reductions in year y in tCO₂e

PE_y: Project Emissions in year y in tCO₂e

LE_y: Leakage Emissions in year y in tCO₂e

Table below summarizes the emission reductions for this monitoring period.

Vintage period	Baseline emissions (tCO ₂ e)	Project emissions (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Reduction VCUs (tCO ₂ e)	Removal VCUs (tCO ₂ e)	Total VCUs (tCO ₂ e)
01-Jan-2022 to 31-Dec-2022	21,147.00	809.00	0	20,338.00	N/A	20,338.00
01-Jan-2023 to 31-Dec-2023	24,418.00	899.00	0	23,519.00	N/A	23,519.00
01-Jan-2024 to 31-Dec-2024	27,772.00	454.00	0	27,318.00	N/A	27,318.00
01-Jan-2025 to 31-May-2025	12,388.00	195.00	0	12,193.00	N/A	12,193.00
Total	85,725.00	2,357.00	0	83,368.00	N/A	83,368.00

Vintage period	Ex-ante estimated reductions/removals	Achieved reductions/removals	Percent difference	Explanation for the difference
01-Jan-2022 to 31-Dec-2022	31,878.00	20,338.00	-36.20%	The Net GHG emission reductions in this monitoring period were approximately 7.54% and 36.20% lower than the ex-ante estimated reductions for the respective periods. This difference is mainly explained by the update of the fNRB parameter used in the ER calculation. As ERs are directly proportional to fNRB, the updated value resulted in lower emission reductions compared to the ex-ante estimates. Differences between actual and ex-ante estimated production levels also contributed to the observed variation in ERs.
01-Jan-2023 to 31-Dec-2023	31,878.00	23,519.00	-26.22%	
01-Jan-2024 to 31-Dec-2024	31,878.00	27,318.00	-14.30%	
01-Jan-2025 to 31-May-2025*	13,188.00	12,193.00	-7.54%	
Total	108,822.00	83,368.00	-23.39%	

* Regarding the ex-ante value for 2025, this value was calculated based on the Project Description (PD), Version 08, dated 20 June 2018, which estimates annual greenhouse gas emission reductions of 31,878 tCO₂e.

For 2025, only the period from 01 January to 31 May was considered, corresponding to 151 days. Based on a daily pro rata calculation, this resulted in a proportional ex-ante value of 13,187.88 tCO₂e, rounded to 13,188 tCO₂e ($31,878 \times (151 \div 365)$).

APPENDIX 1: COMMERCIALY SENSITIVE INFORMATION

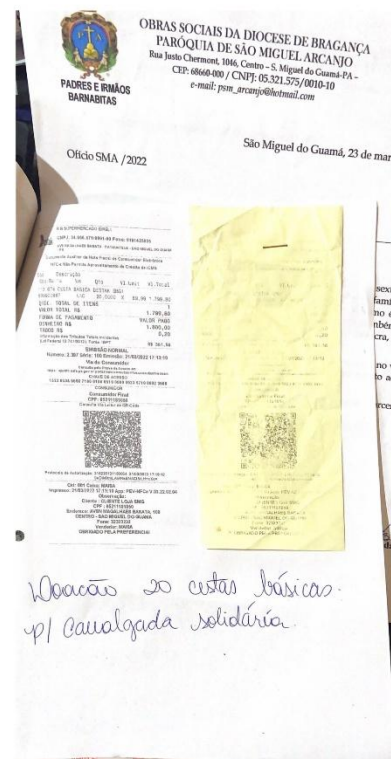
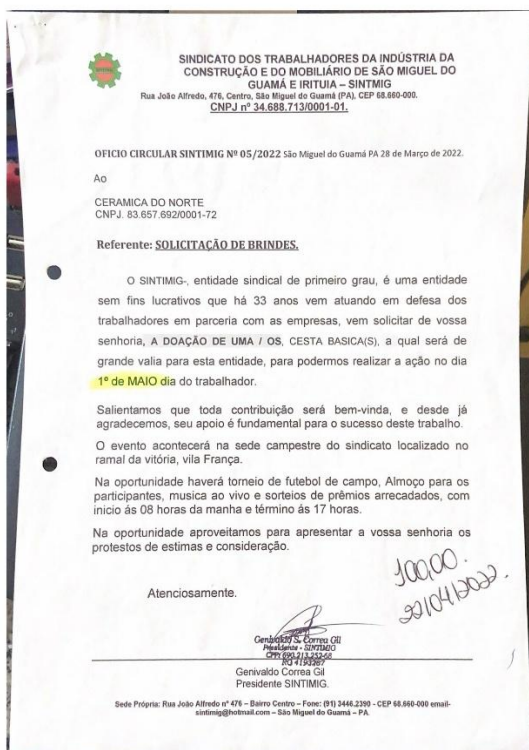
None of the information exposed to the Validation and Verification Body was withheld from the public version of the report.

Section	Information	Justification
<u>N/A</u>	<u>N/A</u>	<u>N/A</u>

APPENDIX 2: SUSTAINABLE DEVELOPMENT CONTRIBUTIONS

Evidence of the project's contributions to SDGs 2, 3, 7, 8, 13 and 17 during this monitoring period.

SDG 2:





**SINDICATO DOS TRABALHADORES DA INDÚSTRIA DA
CONSTRUÇÃO E DO MOBILIÁRIO DE SÃO MIGUEL DO
GUAMÁ E IRTUÍUA – SINTMIG**
Rua João Alfredo, 476, Centro, São Miguel do Guamá (PA), CEP 68.860-000.
CNPJ nº 34.688.713/0001-01.

OFÍCIO CIRCULAR SINTMIG Nº 05/2022 São Miguel do Guamá PA 28 de Março de 2022.

Ao

CERAMICA DO NORTE
CNPJ. 83.657.692/0001-72

Referente: **SOLICITAÇÃO DE BRINDES.**

O SINTMIG-, entidade sindical de primeiro grau, é uma entidade sem fins lucrativos que há 33 anos vem atuando em defesa dos trabalhadores em parceria com as empresas, vem solicitar de vossa senhoria, A DOAÇÃO DE UMA / OS, CESTA BÁSICA(S), a qual será de grande valia para esta entidade, para podermos realizar a ação no dia **1º de MAIO** dia do trabalhador.

Salientamos que toda contribuição será bem-vinda, e desde já agradecemos, seu apoio é fundamental para o sucesso deste trabalho.

O evento acontecerá na sede campestre do sindicato localizado no ramal da vitória, vila França.

Na oportunidade haverá torneio de futebol de campo, Almoço para os participantes, música ao vivo e sorteios de prêmios arrecadados, com início às 08 horas da manhã e término às 17 horas.

Na oportunidade aproveitamos para apresentar a vossa senhoria os protestos de estima e consideração.

Atenciosamente.



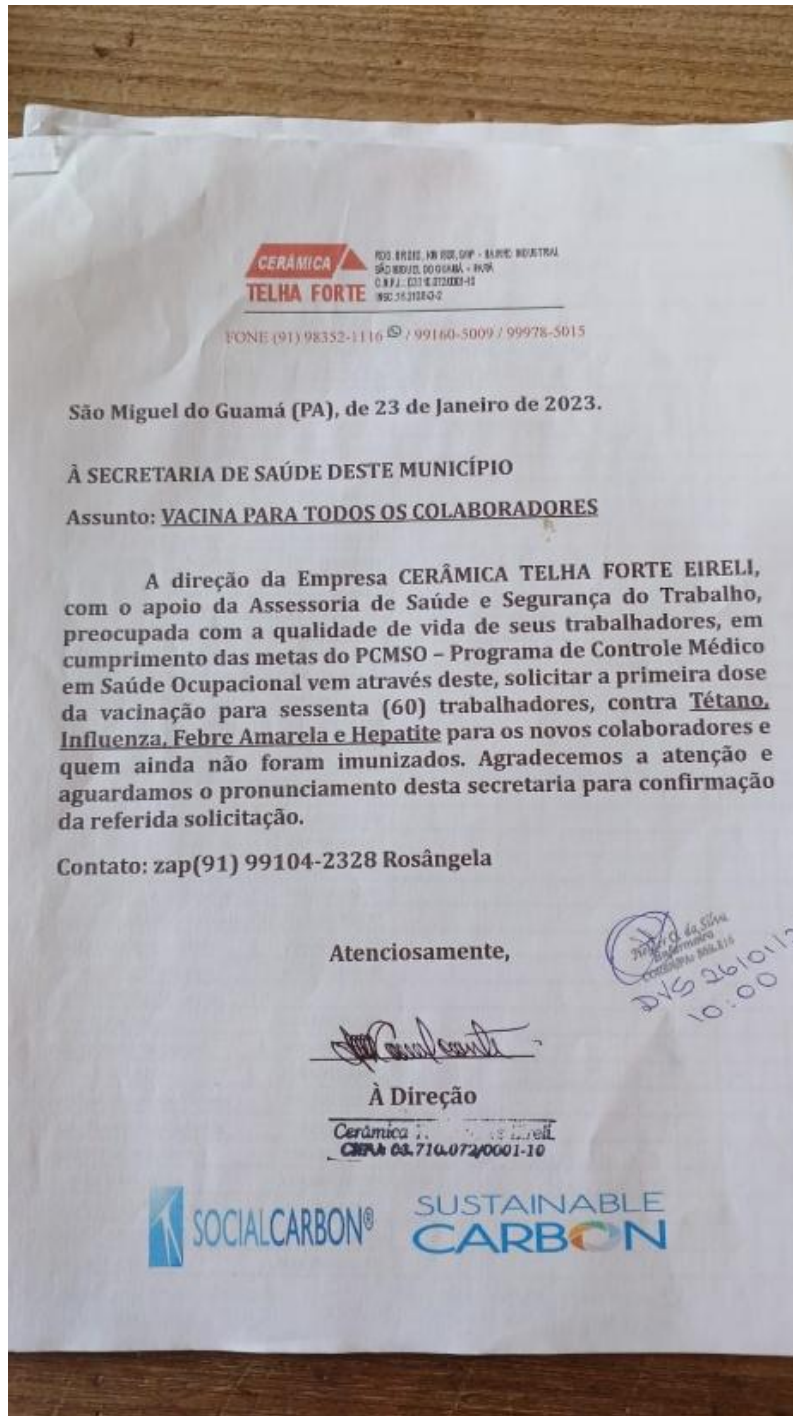
Genivaldo S. Correa Gil
Presidente - SINTMIG
CNPJ 34.688.713/0001-01
RG 4194987

Genivaldo Correa Gil
Presidente SINTMIG.

Sede Própria: Rua João Alfredo nº 476 - Bairro Centro - Fone: (91) 3446.2290 - CEP 68.860-000 email: sintmig@hotmail.com - São Miguel do Guamá - PA.

30000.
29/04/2022.

SGD 3:



	A	B	C	D	E	F	G	H
1								
2								
3	VACINAÇÃO 2023							
4	CERÂMICA TELHA FORTE LTDA / CNPJ 03.710.072/0001-10							
5	DATA	13/02/2023						
6	DIAS	1						
7	QTD COLABORADORES	31						
8	VACINAS	MENINGOCÓCICA	ANTITETANICA	F.AMARELA	INFLUENZA			
9	DOSES	29	25	2	1			
10	CERÂMICA DO NORTE LTDA - CENOL / CNPJ: 83.657.692/0001-72							
11	DATA	09/02/2023						
12	DIAS	1						
13	QTD COLABORADORES	43						
14	VACINAS	MENINGOCÓCICA	HEPATITE B	F.AMARELA	ANTITETANICA			
15	DOSES	41	4	1	38			
16	COLABORADORES/ PRSTADORES DE SERVIÇOS/ PÚBLICO EM GERAL							
17	DATA	09/02/2023						
18	DIAS	1						
19	QTD COLABORADORES	5						
20	VACINAS	MENINGOCÓCICA	HEPATITE B	F.AMARELA	ANTITETANICA			
21	DOSES	5	0	0	5			
22	VACINAS	MENINGOCÓCICA	HEPATITE B	F.AMARELA	ANTITETANICA	INFLUENZA		
23	TOTAL DE DOSES	75	4	3	68	1		
24								
25								

SDG 7:

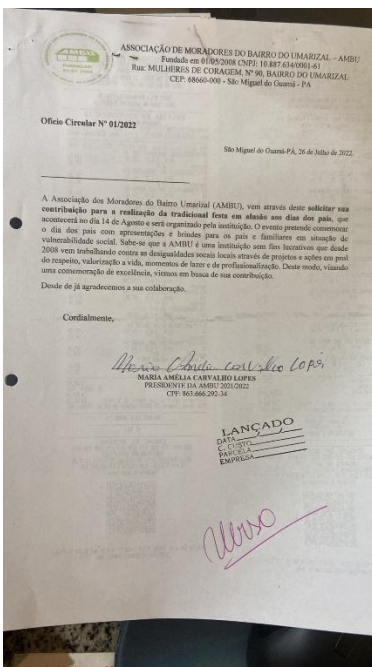
SUSTAINABLE
CARBON

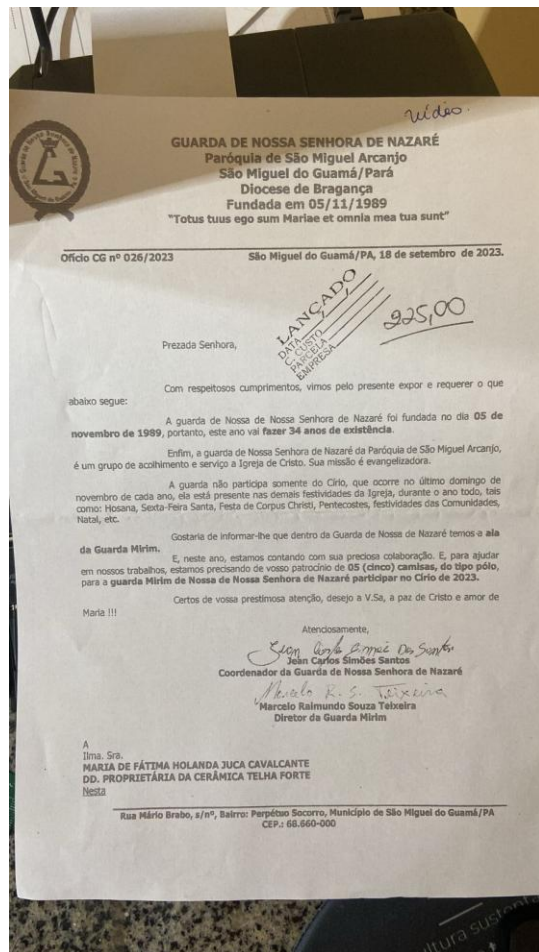
Biome	State	Project site	Project type	Amount of wood saved [m3/year]	Hectares saved (ha/year)	Hectares saved in this monitoring period	Hectares saved during the project lifetime
Amazon Biome	PA	Cenol	Fuel Switching	21,324	57	196	1,011
	PA	Telha Forte	Fuel Switching	44,425	120	409	2,106

SDG 8:



Other actions:





APPENDIX 3: SUPPLY CHAIN (SCOPE 3) EMISSIONS

Evidence of the public statement made by Cenol and Telha Forte Ceramics on their WhatsApp channel, which is the main communication channel of the ceramic facilities.

